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## LIST OF THE MEMBERS OF IIT COUNCIL
**(April 2008 – March 2009)**

### Name of the Representing Organization

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<th>Position</th>
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<tr>
<td>(A) The Minister-in-Charge of Technical Education in the Central Government (Ex-officio)</td>
<td>Chairman</td>
<td>Shri Arjun Singh, Hon’ble Minister of Human Resource Development, New Delhi</td>
</tr>
<tr>
<td>(B) Chairman of each institute (Ex-officio)</td>
<td></td>
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</tr>
<tr>
<td>(i) Kharagpur</td>
<td>Member</td>
<td>Shri B. Muthuraman, Chairman, BOG, IIT Kharagpur, Kharagpur – 721 302</td>
</tr>
<tr>
<td>(ii) Delhi</td>
<td>Member</td>
<td>Dr. V. S. Ramamurthy, Chairman, BOG, IIT Delhi, Delhi – 110 016</td>
</tr>
<tr>
<td>(iii) Delhi</td>
<td>Member</td>
<td>Dr. V. S. Ramamurthy, Chairman, BOG, IIT Delhi, Delhi – 110 016</td>
</tr>
<tr>
<td>(iv) Madras</td>
<td>Member</td>
<td>Dr. R. Chidambaram, Chairman, BOG, IIT Madras, Chennai – 600 036</td>
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<tr>
<td>(v) Kanpur</td>
<td>Member</td>
<td>Shri M. Anandakrishnan, Chairman, BOG, IIT Kanpur, Kanpur – 208 016</td>
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<tr>
<td>(vi) Guwahati</td>
<td>Member</td>
<td>Dr. M. K. Bhan, Chairman, BOG, IIT Guwahati, Guwahati – 781 039</td>
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<td>(vii) Roorkee</td>
<td>Member</td>
<td>Shri Jaiprakash Gaur, Chairman, BOG, IIT Roorkee, Roorkee – 247 667</td>
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<td>(C) Director of each Institute (Ex-officio)</td>
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<tr>
<td>(i) Kharagpur</td>
<td>Member</td>
<td>Prof. Damodar Acharya, Director, IIT Kharagpur, Kharagpur – 721 302</td>
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<tr>
<td>(ii) Delhi</td>
<td>Member</td>
<td>Prof. Surendra Prasad, Director, IIT Delhi, New Delhi – 110 016</td>
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<td>(iii) Bombay</td>
<td>Member</td>
<td>Prof. Devang Khakhar, Director, IIT Bombay, Mumbai – 400 076</td>
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<tr>
<td>(iv) Madras</td>
<td>Member</td>
<td>Prof. M. S. Ananth, Director, IIT Madras, Chennai – 600 036</td>
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</table>
| (v) Kanpur | 13. Prof. S. G. Dhande  
Director, IIT Kanpur  
Kanpur – 208 016 |
| (vi) Guwahati | 14. Prof. Gautam Baura  
Director, IIT Guwahati  
Guwahati – 781 039 |
| (vii) Roorkee | 15. Prof. S. C. Saxena  
Director, IIT Roorkee  
Roorkee – 247 667 |
| (D) Chairman, University Grants Commission (Ex-officio) | 16. Prof. Sukhdeo Throat  
Chairman, University Grants Commission  
Bahadurshah Zafar Marg  
New Delhi – 110 002 |
| (E) Director-General, Council of Scientific & Industrial Research (Ex-officio) | 17. Dr. T. Tamasami  
Director General  
Council of Scientific & Industrial Research  
Anusandhan Bhawan Rafi Marg  
New Delhi – 110 001 |
| (F) Chairman, Council of the Indian Institute of Science, Bangalore (Ex-officio) | 18. Dr. K. Kasturirangan  
Chairman, Indian Institute of Science  
Bangalore – 560 012 |
| (G) Director, Indian Institute of Science, Bangalore (Ex-officio) | 19. Prof. P. Balaram  
Director, Indian Institute of Science  
Bangalore – 560 012 |
| (H) Three Nominees of the Central Government | 20. Shri R. P. Agrawal  
Secretary, Department of Secondary & Higher Education Government of India  
Ministry of Human Resource Development  
Shastri Bhavan, New Delhi – 110 001 |
| (i) To represent Ministry concerned with Technical Education | 21. Ms. Sushma Nath  
Secretary, Department of Expenditure Government of India  
Ministry of Finance  
North Block, New Delhi – 110 001 |
| (ii) To represent Ministry of Finance | 22. Shri Jainerd Singh  
Secretary, Department of Information Technology Government of India, Ministry of Communication and Information Technology  
Electronics Niketan6, C.G.O. Complex  
New Delhi – 110 00 |
(I) Nominee of the All India Council for Technical Education (AICTE)

23. Prof. R. A. Yadav 
   Chairman, 
   AICTE, P. Estage. I.G. Sports Complex 
   New Delhi – 110 00

(J) Nominees of the Visitor (Nominated for a period of

24. Prof. C. N. R. Rao 
   Chairman 
   Scientific Advisory Council three years 
   w.e.f. 06.09.2006) to the Prime Minister

25. Prof. C. S. Seshadri 
   Director 
   Chennai Mathematical Institute, 
   Chennai 
   Plot H1, SIPCOT IT Park 
   Padur PO 
   Siruseri – 603 103

26. Prof. Sabyasachi Bhattacharya 
   Director, 
   Tata Institute of Fundamental Research 
   Homi Bhabha Road 
   Mumbai – 400 005

27. Dr. Kota Harinarayan 
   Chairman 
   Research Council of Central Scientific 
   Instrument Organization 
   Raja Ramana Fellow 
   National Aerospace Laboratory 
   P.O. No. 1779 
   Bangalore – 560 017

28. Shri Tarun Das 
   Member 
   Chief Mentor 
   Confederation of Indian Industry 
   Plot No. 249-F, Sector 18Udyog Vihar, 
   Phase IV, Gurgaon – 122 015 (Haryana)

(K) Three members of Parliament (two from Lok Sabha and one from Rajya Sabha)

29. Shri Milind Deora 
   Member of Parliament (Lok Sabha) 
   65, Lodhi Estate New Delhi – 110 003

30. Shri Ananta Nayak 
   Member of Parliament (Lok Sabha) 
   180, South Avenue New Delhi – 110 001

31. Shri B. J. Panda 
   Member of Parliament (Rajya Sabha) 
   2, Mahadev Road New Delhi – 110 001

(L) Secretary to the Council

32. Shri Ashok Thakur 
   Secretary 
   Additional Secretary (HE) 
   Department of Secondary & Higher Education 
   Government of India 
   Ministry of Human Resource Development 
   Shastri Bhavan, New Delhi – 110 001
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<tbody>
<tr>
<td>1.</td>
<td>Shri B. Muthuraman Chairman, BOG, IIT Kharagpur &amp; Managing Director Tata Steel Limited Jamshedpur 831 001</td>
<td>Chairman</td>
</tr>
<tr>
<td>2.</td>
<td>Shri R. P. Agrawal Secretary, Government of India Ministry of Human Resource Development Department of Higher Education Shastri Bhawan New Delhi -110 001</td>
<td>Member</td>
</tr>
<tr>
<td>3.</td>
<td>Prof. T. P. Singh Head of the Department (Bio-Physics) All India Institute of Medical Sciences (AIIMS) Ansari Nagar New Delhi 110 029</td>
<td>Member</td>
</tr>
<tr>
<td>4.</td>
<td>Dr. T. Ramasami Secretary, Department of Science and Technology Technology Bhawan New Mehrauli Road New Delhi 110 016</td>
<td>Member</td>
</tr>
<tr>
<td>5.</td>
<td>Prof. Prem Kumar Kalra Head, Department of Electrical Engineering Indian Institute of Technology Kanpur Kanpur 208 016</td>
<td>Member</td>
</tr>
<tr>
<td>6.</td>
<td>Shri Roopen Roy Managing Director Deloitte &amp; Touche Consulting India Pvt. Ltd. Bengal Intelligent Park, Building Alpha, 1st Floor Plot No. A2, M2 &amp; N2, BlockEP &amp; GP, Sector-V, Salt lake Electronics Complex Kolkata 700 091</td>
<td>Member</td>
</tr>
<tr>
<td>7.</td>
<td>Dr. Dhruv Prasad Director, Department of Science &amp; Technology Government of Bihar Patna 800 015</td>
<td>Member</td>
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<td>8.</td>
<td>Prof. O. N. Mohanty Vice-Chancellor Bijupatnaik University of Technology, Rourkela Camp Techno Campus CET Ghatikia, Kalinganagar Bhubaneswar 751 003</td>
<td>Member</td>
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9. Shri R. S. Sharma  
Principal Secretary  
Department of Science & Technology  
Government of Jharkhand  
Nepal House Doranda  
Ranchi 834 002

10. Prof. D. Acharya  
Director  
Indian Institute of Technology Kharagpur  
Kharagpur 721 302

11. Prof. P. P. Chakrabarti  
Department of Computer Science & Engineering  
Indian Institute of Technology Kharagpur  
Kharagpur 721 302

12. Prof. Sanat Kumar Roy  
Department of Metallurgical & Materials Engineering  
Indian Institute of Technology Kharagpur  
Kharagpur 721 302

13. Dr. D. Gunasekaran  
Registrar  
Indian Institute of Technology Kharagpur  
Kharagpur 721 302
**FINANCE COMMITTEE**

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<tr>
<td>1.</td>
<td>Shri B. Muthuraman Chairman, BOG, IIT Kharagpur &amp; Managing Director Tata Steel Limited Jamshedpur 831 001</td>
<td>Chairman</td>
</tr>
<tr>
<td>2.</td>
<td>Shri Sanat Kumar Ray Financial Adviser &amp; Joint Secretary Government of India Ministry of Human Resource Development Department of Higher Education Shastri Bhawan New Delhi 110 001</td>
<td>Chairman</td>
</tr>
<tr>
<td>3.</td>
<td>Joint Secretary (T) Government of India Ministry of Human Resource Development Department of Higher Education Shastri Bhawan New Delhi 110 001</td>
<td>Member</td>
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<td>4.</td>
<td>Shri Roopen Roy Managing Director Deloitte &amp; Touche Consulting India Pvt. Ltd. Bengal Intelligent Park, Building Alpha, 1st Floor Plot No. A2, M2 &amp; N2, Block EP &amp; GP, Sector-V, Salt lake Electronics Complex Kolkata 700 091</td>
<td>Member</td>
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<tr>
<td>5.</td>
<td>Prof. D. Acharya Director Indian Institute of Technology Kharagpur Kharagpur 721 302</td>
<td>Member</td>
</tr>
<tr>
<td>6.</td>
<td>Prof. P. P. Chakrabarti Department of Computer Science &amp; Engineering Indian Institute of Technology Kharagpur Kharagpur 721 302</td>
<td>Member</td>
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<td>7.</td>
<td>Dr. D. Gunasekaran Registrar Indian Institute of Technology Kharagpur Kharagpur 721 302</td>
<td>Secretary</td>
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# BUILDING AND WORKS COMMITTEE

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| 1. | Prof. D. Acharya  
Director  
Indian Institute of Technology Kharagpur  
Kharagpur 721 302 | Chairman |
| 2. | Director (T)  
Government of India  
Ministry of Human Resource Development  
Department of Higher Education  
Shastri Bhawan  
New Delhi 110 001 | Chairman |
| 3. | Shri D. K. Mitra  
Superintending Engineer & Circle Manager  
Midnapore Distribution Circle  
West Bengal State Electricity Distribution Co. Ltd. (WBSEDCL)  
190, S. K. Bose Road  
Midnapore 721 101  
Dist. : Paschim Medinipur | Member |
| 4. | Superintending Engineer  
South Western Circle  
Public Works Department (PWD)  
Saheed Mangal Pandey Sarani  
Midnapore 721 101  
Dist. : Paschim Medinipur | Member |
| 5. | Head  
Department of Civil Engineering  
Indian Institute of Technology Kharagpur  
Kharagpur 721 302 | Member |
| 6. | Head  
Department of Electrical Engineering  
Indian Institute of Technology Kharagpur  
Kharagpur 721 302 | Member |
| 7. | Head  
Department of Architecture & Regional Planning  
Indian Institute of Technology Kharagpur  
Kharagpur 721 302 | Member |
| 8. | Dr. D. Gunasekaran  
Registrar  
Indian Institute of Technology Kharagpur  
Kharagpur 721 302 | Secretary |
# LIST OF ADMINISTRATIVE HEADS

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<tr>
<td>Director</td>
<td>Prof. Damodar Acharya</td>
</tr>
<tr>
<td>Deputy Director</td>
<td>Prof. M. Chakraborty</td>
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<tr>
<td>Registrar</td>
<td>Dr. D. Gunasekaran</td>
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<td>Faculty &amp; Planning</td>
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<tr>
<td>Postgraduate Studies &amp; Research</td>
<td>Prof. P. K. J. Mohapatra</td>
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<td>Sponsored Research &amp; Industrial Consultancy</td>
<td>Prof. P. P. Chakrabarti</td>
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<td>Students' Affair</td>
<td>Prof. D. K. Tripathy</td>
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<td>Continuing Education</td>
<td>Prof. Ajay Chakraborty</td>
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<td>Alumni Affairs &amp; International Relations</td>
<td>Prof. Amit Patra</td>
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<td>Vinod Gupta School of Management</td>
<td>Prof. Proibir Kumar Gupta</td>
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<td>Prof. S. Srinivasan</td>
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## Head of Departments

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<td>Aerospace Engineering</td>
<td>Prof. Navtej Singh</td>
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<td>Agricultural &amp; Food Engineering</td>
<td>Prof. B. C. Mal</td>
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<td>Prof. Rajendra Singh</td>
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<td>Architecture &amp; Regional Planning</td>
<td>Prof. Arif N. Merchant</td>
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<tr>
<td>Biotechnology</td>
<td>Prof. A. K. Ghosh</td>
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<td>Chemical Engineering</td>
<td>Prof. Dibyendu Mukherjee</td>
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<td>Prof. Amar Nath Samanta</td>
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<tr>
<td>Chemistry</td>
<td>Prof. Amit Basak</td>
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<tr>
<td>Civil Engineering</td>
<td>Prof. P. K. Chattaraj</td>
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<tr>
<td>Computer Science &amp; Engineering</td>
<td>Prof. Indranil Sengupta</td>
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<td>Electrical Engineering</td>
<td>Prof. A. K. Sinha</td>
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<td>Electronics &amp; Electrical Communication Engineering</td>
<td>Prof. Debasish Datta</td>
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<td>Geology &amp; Geophysics</td>
<td>Prof. Ajay Chakraborty</td>
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<td>Mathematics</td>
<td>Prof. A. R. Roy</td>
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<td>Prof. J. Bhattacharyya</td>
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<td>Prof. R. N. P. Choudhary</td>
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## Head of Centres

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<td>Centre for Educational Technology</td>
<td>Prof. T. K. Basu</td>
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<td>Centre for Oceans, Rivers, Atmosphere and Land Sciences</td>
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<tr>
<td>Material Science</td>
<td>Prof. C. K. Das</td>
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<td>Prof. Basudam Adhikari</td>
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Reliability Engineering  Prof. R. B. Misra  Upto 31-08-2008  
Prof. V. N. Achutha Naikan  From 01-09-2008  
Rubber Technology  Prof. T. Chaki  
Rural Development  Prof. P. B. S. Bhadoria  
Computer & Informatics  Prof. Prabir Kumar Biswas  
Administrative Computer Service Support Centre  Prof. Rajib Mall  

Head of Schools  
G. S. Sanyal School of Telecommunication  Prof. S. Chakrabarti  
School of Information Technology  Prof. I. Sengupta  
School of Medical Science & Technology  Prof. A. K. Ray  Upto 03-03-2009  
Prof. Pranab Kumar Dutta  From 04-03-2009  
Vinod Gupta School of Management  Prof. Probir Kumar Gupta  Upto 12-06-2008  
Prof. S. Srinivasan  From 13-06-2008  
Rajiv Gandhi School of Intellectual Property Law  Prof. S. Tripathy  
Ranbir and Chitra Gupta School of Infrastructure Design and Management  Prof. K. S. Reddy  
School of Water Resources  Prof. S. N. Panda  

Chairmen & Vice-Chairmen  
UG Admissions  Prof. A. K. Ghosh  Upto 31-07-2008  
Prof. A. N. Samanta  From 01-08-2008  
Vice-Chairman, UG Admissions  Prof. A. N. Samanta  Upto 31-07-2008  
Prof. P. K. Dutta  From 01-08-2008  
PG Admissions  Prof. Biswajit Maiti  Upto 01-07-2008  
Prof. O. P. Sha  From 30-06-2008  
Vice-Chairman, PG Admissions  Prof. S. K. Barai  
Prof. Somesh Kumar  Upto 16-08-2008  
JAM  Prof. J. K. Ray  
Vice-Chairman, JAM  Prof. A. Chandrasekar  
Prof. Krishna Kumar  
Central Library  Prof. S. Sahu  
Hall Management Committee  Prof. Jayanta Pal  
Chairman, CWISS  Prof. P. K. Das  
Central Research Facility  Prof. Indranil Manna  
IIT-Optel Fibre Optics R&D Centre  Prof. Indranil Manna  
Rajbhasha Vibhag  Prof. P. D. Srivastava  
Nehru Museum of Science & Technology  Prof. D. Sen  
Kalpana Chawla Space Technology Cell (KCSTC)  Prof. Somnath Sengupta  
Advanced Technology Development Centre (ATDC)  Prof. P. P. Chakrabarti  

Professors-in-Charge  
Examinations  Prof. P. D. Srivastava  
Training & Placement  Prof. B. K. Mathur  
General Time Table  Prof. B. Mahanty  
Convocation-2008  Prof. S. K. Som  
Institute Information Cell  Prof. B. K. Mathur  
President, Technology Students Gymkhana  Prof. Manish Bhattacharjee  
Refrigeration & Air Conditioning  Prof. Sukanta Dash
Horticulture Prof. S. C. Kundu  
Water Works Prof. A. K. Gupta  
Civil Works (Construction and Maintenance) Prof. S. K. Bhattacharya  
Electrical Works Prof. Sabyasachi Sengupta  
Telecommunication Prof. R. V. Raja Kumar  
Institute Guest Houses Prof. B. K. Sengupta  
Intellectual Property Right & Industrial Relation Prof. S. Tripathy  

Prof. D. Das From 09.06.2008  

General  
Librarian Dr. B. Sutradhar  
Public Information Officer Dr. D. Gunasekaran  
Head, B.C. Roy Technology Hospital Dr. Tapan Kumar Ghosal  
Superintending Engineer (Civil) Dr. Nirmal Kumar Som  
Executive Engineer (Civil) Shri T. K. Mukherjee  
Executive Engineer (Electrical) Shri Sabyasachi Ghosh  
Security Officer Shri U. P. Singh  

Deputy Registrars  
Establishment Section Shri Atul Prakash Trivedi  
Academic Section Shri Nalini Ranjan Maiti  
Finance & Accounts Section Dr. Tapan Kumar Ghosal  
Estate Office Shri B. K. Basu Roychowdhury
THE SENATE

Director (Chairman) Prof. Damodar Acharya
Deputy Director Prof. Madhusudan Chakraborty

Department of Aerospace Engineering
Prof. Tarun Kumar Sarkar
Prof. Jayanta Kumar Ray
Prof. Pratim Kumar Chattaraj
Prof. Sujit Roy
Prof. Tanmaya Pathak
Prof. Tarasankar Pal
Prof. Amit Basak
Prof. Dipakranjan Mal
Prof. Debasish Ray
Prof. Manish Bhattacharjee
Prof. Suneel Kumar Srivastava

Department of Agricultural & Food Engineering
Prof. Keshaw Prasad Pandey
Prof. Bimal Chandra Mal
Prof. Rajendra Singh
Prof. Virendra Kumar Tewari
Prof. Kamlesh Narayan Tiwari
Prof. Rabindra Kumar Panda
Prof. Rintu Banerjee
Prof. Susanta Kumar Das
Prof. Bijoy Chandra Ghosh
Prof. Pratapbhanu Singh Bhadoria
Prof. Ashis Kumar Dutta
Prof. Hari Niwas Mishra
Prof. Narendra Singh Raghuwanshi
Prof. Sudhendra Nath Panda
Prof. Tridib Kumar Goswami

Department of Architecture & Regional Planning
Prof. Rabindranath Datta
Prof. Biplab Kumar Sengupta
Prof. Uttam Kumar Banerjee
Prof. Arif Noman Merchant

Department of Biotechnology
Prof. Subhas Chandra Kundu
Prof. Debabrata Das
Prof. Satyahari Dey
Prof. Ananta Kumar Ghosh
Prof. Amit Kumar Das

Department of Chemical Engineering
Prof. Dibyendu Mukherjee
Prof. Amar Nath Samanta
Prof. Sunando Dasgupta
Prof. Narayan Chandra Pradhan
Prof. Sirshendu De

Department of Chemistry
Prof. Panchanan Pramanik

Department of Electrical Engineering
Prof. Tapan Kumar Basu
Prof. Sarit Kumar Das
Prof. Avinash Kumar Sinha
Prof. Jayanta Pal
Prof. Soumitra Banerjee
Prof. Amit Patra
Prof. N. K. Kishore
Prof. Alok Barua
Prof. Goshaidas Ray
Prof. Siddhartha Mukhopadhyay
Prof. Siddhartha Sen
Prof. Pranab Kumar Dutta
Prof. Murari Mohan Bosukonda
Prof. Debapriya Das
Prof. Sabyasachi Sengupta
Prof. Tapas Kumar Bhattacharya

Department of Industrial Engineering & Management
Prof. Pratap Kumar Jagadev Mohapatra
Prof. Rabindra Nath Banerjee
Prof. Sadananda Sahu
Prof. S. Srinivasan
Prof. Biswajit Mahanty
Prof. Pradip Kumar Ray

Materials Science Centre
Prof. Ajit Kumar Banthia
Prof. Debasis Bhattacharya
Prof. Chapal Kumar Das
Prof. Basudam Adhikari
Prof. Shanker Ram

Department of Electronics & Electrical Communication Engineering
Prof. Ramesh Garg
Prof. Ajoy Chakraborty
Prof. Debasish Dutta
Prof. Ajoy Kumar Roy
Prof. Swapna Banerjee
Prof. Chinmay Kumar Maiti
Prof. Ratnam Varada Raja Kumar
Prof. Prabir Kumar Biswas
Prof. Somnath Sengupta
Prof. Mrityunjay Chakraborty
Prof. Sant Sharan Pathak
Prof. Subrata Sanyal
Prof. Dhrubes Biswas

Department of Geology & Geophysics
Prof. Sankar Kumar Nath
Prof. Biswajit Mishra
Prof. Anil Kumar Gupta
Prof. Debashish Sengupta
Prof. Abhijit Bhattacharya
Prof. Subhashis Tripathy
Prof. Anindya Sarkar
Prof. Subhashis Das

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Prof. Biswajit Mishra
Prof. Anil Kumar Gupta
Prof. Debashish Sengupta
Prof. Abhijit Bhattacharya
Prof. Subhashis Tripathy
Prof. Anindya Sarkar
Prof. Subhashis Das

G. S. Sanyal School of Telecommunications
Prof. Saswot Chakraborti

Department of Humanities & Social Sciences
Prof. Bani Chatterjee
Prof. Partha Basu
Prof. Hare Ram Tewari
Prof. Manas Kumar Mandal

Prof. Damodar Suar
Prof. Anjali Gera Ray
Prof. Kailash Bihari Lal Srivastava
Prof. Suhita Chopra Chatterjee

Department of Mathematics
Prof. Sudarsan Nanda
Prof. Syed Samsul Alam
Prof. Akhil Ranjan Roy
Prof. Parmeshwary Dayal Srivastava
Prof. Anjan Sarkar
Prof. Umesh Chandra Gupta
Prof. Mahendra Prasad Biswal
Prof. Dharmendra Kumar Gupta
Prof. Vinay Kumar Jain
Prof. Somnath Bhattacharyya
Prof. Adrijit Goswami
Prof. Somesh Kumar

Department of Mechanical Engineering
Prof. Amalendu Mukherjee
Prof. Brajendra Pradhan
Prof. Sankar Kumar Som
Prof. Venkata Varanasi Satyamurthy
Prof. Ranjit Karmaker
Prof. Samar Kumar Roy Chowdhury
Prof. Ranajit Kumar Brahma
Prof. Ajay Kumar Chattopadhyay
Prof. Souvik Bhattacharya
Prof. Ranjan Bhattacharya
Prof. Sukanta Kumar Dash
Prof. Prasanta Kumar Das
Prof. Amiya Ranjan Mohanty
Prof. Satish Nath Bhattacharya
Prof. Rathindranath Maiti
Prof. Biswajit Maiti

ANNUAL REPORT
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Prof. Soumitra Paul
Prof. Manas Chandra Ray
Prof. Ashish Kumar Nath
Prof. Subhransu Roy
Prof. Dilip Kumar Pratihar
Prof. Suman Chakraborty
Prof. Anirvan Dasgupta

Department of Metallurgical & Materials Engineering
Prof. Brij Kumar Dhindaw
Prof. Shyamal Kumar Pabi
Prof. Sanat Kumar Roy
Prof. Mahadev Malhar Godkhindi
Prof. Kalyan Kumar Ray
Prof. Sarat Chandra Panigrahi
Prof. Nirupam Chakraborty
Prof. Indranil Manna
Prof. Siddhartha Das

Department of Mining Engineering
Prof. S. Suryanarayana Bhamidipati
Prof. Ashis Bhattacharya
Prof. Karanam Uma Maheshwar Rao
Prof. Samir Kumar Das
Prof. Khanindra Pathak
Prof. Jayanta Bhattacharyya
Prof. Subir Kumar Mukhopadhyay

Department of Ocean Engineering & Naval Architecture
Prof. Suresh Chandra Misra
Prof. Subir Kumar Satsangi
Prof. Nisith Ranjan Mandal
Prof. Debabrata Sen
Prof. Om Prakash Sha

Department of Physics & Meteorology
Prof. Sobhendu Kumar Ghatak

Prof. Ram Naresh Prasad Choudhary
Prof. Naresh Chandra
Prof. Balbir Kumar Mathur
Prof. Biswas Kumar Samantaray
Prof. Shivcharan Lal Sharma
Prof. Anantharaman Chandrasekar
Prof. Srinivas Veeturi
Prof. Samit Kumar Ray
Prof. Arghya Taraphder
Prof. Krishna Kumar
Prof. Prabhu Krishna Raina

Reliability Engineering Centre
Prof. Ravindra Babu Mishra

Rubber Technology Centre
Prof. Anil Kumar Bhowmick
Prof. Deba Kumar Tripathy
Prof. Golok Behari Nando
Prof. Dipak Khastgir
Prof. Tapan Kumar Chaki

Vinod Gupta School of Management
Prof. Gautam Sinha
Prof. Kalyan Kumar Guin

Nominated Members
Dr. Bablu Sutradhar, Librarian
Prof. S. Srinivasan, Dean, VGSOM

Registrar (Secretary)
Dr. D. Gunasekaran

Students Representative
Sri Arnav (Roll No.: 05SI2012)
Sri Aashish Nawal (Roll No.: 05AG1002)
Sri Nitesh Chhatri (Roll No.: 07RE6010)
Sri Bal Govind Tiwari (Roll No.: 04PH9405)
DIRECTOR'S REPORT

IIT Kharagpur continued taking new strides towards emerging directions to further the growth and dissemination of scientific and technological knowledge during the year 2008-2009. Brief outlines of the major activities of the Institute during the year 2008-2009 are highlighted.

ACADEMIC PROGRAMMES

The Institute has been very sensitive to the human resource development of the country and to that end continues initiating new academic programmes.

During the year 2008-2009, two new M. Tech. programmes, one in Infrastructure Design and Management and the other in Water Management were introduced. Also, two new five-year dual degree programmes, one in Engineering Entrepreneurship and the other in Financial Engineering, is being introduced. The Institute is introducing joint M.Sc.-Ph.D., joint M.S.-Ph.D. and joint M.Tech.-Ph.D. programmes in order to motivate young and aspiring students to join the Ph.D. programmes in large numbers that will accelerate the research activities.

Opening of the new Schools of Engineering Entrepreneurship, Bioscience, Energy, Quality Engineering Design and Manufacturing, and Nanoscience are also under active consideration.

The Institute has installed an interactive course management software system for uploading lecture notes, questions and answers that will help both the teachers and students in the teaching-learning process. For improving the quality of research, the Institute has already prepared documents on research policy, research ethics, maintenance of research data and records, and various guidelines for preparing research documents. It has put in place on-line research information system for both Ph.D. and MS students.

The Institute has prepared a perspective plan to address issues related to increase in students strength. Accordingly, all facilities and infrastructure are being upgraded. For the academic year 2009-2010, the Institute has increased its student intake by 30 percent of the base year figure of 2007-2008. The Institute shall also increase the student intake in the academic year 2010-2011.

The Institute is presently offering B.Tech. (Hons.) programmes in fifteen different branches of engineering, a B.Arch. (Hons.) programme in Architecture, thirty-five Dual Degree programmes, seven Integrated M.Sc. programmes, six two-year M.Sc. programmes, fifty-two postgraduate degree programmes leading to M.Tech., MCP, MBM, and MMST degrees besides an LLB degree and one postgraduate diploma. The curricula and syllabi of these programmes are constantly revised to meet the needs of the changing world with focus on quality and excellence. In the recent undergraduate curricula revision, Bioscience and Environmental Science as compulsory subjects have been included considering their importance.

CONVOCATION

Fifty-fourth Convocation of the Institute was held on 25th July 2008. Dr. Anil Kakodkar, Chairman of Atomic Energy Commission of India, was the Chief Guest. In the Convocation, 167 Ph.D., 37 MS, 611 M.Tech. 23 MCP, 121 MBA, 168 Dual Degree, 09 MMST, 76 PGDIT, 03 PGDMOM, 06 PGDRD, 12 PGDIPL, 11 PGDTNM, 99 PGDBA, 22 PGDST, 08 PGDM, 196 M.Sc 323 B.Tech. (Hons.) and 10 B.Arch. (Hons.) degrees were conferred. Shri Rithe Rahulkumar Jagdish, of the Department of Electronics and Electrical Communication Engineering was the recipient of President of India Gold Medal for the best academic performance among the outgoing B.Tech. (Hons.) and B.Arch. (Hons.) students. Shri Indrajit Mal of the Department of Metallurgical and Materials Engineering won the Dr. Bidhan Chandra Roy Memorial Gold Medal for the best all-round performance among the B.Tech. (Hons.) and B.Arch. (Hons.) outgoing students. The Prime Minister of India Gold Medal for the best academic performance among the Dual degree and Integrated M.Sc. outgoing students went to Shri Goparaju Sreechakra of the Department of Electronics and Electrical Communication Engineering. Dr. Jnan Chandra Ghosh Memorial Gold Medal for the best all-round performance among the outgoing Dual Degree and Integrated M.Sc. students was awarded to Shri Kumar Puspesh of the Department of Computer Science and Engineering. Shri Arjun Sengupta of the Department of Chemistry won the Professor Jagdish Chandra Bose Memorial Gold Medal for the best academic
In the fifty-fourth Convocation, the Senate and the Board of Governors of the Institute conferred the highest honour, Doctor of Science (Honoris Causa), on Dr. A. P. J. Abdul Kalam, Dr. Asit K. Biswas, Lord S. K. Bhattacharya, Dr. Anil Kakodkar and Shri Brijmohan Lall Munjal. Dr. A. P. J. Abdul Kalam is conferred for providing outstanding leadership in guiding the Nation towards all-round progress with particular emphasis on science, technology and human resource development, Dr. Asit K. Biswas is awarded for his pioneering contribution to management of water resources, Lord S. K. Bhattacharya is awarded for his remarkable innovations in the field of manufacturing science, Dr. Anil Kakodkar is conferred for his extra-ordinary contribution and leadership to nuclear reactor technology and Shri Brijmohan Lall Munjal is awarded for his unparalleled contribution to the economic growth through manufacturing of affordable two-wheelers in the Country.

In the Convocation, to recognize the significant contributions of eminent individuals, alumni and well-wishers, the Senate and the Board of Governors of the Institute conferred Distinguished Alumnus Awards. The awards were conferred on Dr. Anil K. Malhotra, Regional Energy Adviser for Asia Region in the World Bank; Dr. Duvvuri Subbarao, Finance Secretary and Secretary, Department of Economic Affairs, Government of India; Dr. Pradip K. Roy, Founder and CTO, Neopad Technologies Corporation and Shri Santanu Mohapatra, eminent Music Composer and Director.

RESEARCH AND DEVELOPMENT ACTIVITIES

The Institute, besides producing world-class graduates, has also proven to be a knowledge powerhouse of global reckoning and gained the confidence of industrial houses, both domestic and international. The various academic departments, centers, schools and research programs work across traditional academic boundaries to promote research and teaching that is interdisciplinary, collaborative and groundbreaking. The researchers and the educators of the Institute find innovative answers to society’s needs, focusing particularly on energy and environment, health and well-being, infrastructure and information management. IIT Kharagpur benefits greatly from the Institute’s longstanding ties with government agencies, foundations and corporate partners.

Over the years IIT Kharagpur has gained special expertise in advanced chip design and CAD for VLSI and MEMS including in areas like formal verification where it works hand in hand with international organizations. The areas of software development, planning, management and ERP are core capabilities of the Institute. The large gamut of specialized software technologies developed in the Institute include power management software used by Power Grid Corporation, telemedicine software, communication empowerment software for physically challenged, software for medical measurements, and tools for security and biometric authentication. Other important software packages developed include bond-graph based technology used for analysis of dynamics by companies within and outside the country, a biomechanics simulator that is now deployed in industry, and a fluid mechanics and ocean dynamics based software for storm surge measurements that has been deployed in several countries. ERP software has been developed and deployed in Coal India, Neyveli Lignite Corporation, and other organizations. Research work is also going on for development of MEMS based accelerometers for aerospace applications and design automation of analog VLSI. A Mission Project for development of Virtual Labs involving premier Institutes of the nation has been initiated this year.

The Institute has a long-standing focus on Life Sciences research with special emphasis in medical science and technology. Artificial heart development program is undergoing phase II, a unique male contraceptive, RISUG, is undergoing the third phase of trials and research work on development of a medical expert system is also going on. Interdisciplinary research is being carried out in areas of non-invasive measurements, advanced image processing, medical implants, protein structure analysis and drug design, orthopedic biomechanics and brain research. Green technology routes have produced unique protocols for insect resistant cotton, jute, bio-hydrogen, separation and purification of anti-carcinogenic components from green tea leaves. Research in biotechnology has resulted in a number of high quality enzymatic processes for a variety of food technologies. Research work is being carried out on high pressure processing on high-value perishable commodities, development of novel nano-biocomposite osteogenic matrices for cell-based bone...
tissue engineering, production of pure variety disease-free potato seeds through in-vitro culture technique and design and development of non-invasive blood glucose measuring system.

The major research initiatives in nanotechnology and nano-materials include unique microstructures prepared from gelcast ceramics, nano-composites, nano-wires, semiconductors and metal alloys. The MEMS group has made significant contributions to national research programs of ISRO and DRDO by development of advanced accelerometers, gyros, micro-valves, etc. The area of micro-fluidics and bio-nano-mems has developed new techniques for DNA hybridization and micro-scale cooling for electronic components. The Institute has special expertise in advanced plasma technologies and plasma based materials that are being used for advanced research for industrial, strategic and biomedical areas. The Institute has been recognized with a special research program in microfabrication and fabronics with support from Indo-US Science & Technology Forum.

The vibrant energy research programs at IIT Kharagpur also include fuel cell based systems and energy materials, production of renewable hydrogen combined with Carbon dioxide capture to address global warming and energy production. The current ongoing research activities in mechanical sciences include thermal engineering, CFD, motion and vibration dynamics, robotics, and robot development. The Institute has developed state-of-the-art cutting tools comparable to the best available worldwide. Prototype vehicle development activities include development of a large autonomous underwater vehicle, fault-tolerant micro-aero vehicle, hovercraft and electric vehicles.

Industryacademia partnership at IIT Khargpur is thriving with industrial organisations forming partnerships in joint research projects, acquiring technologies developed in the Institute, and seeking consultancy supports from the Institute. Some of the major research initiatives in recent years include Steel Technology Center, major R&D Centers in Energy Sector in collaboration with DVC, Tea Engineering Research Center, Vodafone-Essar-IIT Kharagpur Centre of Excellence in Telecommunications, National Program in Marine Hydrodynamics, Centre of Excellence in Information Assurance, National facilities for EPMA, General Motors Collaborative Research Laboratory in Electronics Controls and Software (ECS) and a Regional Center for Rural Technology Action Group (RUTAG), and National Agriculture Innovation Programme.

INFRASTRUCTURE DEVELOPMENT

In order to cope with the rapid advances in science and technology, the infrastructure and experimental facilities require constant modernization. During the last year, several new scientific equipment have been acquired and installed and new facilities created in the Departments, Centers and Schools. A Molecular Beam Epitaxy System has been set up in the Advanced Technology Development Centre for carrying out research in the field of micro electronics; a Direct Metal Laser Sintering based Rapid Prototyping Machine has been set up in the Department of Mechanical Engineering for carrying out research in the field of fabrication of metal prototypes and biomedical implants; SMPS SQUID Magnetometer is being set up in the Central Research Facility for carrying out research in the field of magnetic materials, and a Bench Top Triple Quadrupole MS/MS System has been set up in the Department of Biotechnology for carrying out research in the field of plant biotechnology.

The continuously growing campus needs constant revamping and augmentation of facilities. To this end, the Institute has taken several actions. Two new Halls of Residence for boys of 2,000 capacity each are being constructed. Construction for one has started and the other will start soon. Construction of new students' blocks in two existing Halls of Residence and construction of one additional floor in three existing Halls of Residence are nearing completion. Arrangements have been made for the construction of Sir J. C. Ghosh Science Block and P.C. Roy Laboratory Block for Chemistry Department and Rubber Technology Centre. The construction for the new class room complex with 30 class rooms of 120 capacity each and 100 class rooms of 60 capacity each will start in next two months. The construction of 100-room guesthouse is on the verge of completion. The construction works for 63 A-type flats and 81 B-type flats are going on for augmenting faculty housing. Arrangements have been made for the construction of 64 2-BR type and 80 1-BR type of flats for staff housing. The extension programme for the Vikram Sarabhai Residential Complex is in the process. Keeping pace with the increased strength of students, different measures have been taken for augmentation of power supply system and revamping of the power distribution system. Some of these are: augmentation of the 33 kV substation to 17.6 MVA, doubling the capacities of all distribution substations and all overhead power lines are converted to underground cable lines. To meet the additional water demand from the increased student and faculty strength, the Institute has taken up several works that are in progress.
INTERNATIONAL COLLABORATION

Accelerated progress in many of the endeavors of the Institute are possible only through active collaboration. The Institute has several collaborations in different areas of research and development, faculty and student exchange programmes. Collaborations at different levels are going on with several universities and institutes of repute.

In the last year, the Institute has signed MOU for academic and research activities with UC Berkeley, USA, University of Rome, RWTH, Germany, Berlin Institute of Technology, Germany, University of Southampton, UK, Leibniz University, Germany, The University of Warwick, UK, University of Tokyo, Japan, Lulea University of Technology, Sweden, University of Utah, USA, University of Western Ontario, Canada, Politecnico di Milano, Italy, National University of Singapore. The Institute has entered into MOU on research and IPR creation with reputed industries including Microsoft, National Semiconductor and TOTAL.

SPONSORED RESEARCH AND INDUSTRIAL CONSULTANCY

IIT Kharagpur benefits greatly from the Institute's longstanding ties with government agencies, foundations and corporate partners. Many technology-intensive and industrial houses are increasingly forming partnerships in joint research projects, acquiring technologies developed in the Institute and seeking consultancy supports from the Institute. Collaborations are also going on with Intel, National Semiconductors, Synopsys, Microsoft, General Motors, Orrick, National Oceanic and Atmospheric Administration of USA, and Geological Survey of Japan, SHELL International & Exploration BV of The Netherlands, DAV Norway and Texas Instruments of USA. During the year 20082009, the Institute received from the Government, private and international funding agencies 167 research projects for a total value of Rs. 158 crores and 142 consultancy projects worth Rs. 13 crores aggregating to a total of 309 projects for Rs.171 crores.

The Intellectual Property Rights and Industrial Relations (IPR & IR) Cell under SRIC is responsible for the licensing and the transfer of technologies developed by faculty members, students and other researchers at IIT Kharagpur to the commercial sector. The technologies developed at IIT Kharagpur are showcased to an audience of small and medium scale industries (SME) during IndAc 2009 in Kolkata during March 2009 culminating in a number of technology transfers and licensing. IIT Kharagpur also has a long tradition of protecting inventions and has received numerous patents over the years.

STEP IIT KHARAGPUR

Innovation is a step towards of growth and its sustainability. Science and Technology Entrepreneurs Park (STEP), IIT Kharagpur is nodal center for innovation. It works towards translating some of the research outcomes of IIT to commercially viable products. STEP IIT Kharagpur provides a single-window facility for turning individuals with science and technology background into successful entrepreneurs. At present, twenty-five companies are under incubation programme at STEP IIT Kharagpur and its Gopali campus. A global venture laboratory, in collaboration with the Jyvaskyla University, Finland and the University of California Berkeley, has been initiated at STEP to further improve the skills of the budding entrepreneurs.

CONFERENCES, SYMPOSIA, SEMINARS AND WORKSHOPS

The Institute lays great emphasis on knowledge dissemination, and encourages organization of conferences, symposia and workshops. The last year saw Departments, Centers and Schools of the Institute organizing many such activities which attracted a large number of participants from India and abroad.

The Department of Architecture and Regional Planning organized the “36th IAHS World Congress on Housing Science” at Kolkata. An International Workshop on “Biomaterials for Tissue engineering and Biotechnological Applications” was organized by the Department of Biotechnology. The Department of Computer Science and Engineering has organized “5th International Conference on Distributed Computing & Internet Technology”, “International Conference on Contemporary Computing” and “International Conference on Information Technology”. The Department also organized “International Summer School on NLP and Text Mining”. “IEEE 2009 International Conference on Industrial Technology” has been organized by the Department of Electrical Engineering. The Department of Electronics and Electrical Communication
Engineering has organized “International Conference on Cryptology” and “International Conference on Industrial Information System”. The Department of Geology & Geophysics organized a symposium on “Indo-US Frontier of Science”. The Department also organized the Second meeting of Asian Current Research on Fluid Inclusions. The Materials Science Centre has organized the “International Conference of High-Tech Materials”. The Department of Mechanical Engineering has organized “Indo-US Workshop on Microfluidics and Fabrionics”. The Department of Metallurgical & Materials Engineering has organized the “International Conference on Advanced Materials and Processing”. “9th International Conference on Vibration Problems” has been organized by the Centre for Theoretical Studies.

The Department of Agricultural and Food Engineering organized a National Meet of Tractor and Allied Machinery Manufacturers and a workshop on “Farm Implements and Machinery”. The Department of Chemical Engineering has organized a conference on “Plasma Technology for Biomedical Application”. Symposium on “Chemistry and Physics of Materials and Fluids” and the “Sixth National Symposium in Chemistry” have been organized by the Department of Chemistry. National Seminar on “Trans-historian Configurations : Colonial Past & Post Modern Futuresin USA and India” and a Workshop on “Industrial Relations in India” have been organized by the Department of Humanities and Social Sciences. National Workshop on “Some Recent Research Directions in Graph Theory” has been organized by the Department of Mathematics. A workshop on “Technology in Health Care: Prospects and Challenges” has been organized by the School of Medical Science and Technology. Rubber Technology Centre has organized the “India Rubber Expo 2009”.

CONTINUING EDUCATION PROGRAMME

The Continuing Education Programme constitutes an important activity of the Institute. Over the years, it has diversified in terms of coverage of disciplines, duration of programme, the level of the programmes, and the types of industry served. During the last one year, with AICTE support, twenty-one teachers from various engineering colleges have obtained their Doctoral degree and thirteen teachers their Master's degree. Seventeen teachers have enrolled for the Ph.D. programme, while eighteen teachers have taken advance admission to the Ph.D. programme. Ninety-six short-term courses, both on-campus as well as off-campus, have been conducted for professionals employed in industry and R&D organizations. Last year, 3,058 participants were awarded certificates on completion of the course works. The Institute also conducted 22 summer and winter courses under the staff development programme of AICTE, MHRD.

The CEP is in the process of starting part-time M.Tech. programmes in Computer Science and Engineering, Electronics and Electrical Communication Engineering and Electrical Engineering at its Kolkata and Bhubaneswar extension centres, primarily for faculty members of AICTE-sponsored engineering colleges. The CEP is also associated with the national mission on education through information and communication technology. IIT Kharagpur is the lead institute in the creation of virtual laboratories.

LAURELS AND DISTINCTIONS

In their quest for excellence, teachers and students of IIT Kharagpur have been receiving awards and honours, laurels and distinctions. This year, too, faculty members have been honoured with prestigious awards and were elected as Fellows of the National Science Academy and Indian National Academy of Engineering.

Prof. Sunando DasGupta of the Department of Chemical Engineering and Prof. Jayanta Mukhopadhyay of the Department of Computer Science and Engineering have been elected as Fellows of the Indian National Academy of Engineering. Prof. Suman Chakraborty and Prof. P. K. Das of the Department of Mechanical Engineering have also been elected as Fellows of the Indian National Academy of Engineering. Prof. Indranil Manna of the Department of Metallurgical and Materials Engineering has been awarded the INAE Visvesvarya Chair Professorship for the year 2009. Prof. S. K. Sen of the Advanced Laboratory for the Plant and Genetic Engineering has been invited to join as Fellow of the National Academy of Agricultural Sciences. Dr. Goutam Saha of the Department of Electronics and Electrical Communication Engineering won the prestigious “Innovators' Competition” for DST-Lockheed Martin India Innovation Growth Programme 2009.

Prof. Suman Chakraborty of the Department of Mechanical Engineering received the Scopus Young Scientist in Engineering Award for the year 2008. Prof. Sunando DasGupta of the Department of Chemical Engineering
has been awarded the IIChE Award for the year 2008. He has also been appointed a Senior Associate of the Abdus Salam International Centre for Theoretical Physics, Italy. Prof. Jayanta Bhattacharya of the Department of Mining Engineering has received the John Dunn Medal for 2007-2008. Prof. Khanindra Pathak of the same Department has been awarded the Bala Tandon Gold Medal of MGMI for 2007-2008. Prof. Subir Kumar Mukhopadhyay and Dr. Debasis Deb of the Department of Mining Engineering received the Hindustan Zinc Gold Medals. Dr. Karabi Das of the Department of Metallurgical and Materials Engineering has been awarded the MRSI Medal for 2009. Prof. Abhijit Bhattacharya of the Department of Geology and Geophysics received the National Mineral Award. Dr. Sudip Misra of the School of Information Technology received the India Swarna Jayanti Puraskar 2008 from the National Academy of Sciences. Dr. Madan Kumar Jha of the Department of Agricultural and Food Engineering received the Shankar Memorial Award from the Indian Society of Agricultural Engineers. Dr. Debdeep Mukhopadhyay of the Department of Computer Science and Engineering has received the Techno-Inventor Award from Indian Semiconductor Association. Dr. Sanjeev Kumar Srivastava of the Department of Physics and Meteorology received the Young Physicist Award 2008 from The Indian Physical Society.

ALUMNI AFFAIRS
The alumni of the Institute have played a significant role in facilitating increased interaction of IIT Kharagpur in India and abroad. This year's Nina Saxena Excellence in Technology Award, instituted in memory of Dr. Nina Saxena, B.Tech. (Hons.), ECE 1992, for technical innovation was awarded to Dr. Subhash P. Andey, Scientist, Geo-Environment Management Division, NEERI, Nagpur. The New Year brought together the alumni of the Institute in the Sixth Annual Alumni Meet 2009. The Meet was organized for the graduates of 1959 and 1984. During the year, several alumni including the 1966-1971 Class of Architecture Students visited the Institute. Prof. Lord Sushantha Kumar Bhattacharyya, Director, Warwick Management Group, Warwick was the Chief Guest on 18th August 2008, the Institute Foundation Day. Sri Ranbir Singh Gupta, with whose bequest the Ranbir and Chitra Gupta School of Infrastructure Design and Management was created and Dr. Prabhakant Sinha, Educator, entrepreneur and thought leader also visited the Institute.

TRAINING AND PLACEMENT
The Training and Placement Section of the Institute is actively engaged in forging synergistic relationships between the Institute and various industrial organizations and employers of technical and scientific manpower. During 2008-2009, 135 companies and organizations visited the campus for taking placement interviews. In addition, 14 others preferred to have telephonic interview, video conference or called the students for interviews to their offices. This year the placement undergraduate students has been 78%, while that of the postgraduate students has been 49%. Harnessing student power has been very fruitful and students effectively ensured that placement programmes were run continuously as per schedule during the placement process. A total of 103 companies have offered summer training to the students of the Institute, and 48 of them provided financial assistance. Last year 400 students of the Institute have taken summer training in countries outside India. A Deferred Placement Programme exists in the Institute to boost entrepreneurship amongst graduating students. The idea behind such a programme is to encourage students to take up entrepreneurial ventures while simultaneously offering them a safety net in case the venture does not take off.

STUDENTS’ AFFAIRS
In pursuit of excellence and giving life a meaningful direction, Technology Students Gymkhana of IIT Kharagpur works towards personality development of IIT students by infusing in them a spirit of constructive co-operation, leadership qualities and organizational capabilities. This is being achieved by involving them in a wide spectrum of sports and games as well as social, cultural and technological activities throughout the year. The year 2008-2009 was also full of activities and achievements and proved to be matching the high standards of organizational and leadership capabilities of the students of the Institute.

The 44th Inter-IIT Sports Meet began with Inter-IIT Aquatic Meet, which was held during October 6 to 9, 2008 at IIT Madras. IIT Kharagpur students secured 3rd position in Swimming. The second phase, which included all other games, was held from December 11 to 17, 2008. IIT Kharagpur students secured Silver Medals in Badminton, Athletics, Basketball and Men's Table Tennis. The Inter-Hall Aquatic Competitions were held in August 2008 and the Inter-Hall Athletics Meet was held from 14th to 15th November 2008.

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This year, Technology Students' Gymkhana organized SHAURYA, an Inter-College Sports Meet, from 31st October to 3rd November 2008 in which Basketball, Tennis, Volleyball, Hockey and Table Tennis competitions were held. St. Xaviers, Ranchi, KIIT Bhubaneswar, Marine Engineering College, Kolkata, NIIT Rourkela, and IIT Kharagpur took part in SHAURYA.

The Annual Socio-Cultural Festival, SPRING FEST-2009, celebrated its golden jubilee during January 22 to 25, 2009. This year, Spring Fest witnessed overwhelming participation from various prestigious colleges across the Country including international participants from New Zealand, Belgium, Netherlands, Tunisia, Brazil and Poland. Students took part in a complete new genre of competitive events like Youth Flick quiz, Fusion Fiesta, SF Karaoke and Twisted Grades. Maestros like Krishna Kumar, Pandit Chitresh Das, Grammy Award winner Jason Samuels, Pandit Vakil's Rhythm Riders and Led Zepplica a California based Rock Band captivated the audience.

KSHITIJ the annual Techno-Management Fest was organized from 29th January to 1st February 2009. Around 5,000 students from various colleges of India and abroad took part in various competitive events like Business Plan, Advertisement Designing, Case Studies, Paper Presentations, Computer Programming, and Robotics. Students came up with innovative designs for the Kharagpur Railway Station, as a part of the 'The Grand Central' event. Presence of stalwarts from scientific, technical and managerial domains like Mr. Prahlad Kakkar, Mr. Philip Emeagwali, the Father of Internet, Nobel Laureate Kurt Wuthrich, Prof. Chandra Lalwani from Hull University, Pioneer S. K. Shivkumar, Prof. Chandra Wickramasinghe, Emmy Award winner Jeremy Bristow NASA's Christopher McKay were the star attractions of the Fest. Technical Exhibitions and Workshops on Forensic Sciences, Financial Risk Management, Mind Reading Machines and Solar Robotics were also held during the fest.

This year, eight Institute Blues and five Orders of Merit have been awarded to the outgoing students for their outstanding achievements in sports and games, social, cultural, and technological activities.
PART - I

DEPARTMENTS, CENTRES AND SCHOOLS
DEPARTMENTS, CENTRES AND SCHOOLS

IIT Kharagpur is a wholly residential Institute with a large campus spread over an area of approximately 600 hectares. It has a student population of approximately 6700. The sanctioned faculty strength of the Institute is 511. As per faculty : students ratio of 1 : 10, the faculty strength has to be increased to 670.

The Institute has 19 Departments, 7 Centres and 7 Schools. These are:

**Departments**


**Centres**

Centre for Educational Technology, Centre for Oceans, Rivers, Atmosphere and Land Sciences, Cryogenic Engineering, Materials Science, Reliability Engineering, Rubber Technology and Rural Development.

**Schools**

G. S. Sanyal School of Telecommunications, Rajiv Gandhi School of Intellectual Property Law, School of Information Technology, Ranbir and Chitra Gupta School of Infrastructure Design and Management, School of Medical Science and Technology, School of Water Resources and Vinod Gupta School of Management.
<table>
<thead>
<tr>
<th>COURSES OFFERED BY DEPARTMENTS, CENTRES AND SCHOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Strength 511</td>
</tr>
<tr>
<td>as on 31.03.2009</td>
</tr>
</tbody>
</table>

### Aerospace Engineering
- B.Tech. (Hons.) - Aerospace Engineering
- Dual Degree - Aerospace Engineering
- Dual Degree - Aerospace Engineering / MBA
- M. Tech. - Aerospace Engineering
- Ph.D.

### Agricultural and Food Engineering
- B.Tech. (Hons.) - Agricultural & Food Engineering
- Dual Degree - Agricultural & Food Engineering / Farm Machinery & Power
- Dual Degree - Agricultural & Food Engineering / Soil and Water Conservation Engineering
- Dual Degree - Agricultural & Food Engineering / Dairy & Food Engineering
- Dual Degree - Agricultural & Food Engineering / Water Resources Development & Management
- Dual Degree - Agricultural & Food Engineering / Aqua Cultural Engineering
- Dual Degree - Agricultural & Food Engineering / Agricultural Systems & Management
- Dual Degree - Agricultural & Food Engineering / Post Harvest Engineering
- Dual Degree - Agricultural & Food Engineering / MBA
- M. Tech. - Farm Machinery & Power
- M. Tech. - Soil and Water Conservation Engineering
- M. Tech. - Dairy and Food Engineering
- M. Tech. - Applied Botany
- M. Tech. - Water Resources Development & Management
- M. Tech. - Aqua Cultural Engineering
- M. Tech. - Agricultural Systems & Management
- M. Tech. - Post Harvest Engineering
- Ph.D.

### Architecture and Regional Planning
- B.Arch.(Hons.)
- MCP
- Ph.D.

### Biotechnology
- B.Tech.(Hons.) - Biotechnology & Biochemical Engineering
- Dual Degree - Biotechnology & Biochemical Engineering
- Dual Degree - Biotechnology & Biochemical Engineering / MBA
- M. Tech. - Biotechnology and Biochemical Engineering
- Ph.D.

### Chemical Engineering
- B.Tech.(Hons.) - Chemical Engineering
- Dual Degree - Chemical Engineering
- Dual Degree - Chemical Engineering / MBA
- M. Tech. - Chemical Engineering
- Ph.D.
### Chemistry
M.Sc. - Industrial Chemistry  
M.Sc. (2 yr) - Chemistry (up to 2008 admissions)  
M.Sc.- Ph.D. Dual Degree in Chemistry (with effect from 2009 admissions)  
Ph.D.

### Civil Engineering
- **B.Tech. (Hons.) - Civil Engineering**  
- Dual Degree - Civil Engineering / Hydraulics & Water Resources Engineering  
- Dual Degree - Civil Engineering / Transportation Engineering  
- Dual Degree - Civil Engineering / Geotechnical Engineering  
- Dual Degree - Civil Engineering / Structural Engineering  
- Dual Degree - Civil Engineering / Environmental Engineering  
- Dual Degree - Civil Engineering / MBA  
- Dual Degree - Civil Engineering / Infrastructural Civil Engineering  
- M. Tech. - Hydraulics & Water Resources Engineering  
- M. Tech. - Transportation Engineering  
- M. Tech. - Environmental Engineering & Management  
- M. Tech. - Geotechnical Engineering  
- M. Tech. - Structural Engineering  
- Ph.D.

### Computer Science and Engineering
- **B.Tech. (Hons.) - Computer Science & Engineering**  
- Dual Degree - Computer Sc. & Engineering / Computer & Information Technology  
- Dual Degree - Computer Sc. & Engineering / MBA  
- M. Tech. - Computer Science and Engineering  
- Ph.D.

### Electrical Engineering
- **B.Tech. (Hons.) - Electrical Engineering**  
- B.Tech. (Hons.) - Energy Engineering  
- B.Tech. (Hons.) - Instrumentation Engineering  
- Dual Degree - Electrical Engineering / Machine Drives & Power Electronics  
- Dual Degree - Electrical Engineering / Control System Engineering  
- Dual Degree - Electrical Engineering / Power System Engineering  
- Dual Degree - Electrical Engineering / Instrumentation Engineering  
- Dual Degree - Energy Engineering / Machine Drives & Power Electronics  
- Dual Degree - Energy Engineering / Power System Engineering  
- Dual Degree - Instrumentation Engineering / Control Systems Engineering  
- Dual Degree - Electrical Engineering / MBA  
- Dual Degree - Energy Engineering / MBA  
- Dual Degree - Instrumentation Engineering / MBA  
- M. Tech. - Machine Drives & Power Electronics  
- M. Tech. - Control System Engineering  
- M. Tech. - Power System Engineering  
- M. Tech. - Instrumentation  
- Ph.D.

### Electronics and Electrical Communication Engineering
- **B.Tech. (Hons.) - Electronics & Electrical Communication Engineering**  
- Dual Degree - Electronics & Electrical Communication Engineering / Fibre Optics and Lightwave Engineering
Dual Degree - Electronics & Electrical Communication Engineering / Microelectronics & VLSI Design
Dual Degree - Electronics & Electrical Communication Engineering / RF and Microwave Engineering
Dual Degree - Electronics & Electrical Communication Engineering / Visual Information & Embedded System
Dual Degree - Electronics & Electrical Communication Engineering / Telecommunications System Engineering
Dual Degree - Electronics & Electrical Communication Engineering / MBA
M. Tech. - Microelectronics & VLSI Design
M. Tech. - RF and Microwave Engineering
M. Tech. - Telecommunication Systems Engineering
M. Tech. - Visual Information and Embedded Systems Engineering
Ph.D.

Geology and Geophysics 23
M.Sc. - Exploration Geophysics
M.Sc. - Applied Geology
M.Sc.(2 yr) - Geophysics (upto 2008 admissions)
M.Sc.(2 yr) - Geological Sciences (upto 2008 admissions)
M.Sc.- Ph.D. Dual Degree in Geophysics (with effect from 2009 admissions)
M.Sc.- Ph.D. Dual Degree in Geological Sciences (with effect from 2009 admissions)
M. Tech. - Earth & Environmental Sciences
M. Tech. - Computational Seismology
Ph.D.

Humanities and Social Sciences 20
M.Sc. - Economics
M. Tech. - Human Resources Development & Management
Ph.D.

Industrial Engineering and Management 13
B.Tech. (Hons.) - Industrial Engineering
Dual Degree - Industrial Engineering / Industrial Engineering & Management
Dual Degree - Industrial Engineering / MBA
M. Tech. - Industrial Engineering & Management
Ph.D.

Mathematics 26
M.Sc. - Mathematics & Computing
M.Sc. - Statistics and Informatics (upto 2008 admissions)
M.Sc.(2 yr) - Mathematics (upto 2008 admissions)
M.Sc.(2 yr) - Statistics and Informatics (upto 2008 admissions)
M.Sc.- Ph.D. Dual Degree - Mathematics (with effect from 2009 admissions)
M. Tech. - Computer Science & Data Processing
Ph.D.

Mechanical Engineering 41
B.Tech.Hons.) - Mechanical Engineering
B.Tech. (Hons.) - Manufacturing Science & Engineering
Dual Degree - Mechanical Engineering / Manufacturing Science and Engineering
Dual Degree - Mechanical Engineering / Thermal Science and Engineering
Dual Degree - Mechanical Engineering / Mechanical Systems Design
Dual Degree - Mechanical Engineering / Mechanical Systems, Dynamics & Control
Dual Degree - Manufacturing Sc. & Engineering / Industrial Engineering & Management
Dual Degree - Mechanical Engineering / MBA
Dual Degree - Manufacturing Science & Engineering/ MBA
M. Tech. - Manufacturing Science & Engineering
M. Tech. - Thermal Science and Engineering
M. Tech. - Mechanical Systems Design
M. Tech. - Mechanical Systems Dynamics & Control
Ph.D.

Metallurgical & Materials Engineering 25
B.Tech. (Hons.) - Metallurgical and Materials Engineering
Dual Degree - Metallurgical & Materials Engineering / Metallurgical Engineering
Dual Degree - Metallurgical & Materials Engineering / MBA
M. Tech. - Metallurgical & Materials Engineering
Ph.D.
Postgraduate Diploma in Steel Technology

Mining Engineering 12
B.Tech. (Hons.) - Mining Engineering
Dual Degree - Mining Engineering / Mining Engineering
Dual Degree - Mining Engineering / Safety Engineering and Disaster Management
Dual Degree - Mining Engineering / MBA
M. Tech. - Mining Engineering
Ph.D.

Ocean Engineering and Naval Architecture 09
B.Tech. (Hons.) - Ocean Engineering and Naval Architecture
Dual Degree - Ocean Engineering & Naval Architecture
Dual Degree - MBA
M. Tech. - Ocean Engineering & Naval Architecture
Ph.D.

Physics and Meteorology 30
M.Sc. - Physics
M.Sc.(2 yr) - Physics (upto 2008 admissions)
M.Sc.- Ph.D. Dual Degree in Physics (with effect from 2009 admissions)
M. Tech. - Solid State Technology
Ph.D.

Centre for Educational Technology 03
M. Tech. - Media and Sound Engineering
Ph.D.

Centre for Oceans, Rivers, Atmosphere and Land Sciences 05
M. Tech. - Earth System Science and Technology
Ph.D.

Cryogenic Engineering 10
M. Tech. - Cryogenic Engineering
Ph.D.
<table>
<thead>
<tr>
<th>Course</th>
<th>Year</th>
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<tbody>
<tr>
<td>Materials Science</td>
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<tr>
<td>M. Tech. - Materials Science &amp; Engineering</td>
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<td>Ph.D.</td>
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<td>Reliability Engineering Centre</td>
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<td>M. Tech. - Reliability Engineering</td>
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<td>Rubber Technology</td>
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<td>M. Tech. - Rubber Technology</td>
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<td>Ph.D.</td>
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<td>Rural Development</td>
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<td>Ph.D.</td>
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<td>G. S. Sanyal School of Telecommunications</td>
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<tr>
<td>Postgraduate Diploma in Telecommunications Networking Planning and Management</td>
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<tr>
<td>Ph.D.</td>
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<tr>
<td>Rajiv Gandhi School of Intellectual Property Law</td>
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<td>LLB - Intellectual Property Rights</td>
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<td>Ph.D.</td>
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<tr>
<td>Postgraduate Diploma in Intellectual Property Law</td>
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<td>School of Information Technology</td>
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<td>M. Tech. - Information Technology</td>
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<td>Ph.D.</td>
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<tr>
<td>School of Infrastructure Design &amp; Management</td>
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<tr>
<td>M. Tech. - Infrastructure Design and Management</td>
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<td>Ph.D.</td>
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<tr>
<td>School of Medical Science &amp; Technology</td>
<td>09</td>
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<tr>
<td>Masters in Medical Science &amp; Technology</td>
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<tr>
<td>M. Tech. - Medical Imaging and Image Analysis</td>
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<td>Ph.D.</td>
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<tr>
<td>School of Water Resources</td>
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<td>M. Tech. - Water Management</td>
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<td>Ph.D.</td>
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<tr>
<td>Vinod Gupta School of Management</td>
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<tr>
<td>MBA</td>
<td></td>
</tr>
<tr>
<td>Ph.D.</td>
<td></td>
</tr>
</tbody>
</table>
DEPARTMENT OF AEROSPACE ENGINEERING

HEAD : Professor Navtej Singh

FACULTY

Professors
Bandyopadhyay, Gautam Ph.D. (IIT Kharagpur), Experimental and Computational Aerodynamics
Datta, Prosun Kumar Ph.D. (Georgia Tech), Aerospace Structures
Ghosh, Amit Kumar Ph.D. (IIT Madras), Aerodynamics & Propulsion
Singh, Navtej Ph.D. (IIT Kharagpur), Aerodynamics and Computational Fluid Mechanics

Associate Professors
Laha, Manas Kumar Ph.D. (IIT Kharagpur), Aerodynamics, Flight mechanics
Maiti, Dipak K Ph.D. (IIT Kharagpur), Aerospace Structures, Composite & Smart Structures, Structural Dynamics & Aeroelasticity, Design & Development of MR fluid damper & Landing Gear Dynamics
Rao, Tummala Venkateswara Ph.D. (IISc., Bangalore), Propulsion, Aerodynamics, Combustion
Sinha Mahapatra, Kalyan Prasad Ph.D. (IIT Kharagpur), Computational Fluid Dynamics (CFD), Aeroacoustics, Flow-induced vibration, Reactive flows

Assistant Professors
Ghosh, Anup Ph.D. (IIT Kharagpur), Aerospace Structures, Composite Structures, Micro Air Vehicle
Pradhan, Suresh Chandra Ph.D. (IIT Kanpur), Aerospace structures, smart structures, optimisation, FEM, FGM, Nanomechanics, Nonlocal elasticity theory
Roy, Arnab Ph.D. (IIT Kharagpur), Aerodynamics
Sinha, Manoranjan Ph.D. (IIT Kanpur), Neural Networks, Flight Dynamics, System Identification, Controls, Vibration Control

Brief Description of on-going activities
Thrust Areas
1. Computation of High-Speed High-Temperature Reactive Flows, Composite and smart structures, probabilistic analysis & design, Autonomous reconfigurable flight vehicle development and Chandrayaan-I project

Lectures by Visiting Experts
1. Topic1 by Prof. Yoshi Sugiyama (Department of Mechanical and Space Engineering, Faculty of Science and Technology, Ryukoku University, Japan.)

Doctoral and MS Degrees Awarded
1. M. Pandit: An Improved plate model for static, vibration and buckling response of sandwich laminates having random material properties (Ph.D.)
2. Haraprasad Roy: Study of Dynamics of Viscoelastic Rotors- A Finite Element Approach (Ph.D.)
3. Sintu Singh: Large Eddy Simulation of the wakes of rigid and elastic cylinders at low speeds (Ph.D.)
4. Santanu Mitra: Finite element analysis of liquid sloshing in rigid and elastic containers with internal components and flow-induced vibration (Ph.D.)

Member - Editorial Board

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A Study of Wind Movements during Downburst in a Thunderstorm</td>
<td>DST, New Delhi</td>
<td>Rs. 19.62 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Aerodynamic Investigation of Smart Flying Wing MAV</td>
<td>Asian Office of Aerospace R&amp;D, Japan,</td>
<td>Rs. 9.35 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>Aeroelastic Analysis of a Lifting Surface Employing Active Fiber Composite Under Hygro-Thermal Environment</td>
<td>Aeronautics R&amp;D Board,</td>
<td>Rs. 8.96 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Aeroelastic Tailoring of a Composite Lifting Surface Using Smart Structures Concept</td>
<td>SRIC IIT-Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>Axisymmetric and Non-Axisymmetric, subsonic and supersonic jet aerodynamics/aeroacoustics using the three-dimensional navier-stokes/euler coupled simual</td>
<td>Aeronautical Research &amp; Development Board,</td>
<td>Rs. 3.44 Lakhs</td>
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<tr>
<td></td>
<td>Project Description</td>
<td>Implementing Agency</td>
<td>Amount</td>
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<tr>
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<td>-------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>6</td>
<td>Boeing University Relations, IIT Kharagpur-Campus Engagement Plan</td>
<td>Boeing Co., USA</td>
<td>Rs. 14.40 Lakhs</td>
</tr>
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<td>7</td>
<td>Centre of Excellence for Composite Structures Technology Phase II (FCX)</td>
<td>ARDB</td>
<td>Rs. 75.90 Lakhs</td>
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<tr>
<td>8</td>
<td>Development of a three-dimensional unsteady implicit hypersonic viscous turbulent flow solver on an unstructured grid</td>
<td>DRDL</td>
<td>Rs. 9.77 Lakhs</td>
</tr>
<tr>
<td>9</td>
<td>Dynamic Characteristics of thermally post-buckled composite panels embedded with SMA Fibers</td>
<td>DRDO, ER&amp;IP, New Delhi</td>
<td>Rs. 8.52 Lakhs</td>
</tr>
<tr>
<td>10</td>
<td>Dynamic Instability Behaviour of Aerospace Structures under Follower Loading</td>
<td>AR&amp;DB</td>
<td>Rs. 7.00 Lakhs</td>
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<tr>
<td>11</td>
<td>Experimental and numerical investigation of flow past two dimensional arbitrary body geometries at subsonic and supersonic speeds</td>
<td>ISIRD, SRIC, IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
<td>12</td>
<td>Finite element analysis of the FGM cone nozzle</td>
<td>ISIRD, SRIC, IIT Kharagpur</td>
<td>Rs. 2.10 Lakhs</td>
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<tr>
<td>13</td>
<td>FIST Program, Department of Aerospace Engineering (FAE)</td>
<td>DST, New Delhi,</td>
<td>Rs. 105.00 Lakhs</td>
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<td>14</td>
<td>Intelligent Flight Control System</td>
<td>ISIRD, SRIC, IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
<td>15</td>
<td>Intelligent Hybrid Flight Control Design</td>
<td>AR&amp;DB</td>
<td>Rs. 6.00 Lakhs</td>
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<tr>
<td>16</td>
<td>LES Simulation of High Speed Reacting Flow in Scramjet Combustion Flowfield</td>
<td>DRDL, Hyderabad,</td>
<td>Rs. 9.75 Lakhs</td>
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<tr>
<td>17</td>
<td>Least square finite element analysis of adhesively bonded joint</td>
<td>AR&amp;DB Structures panel DRDO, ISAC, Bangalore (ISRO)</td>
<td>Rs. 4.45 Lakhs</td>
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<tr>
<td>18</td>
<td>Lunar Gravity Model and Topography Determination Using Ground Based Observations and Laser Altimetry Data</td>
<td>ISAC, Bangalore (ISRO)</td>
<td>Rs. 8.00 Lakhs</td>
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<tr>
<td>19</td>
<td>Non-linear response of piezoelectric laminated composite panels under different loading conditions with uncertain system properties</td>
<td>SRIC, IIT Kharagpur</td>
<td>Rs. 1.64 Lakhs</td>
</tr>
<tr>
<td>20</td>
<td>Nonlinear vibration study of smart composite plate with random system properties in random hygrothermal environments</td>
<td>ARDB, New Delhi,</td>
<td>Rs. 8.00 Lakhs</td>
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<tr>
<td>21</td>
<td>Numerical and Experimental Investigation of Low Reynolds Number Flow past Airfoils for Flying Wing Micro Air Vehicle</td>
<td>AR&amp;DB,</td>
<td>Rs. 8.95 Lakhs</td>
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<tr>
<td>22</td>
<td>Reconfigurable Autonomous Air Vehicle</td>
<td>Technology Information, Forecasting and Assessment Council (TIFAC)</td>
<td>Rs. 10.00 Lakhs</td>
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<tr>
<td>23</td>
<td>Reconfigurable Flight Control Design</td>
<td>ER&amp;IP (DRDO)</td>
<td>Rs. 9.89 Lakhs</td>
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<tr>
<td>24</td>
<td>Research Activity in Computational Fluid Dynamics</td>
<td>M/S Hypercomp Inc. California, USA,</td>
<td>Rs. 6.40 Lakhs</td>
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<tr>
<td>25</td>
<td>Setting up of AR&amp;DB's associate centre for CFD at IIT Kharagpur</td>
<td>Aeronautical Research &amp; Development Board,</td>
<td>Rs. 23.20 Lakhs</td>
</tr>
<tr>
<td>26</td>
<td>Studies on Initiation and Propagation of Damage in Smart Composite Plates and Shells</td>
<td>SRIC</td>
<td>Rs. 2.80 Lakhs</td>
</tr>
</tbody>
</table>
Three dimensional unstructured grid generation for viscous flow computation about complex configuration using computational geometric technique Defence Research & Development Laboratory, Rs. 9.20 Lakhs

Consultancy Projects
1. Selection Process Examinations Airlines Rs. 1.25 Lakhs

Visits Abroad by Faculty Members
2. Pradhan, Suresh Chandra - participate in international conference (Singapore) one week
3. Roy, Arnab - Recipient of DAAD Fellow Research Scientist Award in 2008; visit was for Research and collaboration (Shock Wave Laboratory, RWTH Aachen, Germany) 2 months
4. Singh, Navtej - Part of an Indian Delegation to participate in the CRIAQ Research Forum and the associated events (Montreal, Canada) 13-04-2008 to 20-04-2008

Invited Lectures by Faculty Members
1. Analysis of Laminated Sandwich Plate using an Improved Higher order Zizag Theory by Singh, Bhrigu Nath (Dept. of Ocean Engineering and Naval Architecture, IIT Kharagpur)
2. FE analysis of Laminated Sandwich Plates by Singh, Bhrigu Nath (MNNIT, Allahabad, India)
3. Advanced Composites and Smart Structures by Maiti, Dipak K (NIT, Rourkela)

Short-Term Courses, Training Programmes and Workshops organized
1. Academic Programme for HAL Trainees (28.07.2008 - 30.11.08)
2. Aerospace Engineering Programme for Aerospace Undergraduate Students of Chosun University, Korea (June 23 - July 02, 2008)
3. HAL Design Program for Aircraft Engineering, Avionics and Manufacturing (January to April 2008)
DEPARTMENT OF AGRICULTURAL & FOOD ENGINEERING

HEAD : Professor Rajendra Singh

FACULTY

Professors
Bal, Satish Ph.D. (IIT Kharagpur), Food Process Engineering, Post Harvest Engineering
Banerjee, Rintu Ph.D. (IIT Kharagpur), Microbial, Food and Environmental Biotechnology
Bhadoria, PB Singh Ph.D. (IIT Kharagpur), Plant Nutrition and Rural Development
Das, Hrishikes MS (Umass Amherst, USA), Food and Dairy Engineering
Das, Susanta Kumar Ph.D. (IIT Kharagpur), Mechanised Food Processing
Datta, Ashis Kumar Ph.D. (Pennsylvania), Dairy and Food Process Engineering
Ghosh, Bijoy Chandra Ph.D. (IIT Kharagpur), Soilless culture, Organic farming, Tea production and processing, Agronomy of medicinal and aromatic plants
Goswami, Tridib Kumar Ph.D. (IIT Kharagpur), Food processing and preservation, cryofreezing, transportation and grinding, potato cold storage, CA and MA storage of fruits and vegetables
Mal, Bimal Chandra Ph.D. (IIT Kharagpur), Aquacultural Engineering, Soil and Water Conservation Engineering
Mishra, Hari Niwas Ph.D. (IIT Kharagpur), Food Science and Technology, Health Foods and Nutraceuticals, Novel Food Processing Technologies
Panda, Rabindra Kumar Ph.D. (IARI, Delhi), Soil and Water Engineering, Water Management
Panda, Sudhindra Nath Ph.D. (PAU, Ludhiana), Water Management, Rainwater Conservation and Recycling
Pandey, Keshaw Prasad Ph.D. (IIT Kharagpur), Tractor power systems, Traction modeling, Precision agriculture
Prasad, Suresh Ph.D. (IIT Kharagpur), Post Harvest Process and Food Engineering, Microwave Applications in Food Processing
Raghuwanshi, Narendra Singh Ph.D. (California), Water Management, Hydrological Modelling
Singh, Rajendra Ph.D. (IIT Kharagpur), Hydrological Modelling, Irrigation System Management
Tewari, Virendra Kumar Ph.D. (IIT Kharagpur), Tractor System Design, Ergonomics and Industrial Safety
Tiwari, Kamlesh Narayan Ph.D. (IARI, Delhi), Land and Water Resources Engineering and Management, Pressurized Irrigation, RS and GIS Application in Hydrology and Watershed Management

Associate Professors
Das, Bhabani Sankar Ph.D. (Kansas), Soil Science, Soil Physics and Soil Hydrology
Dutta Gupta, Snehasish Ph.D. (Kalyani University), Plant Biotechnology
Majumdar, Gautam Chandra  Ph.D. (IIT Kharagpur), Post Harvest Engineering, Food Engineering, Agri. Systems Management
Mallick, Nirupama  Ph.D. (BHU, Varanasi), Algal Biotechnology, Stress Physiology
Mitra, Adinpunya  Ph.D. (East Anglia, UK), Applied Botany, Natural Product Biotechnology (Plant Phenolics), Metabolic Phytochemistry & Molecular Biology
Mitra, Arunabha  Ph.D. (Calcutta University), Ecology and Environmental Pollution, Waste Utilization in Aquaculture, Chemical-free Farming, Mind and Consciousness, Stress Management and Control
Raheman, Hifjur  Ph.D. (Bangkok), Development of combi-implements, Production and utilisation of biodiesel for green electricity generation
Thomas, E V  Ph.D. (IIT Kharagpur), Farm Machinery and Power, Tea Processing Machinery

Assistant Professors
Das, Madhusweta  Ph.D. (Jadavpur University), Macromolecular Science and Engineering
Guha, Proshanta  Ph.D. (IIT Kharagpur), Agronomy, Post-harvest Technology, Forest and Wasteland Management, Weed and Water Management
Mishra, Ashok  Ph.D. (IIT Kharagpur), Watershed-Water resources development and management, Climate forecast applications, Crop yield modeling
Mukherjee, Chanchal Kumar  MS (New Jersey), Fisheries and Aquacultural Engineering
Shrivastava, Shanker Lal  Ph.D. (IIT Kharagpur), Post Harvest Engineering / Dairy & Food Engineering
Srinivasa Rao, Pavuluri  Ph.D. (IIT Kharagpur), Post Harvest Engineering, Aquacultural Engineering, High Pressure Processing of High Value Commodities, Processing of Medicinal Crops, Recirculatory Aquaculture Systems
Srivastav, Prem Prakash  Ph.D. (IIT Kharagpur), Food Science and Technology
Swain, Dillip Kumar  Ph.D. (IIT Kharagpur), Agronomy for sustainable agriculture, Climatic risk assessment on crops, Crop modeling and simulation

Senior Lecturer
Moulick, Sanjib  Ph.D. (IIT Kharagpur), Water quality modeling and management, Biofiltration technology, Aeration system, Recirculating aquaculture system

Senior Scientific Officer
Singh, Manindra Nath  Ph.D. (BHU, Varanasi), Entomology, Grain Storage, Plant Protection

Emeritus Professor, SRIC
Prof. Satish Bal  Ph.D., Food Process Engineering, Post Harvest Engineering

ANNUAL REPORT
2008-2009
Emeritus Professor

Prof. Suresh Prasadz Ph.D., Food Process Engineering, Post Harvest Engineering
Prof. Hrishikes Das MS (Umass Amherst, USA), Food and Dairy Engineering
Prof. P. K. Chattopadhyay Ph.D., Agricultural and Food Engineering

Faculty Resignation
Dr. Nandita Kar Scientific Officer

Brief Description of on-going activities:
Application of GIS in both command area & watershed management, Application of neural network in hydrology, Ballast management of agricultural tractors, Bio-fuels from tree-based oils, Biosynthesis of phenolic fragrance and xanthones, Design and development of continuously variable transmission for tractors, Design and development of automatic depth control system for tractors, Design and development of a centrifugal press for semi-continuous production of paneer, Development of aseptic packaging system for milk, Development of environment-friendly aquaculture, Development of food products, Development of machineries and process technology for cereals & pulses based snacks, Development of rice planter, Development of a continuous chhana making device, Development of jacketed scraped surface vessel for kneading, heating and concentration of high viscosity liquids and pastes, Development of sandesh portioning and shaping device, Development of endless chain pressure dryer for orthodox tea, Design of a centrifugal press for semicontinuous production of paneer, Development of Cashew nut sheller and Cashew peeler, Evaluation of cosmetic properties of Aloe vera L., Flow and solute transport in subsurface environment, Food Packaging, Hydrological modelling of small watersheds, Imaging photosynthesis of micropropagated plants, Integration of surface irrigation and two-dimension infiltration model, Machinery systems and ergonomics, Microbial degradation of plant phenolics for value-added products, Micropropagation and cryopreservation of endangered medicinal plants, Microwave assisted drying of high moisture food, Nutrient management, Polyhydroxyalkanoates from Cyanobacteria, Predicting traction performance using artificial neural network, Process technology for dehydration of mushrooms, Production and processing of tea, Production of tannase under solid state fermentation, Process technology for dahi powder & dahi powder based energy drink mix, Process technology for antioxidant rich RTE health food, Process technology for manufacture of RTE health food (herbal kurkure), Rainwater harvesting and groundwater recharge, Software development for machinery management, Thermal analysis of food materials, Traction potential of bias-ply tyres used in agricultural tractors, Water quality and watershed management

Thrust Areas
1. Agricultural Biotechnology
2. Agro-Informatics
3. Mechanized Food Processing
4. Natural Resources Management
5. Precision Farming

New Acquisitions
1. UV-Vis Spectrophotometer, UV-1800, Shimadzu, Japan
2. Halogen Moisture Analyzer
3. UV detector for HPLC - Thermo Fisher, Germany
4. DS-5 HYDROLAD, Datalogger for measurement of temp, pH, DO, ammonia, barometric pressure, HACH

International Collaborations
1. Technical University of Braunschweig, Germany
2. Department of Geoinformatics, Geohydrology and Modeling, Friedrich-Schiller-University, Jena, Germany
3. Yamaguchi University, Japan
4. Biosystems Engineering Department, College of Agriculture, Sam Ginn College of Engineering, Auburn University, USA
5. Institute of Water Resources Management, Hydrology and Agricultural Hydraulic Engineering, Leibniz University Hannover, Germany
6. ALTERRA-Centre for Water and Climate, Wageningen University, The Netherlands

Lectures by Visiting Experts

1. Cut off strategy for surface irrigation using sensor based cellular communication system and inverse solution modeling -response surface methodology by Mr. Rajat Saha (Department of Biological and Agricultural Engineering, University of California, Davis, USA)
2. Bioretention technology for environmental management by Dr. Surya Pandey (Waikato Institute of Technology, Hamilton, New Zealand)
3. Water networks by Prof. Iven Mareels (Dean of the Melbourne School of Engineering, Australia)
4. Australias water resources by Prof. H.M.Malano (Civil Engineering Department, University of Melbourne, Australia)
5. An overview of second and third generation biofuels by Dr.G.S. Murthy (Sustainable Technologies Laboratory, Oregon State University, Oregon, USA)
6. Extrusion processing-An advanced technology for transformation of ---expanded microstructures by Dr. Sajid Alavi (Dep. of Grain Science and Industry, Kansas State University, Manhattan, USA)
7. Harmonizing economics and environmental uses in Krishna basin, India by Dr. Brian Davidson (Civil Engineering Department, University of Melbourne, Australia)

Doctoral and MS Degrees Awarded

1. Jippu Jacob : Design and Performance of Hexagonal Flighted Trommels for Size Classification (Ph.D.)
3. P.I. Lakhichand : Development of Cereal Based Ready-To-Eat Snack Food (Ph.D.)
4. Yashwant Prabhakar Khandetod : A Study on Vibration Assisted Drying of Parboiled Paddy (Ph.D.)
5. Bhabatarini Panda : Accumulation of Polyhydroxy alkanoates in a Unicellular Cyanobacterium Syncchocystis sp. PCC 6803 (Ph.D.)
7. P. K. Nema : Modelling and Simulation of Fouling in Helical Tube Ultra High Temperature (UHT) Milk Sterilizer (Ph.D.)
9. Akhilesh Kumar Singh : Accumulation of a Novel Short-Chain-Length-Long-Chain-Length Polyhydroxyalkanate Co-Polymer In a Sludge-Isolated Pseudomonos aeruginosa MTCC 7925 (Ph.D.)
10. Sudhamoy Mondal : Biochemical Characterization of Induced Defence in Tomato against Fusarium oxysporum F. Sp. Lycopers (Ph.D.)
12. Chandra Shekhar Sahay : Development of a Power Tiller Operated Oscillatory Tillage Implement for North Eastern Hilly Region of India (Ph.D.)
13. Soumen Palit : Comparative Assessment of Organic and Inorganic Sources of Fertilizer on Productivity and Quality of Tea (Ph.D.)
14. Moumita Chakraborty : Phytochemistry of Phenylpropanoid-derivatives from Mesocarp Tissues and Endosperm Cell Cultures of Cocos nucifera (Ph.D.)
15. Jatindra Kumar Sahu : Process and Machinery Development for Production of Sandesh An Indian Dairy Product (Ph.D.)
16. Parag Prakash Sutar : Combined Osmotic and Microwave Vacuum Dehydration of Carrots (Ph.D.)
17. Annapurna Kumari : Production, Immobilization and Application of Lipases in Organic Synthesis (Ph.D.)
18. Ranjan Kumar Nanda : Tanin Chemistry of Terminalia chebula and Caesalpinia digyna: Evaluation of Bioactive Potential (Ph.D.)
19. Arnab Bandyopadhyay : Temporal and Spatial Trends of Reference Evapotranspiration in Agro-Ecological Regions of India (Ph.D.)

Fellow - Professional Bodies

Member - Editorial Board
10. Goswami, Tridib Kumar (2006) Member of the Editorial Board - Food Processing Technology
17. Mishra, Hari Niwas (2009) Guest Editor, Special Issue on Tea & Tea Products - Fresh Produce
18. Mishra, Hari Niwas (2009) Guest Editor, Special Issue on RTE Health Foods, Snacks & Energy Drinks - Food
Awards & Honours

1. Jha, Madan Kumar (2009) | “K.C. Das Memorial Award”, The Institution of Engineers (India), Orissa State Center, Bhubaneswar
2. Jha, Madan Kumar (2008) | “Shankar Memorial Award”, Indian Society of Agricultural Engineers (ISAE), New Delhi
3. Mitra, Adinpunya (0) | Awarded Bilateral Exchange Fellowship of INSA (India) - DFG (Germany)
4. Mitra, Adinpunya (0) | Awarded Commonwealth Scholarship in United Kingdom for doctoral research
6. Mitra, Adinpunya (0) | Awarded Young Scientist Research Grant from International Foundation for Science (IFS), Sweden
7. Mitra, Adinpunya (0) | Awarded Young Scientist Travel Fellowship from XVII-International Botanical Congress, Austria
8. Panda, Sudhindra Nath (2009) | Institution Award by The Institution of Engineers (India), Orissa State Centre, Bhubaneswar

Fellowships

1. Jha, Madan Kumar (2009) | JSPS Invitation Fellowship (Long-Term)

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>AICRP on Ergonomics &amp; Safety in Agriculture (ESA)</td>
<td>ICAR, New Delhi</td>
<td>Rs 194.10 Lakhs</td>
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<tr>
<td>2.</td>
<td>AICRP on Farm Implements &amp; Machinery (FIM)</td>
<td>ICAR, New Delhi</td>
<td>Rs 95.91 Lakhs</td>
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<tr>
<td>3.</td>
<td>All India Coordinated Research Project on Post Harvest Technology</td>
<td>(Indian Council of Agricultural Research (ICAR), New Delhi</td>
<td>Rs 300.00 Lakhs</td>
</tr>
<tr>
<td>4.</td>
<td>Analysis of Climate Change and its Impact on Flood and Drought in a River Basin</td>
<td>Sponsored Research and Industrial Consultancy (SRIC), IIT Kharagpur</td>
<td>Rs. 3.15 Lakhs</td>
</tr>
<tr>
<td>5.</td>
<td>Application of Image Processing Technology for Quality Assessment of Food Material</td>
<td>Ministry of Food Processing Industries, New Delhi</td>
<td>Rs. 39.50 Lakhs</td>
</tr>
<tr>
<td>6.</td>
<td>Assessment of non-point source pollution of soil &amp; water resources using the AVSWAT model in an agricultural watershed in Eastern India</td>
<td>DST, India and DFG, Germany</td>
<td>Rs. 4.70 Lakhs</td>
</tr>
<tr>
<td>7.</td>
<td>BioCO2 : An integrated multidisciplinary project using solar energy for production of renewable hydrogen combined with CO2 capture, to address global wa</td>
<td>Indo-Norwegian-Swedish Collaborative Research Project</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>8.</td>
<td>Biodiversity characterization at landscape level using satellite remote sensing and GIS for state of J &amp; K (Kargil district and part of Leh (Ladakh))</td>
<td>National Remote Sensing Agency (NRSA)</td>
<td>Rs 2.80 Lakhs</td>
</tr>
<tr>
<td>#</td>
<td>Title of the Project</td>
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<tr>
<td>9</td>
<td>Biodiversity characterization at landscape level using satellite remote sensing and GIS for state of U.P. (except Vindhyan districts).</td>
<td>National Remote Sensing Agency (NRSA)</td>
<td>Rs 19.29 Lakhs</td>
</tr>
<tr>
<td>10</td>
<td>Biosoftening of Stem ITC, Rs. 37.00 Lakhs</td>
<td>ITC,</td>
<td>Rs. 37.00 Lakhs</td>
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<tr>
<td>11</td>
<td>cDNA cloning and functional expression of a p-hydroxybenzaldehyde dehydrogenase from hairy roots of Daucus carota</td>
<td>CSIR, New Delhi</td>
<td>Rs. 5.56 Lakhs</td>
</tr>
<tr>
<td>12</td>
<td>Cost-effective PLA production and its applications</td>
<td>DBT, New Delhi,</td>
<td>Rs. 21.76 Lakhs</td>
</tr>
<tr>
<td>13</td>
<td>Design and Development of a Novel Low Cost Gravity Aeration System</td>
<td>DST, New Delhi,</td>
<td>Rs. 23.89 Lakhs</td>
</tr>
<tr>
<td>14</td>
<td>Design optimum size of rainwater harvesting and recycling structure for diversified cropping system in rainfed upland ecosystem of eastern India</td>
<td>CSIR</td>
<td>Rs. 7.76 Lakhs</td>
</tr>
<tr>
<td>15</td>
<td>Development of an automatic vegetable transplanter with technology for paper pot seedlings</td>
<td>Council of Scientific and Industrial Research</td>
<td>Rs. 12.94 Lakhs</td>
</tr>
<tr>
<td>16</td>
<td>Development of combined tillage implement for improving performance of tractor-implement combination</td>
<td>CSIR</td>
<td>Rs. 9.82 Lakhs</td>
</tr>
<tr>
<td>17</td>
<td>Development of criteria and indications for sustainable forest management in Sunderban mangrove forest under joint forest management</td>
<td>CSIR, New Delhi</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
<td>18</td>
<td>Development of process technology for invtroenzymatic detoxification of food infected with aflatoxin B1 using horse radish peroxidase enzyme</td>
<td>Department of Science &amp; Technology, New Delhi</td>
<td>Rs. 5.26 Lakhs</td>
</tr>
<tr>
<td>19</td>
<td>Development of process technology for manufacture of cereal-fruit based extruded snack foods</td>
<td>ISIRD, SRIC, IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>20</td>
<td>Development of Prototype for Semi-continuous Production of Paneer</td>
<td>National Dairy Development Board, Anand</td>
<td>Rs. 5.25 Lakhs</td>
</tr>
<tr>
<td>21</td>
<td>Development of ready to eat snacks from low value under utilized marine fishes</td>
<td>ISIRD,</td>
<td>Rs. 2.40 Lakhs</td>
</tr>
<tr>
<td>22</td>
<td>Development of Recirculatory Aquaculture System based on Bioremediation and Integrated Bioplastic Production</td>
<td>Department of Biotechnology,</td>
<td>Rs. 26.37 Lakhs</td>
</tr>
<tr>
<td>23</td>
<td>Development of starch based products from Curcuma leucorrhiza (Palo) (All India Coordinated Research Project on Post Harvest Technology,</td>
<td>ICAR, New Delhi</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>24</td>
<td>Development of Technology for Enzymatic Treatment of Rice</td>
<td>Indian Council of Agricultural Research</td>
<td>Rs. 18.00 Lakhs</td>
</tr>
<tr>
<td>25</td>
<td>Development of technology for production of ready-to-eat health foods / snacks and energy drinks</td>
<td>Ministry of Food Processing Industries, Govt. of India, New Delhi</td>
<td>Rs. 29.00 Lakhs</td>
</tr>
<tr>
<td>26</td>
<td>Development of Volatile Compound Based Biosensor 2008 onwards 15.5</td>
<td>DST, New Delhi</td>
<td>Rs. 11.80 Lakhs</td>
</tr>
<tr>
<td>27</td>
<td>Distributed hydrological modeling to analyse sediment and nutrient status of Brahmani-Baitrani delta</td>
<td>SAC, Ahmedabad (ISRO),</td>
<td>Rs. 20.83 Lakhs</td>
</tr>
<tr>
<td>28</td>
<td>Distributed Hydrological Modelling to Analyse Sediment and Nutrient Status of Brahmani-Baitaran Delta</td>
<td>SAC, Ahmedabad</td>
<td>Rs. 20.18 Lakhs</td>
</tr>
<tr>
<td>29</td>
<td>DST-FIST Project for Strengthening Teaching and Research in WRDM</td>
<td>DST</td>
<td>Rs. 78.00 Lakhs</td>
</tr>
<tr>
<td>30</td>
<td>Elucidating fragrant methoxybenzaldehyde biosynthesis in hairy / normal root cultures of Hemidesmus indicus</td>
<td>BRNS</td>
<td>Rs. 21.66 Lakhs</td>
</tr>
<tr>
<td>#</td>
<td>Title of the Project</td>
<td>Sponsor(s)</td>
<td>Amount</td>
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<tr>
<td>31</td>
<td>Enhancing research capacity for undertaking Masters &amp; Doctoral Programmes in Food Science &amp; Technology</td>
<td>Department of Biotechnology, Government of India, New Delhi, MHRD, DST</td>
<td>Rs.838.00 Lakhs, Rs. 10.00 Lakhs, Rs. 78.00 Lakhs</td>
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<tr>
<td>32</td>
<td>Evaluation of competitive diffusive mass transfer and degradation kinetics of lignin, humic substances and xenobiotic compounds in agroresidues and li</td>
<td>MHRD, DST</td>
<td>Rs. 10.00 Lakhs, Rs. 0.00 Lakhs</td>
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<tr>
<td>33</td>
<td>Experimental Agrometeorological Advisory Service Unit (AAS)</td>
<td>DST</td>
<td>Rs. 220.00 Lakhs</td>
</tr>
<tr>
<td>34</td>
<td>FIST Project in Water Resources Development &amp; Management</td>
<td>DST</td>
<td>Rs. 78.00 Lakhs</td>
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<tr>
<td>35</td>
<td>Flood Hazard Mapping &amp; Flood Risk Zoning for a River Reach</td>
<td>ISIRD, SRIC, IIT Kharagpur, Space Application Center, Ahmedabad, MOFPI, New Delhi, Ministry of Environment and Forest</td>
<td>Rs. 3.00 Lakhs, Rs. 10.78 Lakhs, Rs. 10.07 Lakhs</td>
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<td>36</td>
<td>Flood risk modelling using satellite remote sensing data for optimal crop planning</td>
<td>DST</td>
<td>Rs. 220.00 Lakhs, Rs. 10.07 Lakhs, Rs. 13.77 Lakhs</td>
</tr>
<tr>
<td>37</td>
<td>Food Testing Laboratory</td>
<td>DST, New Delhi</td>
<td>Rs. 19.33 Lakhs</td>
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<tr>
<td>38</td>
<td>Fully Biodegradable Starch Based Film for Making Carry Bag and Edible Food Packaging</td>
<td>DST-JSPS</td>
<td>Rs. 4.50 Lakhs</td>
</tr>
<tr>
<td>39</td>
<td>Geo-spatial resources management with computer simulation of flood inundation for Mayurakshi and Ajoy river basins using RS and GIS</td>
<td>DST, New Delhi</td>
<td>Rs. 13.77 Lakhs</td>
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<tr>
<td>40</td>
<td>Hydrological modeling of a watershed to evaluate impacts of watershed structures on surface flow &amp; groundwater recharge</td>
<td>DST, New Delhi</td>
<td>Rs. 19.33 Lakhs</td>
</tr>
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<td>41</td>
<td>Identification, Quantification and Control of Non point source pollution of water resource in Agril Lands</td>
<td>Ministry of Water Resources, Govt. of India</td>
<td>Rs. 57.80 Lakhs</td>
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<tr>
<td>42</td>
<td>Imaging photosynthesis of the micropropagated plants</td>
<td>DST-JSPS</td>
<td>Rs. 4.50 Lakhs</td>
</tr>
<tr>
<td>43</td>
<td>Impact Assessment of NREGA in 2-Districts of West Bengal (IAW)</td>
<td>DST, New Delhi</td>
<td>Rs. 13.77 Lakhs</td>
</tr>
<tr>
<td>44</td>
<td>Impact of climate change on rice yield of West Bengal: A field experiment and simulation study</td>
<td>DST-JSPS</td>
<td>Rs. 4.50 Lakhs</td>
</tr>
<tr>
<td>45</td>
<td>Land use land cover (LULC) dynamics in relation to human dimension and climate in Mahanadi river basin, Orissa</td>
<td>DST-JSPS</td>
<td>Rs. 4.50 Lakhs</td>
</tr>
<tr>
<td>46</td>
<td>Low-cost production of [P(3HB-co-3HV)] co-polymer from cyanobacteria and exploring its biomedical applications</td>
<td>DST, New Delhi</td>
<td>Rs. 13.77 Lakhs</td>
</tr>
<tr>
<td>47</td>
<td>Mechanised Food Engineering</td>
<td>DST, New Delhi</td>
<td>Rs. 13.77 Lakhs</td>
</tr>
<tr>
<td>48</td>
<td>Microwave Assisted Hot Air and Vacuum Drying of Fruits and Spices</td>
<td>DST, New Delhi</td>
<td>Rs. 13.77 Lakhs</td>
</tr>
<tr>
<td>49</td>
<td>Modeling the performance of a few major cropping systems in eastern India in the light of projected climate change</td>
<td>DST, New Delhi</td>
<td>Rs. 13.77 Lakhs</td>
</tr>
<tr>
<td>50</td>
<td>National Vegetation Carbon Pool Assessment</td>
<td>DST, New Delhi</td>
<td>Rs. 13.77 Lakhs</td>
</tr>
<tr>
<td>51</td>
<td>Precision Farming Development Centre</td>
<td>DST, New Delhi</td>
<td>Rs. 13.77 Lakhs</td>
</tr>
<tr>
<td>#</td>
<td>Title of the Project</td>
<td>Sponsor(s)</td>
<td>Amount</td>
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</tr>
<tr>
<td>52</td>
<td>Precision Farming Technologies Based on Microprocessor and Decision Support Systems</td>
<td>ICAR, NAIP, New Delhi</td>
<td>Rs. 46.49 Lakhs</td>
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<tr>
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<td>for Enhancing Input Application Efficiency in Production Ag.</td>
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</tr>
<tr>
<td>53</td>
<td>Process development and enrichment of vermicompost and its assessment in tea rhizosphere grown at two different altitudes</td>
<td>NTRF, Tea Board, Kolkata</td>
<td>Rs. 10.63 Lakhs</td>
</tr>
<tr>
<td>54</td>
<td>Processing and value Addition to Basmati Rice</td>
<td>L.T. Overseas Limited</td>
<td>Rs. 1.00 Lakhs</td>
</tr>
<tr>
<td>55</td>
<td>Processing of Kinnow, apple, pomegranate juice and their mixtures</td>
<td>ICAR, New Delhi</td>
<td>Rs. 19.68 Lakhs</td>
</tr>
<tr>
<td>56</td>
<td>Production and performance evaluation of biodiesel from tree based oils (with high free fatty acids)</td>
<td>Petroleum Conservation Research Association, Ministry of Petroleum &amp; Natural Gas, Govt. of India</td>
<td>Rs. 11.62 Lakhs</td>
</tr>
<tr>
<td>57</td>
<td>Proposed Framework For Implementing Work Package, 5 Consisting of Intervention Analysis At IIT, Kharagpur</td>
<td>International Water management Institute, Sri Lanka</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>58</td>
<td>Purification and characterization of glycosidic conjugates from Bryophyllum pinnatum for their anti diabetic, antioxidant and anti-tyrosinase activity</td>
<td>CSIR</td>
<td>Rs. 1.52 Lakhs</td>
</tr>
<tr>
<td>59</td>
<td>Rapid control atmosphere storage of fruits</td>
<td>Ministry of Food Processing Industries</td>
<td>Rs. 48.00 Lakhs</td>
</tr>
<tr>
<td>60</td>
<td>Rural Technology action group RuTAG</td>
<td>PSA, GOI</td>
<td>Rs. 30.00 Lakhs</td>
</tr>
<tr>
<td>61</td>
<td>Screening of aloe vera germplasms for cosmetic gel and micropropagation of elite clones</td>
<td>Department of Science &amp; Technology,</td>
<td>Rs. 15.00 Lakhs</td>
</tr>
<tr>
<td>62</td>
<td>Simulation of regional salt and water balance in an irrigated area of semi-arid region</td>
<td>DST-DAAD</td>
<td>Rs. 3.85 Lakhs</td>
</tr>
<tr>
<td>63</td>
<td>Standardization of Process Parameters in Tea</td>
<td>Tea Board, Kolkata</td>
<td>Rs. 366.00 Lakhs</td>
</tr>
<tr>
<td>64</td>
<td>Standardization of process parameters in withering, maceration, rolling, fermentation and drying of tea</td>
<td>Tea Board, Govt. of India, Kolkata</td>
<td>Rs. 366.96 Lakhs</td>
</tr>
<tr>
<td>65</td>
<td>Standardization of process parameters in withering, maceration, rolling, fermentation and drying of tea</td>
<td>Tea Board, Govt. of India, Kolkata</td>
<td>Rs. 366.96 Lakhs</td>
</tr>
<tr>
<td>66</td>
<td>Studies on Cryogenic Grinding for Retention of Flavour and Medicinal Properties of Some Important Indian Spices</td>
<td>(NAIP, ICAR (World Bank funded project),</td>
<td>Rs. 90.10 Lakhs</td>
</tr>
<tr>
<td>67</td>
<td>Studies on High Pressure Processing (HPP) of High Value Perishable Commodities</td>
<td>National Agricultural Innovation Project, ICAR, New Delhi</td>
<td>Rs. 464.87 Lakhs</td>
</tr>
<tr>
<td>68</td>
<td>Study of Boundary Layer Characteristics during occurrence of Severe Thunderstorm</td>
<td>Department of Science and Technology</td>
<td>Rs. 46.00 Lakhs</td>
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<td>69</td>
<td>Tagatose : a low calorie sweetener</td>
<td>Ministry of Food Processing Industry</td>
<td>Rs. 69.50 Lakhs</td>
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<tr>
<td>70</td>
<td>Techno-Economic Feasibility of Integrated Aquaculture Options within Irrigation Systems</td>
<td>Indian Council of Agricultural Research</td>
<td>Rs. 31.03 Lakhs</td>
</tr>
</tbody>
</table>

Consultancy Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>250 Kg tannery grade enzyme</td>
<td>Networks Export Pvt. Ltd.</td>
<td>Rs. 2.00 Lakhs</td>
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<tr>
<td>2</td>
<td>Aquatic Survey of Noamundi Iron Mine</td>
<td>The Tata Iron and Steel Company Ltd.</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
<td>No.</td>
<td>Description</td>
<td>Recipient</td>
<td>Cost (Rs.)</td>
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<tr>
<td>-----</td>
<td>---------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
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<tr>
<td>3.</td>
<td>Assessment of Rice Mill Capacity</td>
<td>Rice Millers of Midnapur District,</td>
<td>1.25 Lakhs</td>
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<tr>
<td>4.</td>
<td>Construction of Periphery Road in the Bharatiya Reserve Bank Note Mudran Pvt. Limited, Salboni</td>
<td>Bharatiya Reserve Bank Note Mudran Pvt. Limited, Salboni,</td>
<td>10.00 Lakhs</td>
</tr>
<tr>
<td>5.</td>
<td>Cultivation and preservation of betel leaf</td>
<td>Amritashya Enterprises, Durgachak, Haldia, District: East Midnapore</td>
<td>0.22 Lakhs</td>
</tr>
<tr>
<td>6.</td>
<td>Documentation &amp; recommendation on adaptation of coping strategies for climate variability in Bolangir,</td>
<td>Western Orissa Rural Livelihoods Project (WORLP), Siripur, Bhubaneswar,</td>
<td>1.20 Lakhs</td>
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<tr>
<td></td>
<td>Nutapada, Kalahandi and Bargarh Dist. of Orissa.</td>
<td></td>
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<tr>
<td>7.</td>
<td>Educational and Design Software</td>
<td>Various</td>
<td>0.00 Lakhs</td>
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<tr>
<td>8.</td>
<td>Evaluation of central sector schemes on oilseeds, pulses, oilpalm and maize</td>
<td>Agricultural Finance Corporation, New Delhi</td>
<td>0.50 Lakhs</td>
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<tr>
<td>9.</td>
<td>Evaluation of probable maximum flood for Nagarjun Sagar Dam</td>
<td>Irrigat and CAD, AP</td>
<td>28.00 Lakhs</td>
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<tr>
<td>10.</td>
<td>Evaluation study on activities of soil conservation department DVC</td>
<td>DVC, Hazaribagh,</td>
<td>31.50 Lakhs</td>
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<td>11.</td>
<td>Feasibility study and design of a radial collector well system for South Eastern Railway Kharagpur</td>
<td>S.E. Railway, Kharagpur</td>
<td>2.00 Lakhs</td>
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<td>12.</td>
<td>Intervention analysis of the IGB basin focal project</td>
<td>IWMI, SriLanka</td>
<td>0.00 Lakhs</td>
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<tr>
<td>13.</td>
<td>Milling quality &amp; rice mill performance evaluation</td>
<td>Maa Tara Rice Mill, Chandrakona,</td>
<td>0.05 Lakhs</td>
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<tr>
<td>14.</td>
<td>NREGA Work Evaluation for East Midanapoor &amp; Jhargram districts, W.B.</td>
<td>Ministry of Rural Development (MoRD)</td>
<td>7.00 Lakhs</td>
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<td>15.</td>
<td>Performance Evaluation</td>
<td>Midnapore Rice Mill</td>
<td>0.05 Lakhs</td>
</tr>
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<td>16.</td>
<td>Probable maximum flood estimation for Nagarjunasagar Dam</td>
<td>SE, N.S. Dam Circle, Govt. of A.P.</td>
<td>29.10 Lakhs</td>
</tr>
<tr>
<td>17.</td>
<td>Rain water Harvesting at Bharatiya Reserve Bank Note Mudran Pvt. Limited, Salboni campus, Salboni</td>
<td>Bharatiya Reserve Bank Note Mudran Pvt. Limited, Salboni,</td>
<td>5.60 Lakhs</td>
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<tr>
<td>18.</td>
<td>Rainwater Harvesting</td>
<td></td>
<td></td>
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<tr>
<td>19.</td>
<td>Rainwater harvesting at aluminium refinery, NALCO, Damanjodi</td>
<td></td>
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<td>20.</td>
<td>Rainwater Harvesting at NALCO, Damunjodi, Orissa</td>
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<tr>
<td>21.</td>
<td>Rainwater Harvesting at UAL Bengal Campus</td>
<td></td>
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<td>22.</td>
<td>Rooftop Rainwater Harvesting</td>
<td></td>
<td></td>
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<tr>
<td>23.</td>
<td>Soil and Water Quality Management of Tata Steel</td>
<td></td>
<td></td>
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<td>24.</td>
<td>Solution for elimination of vegetation growth on the Buildings</td>
<td>JUSCO, Sakchi Boulevard Road Northern Town, Bistupu, Jamshedpur,</td>
<td>0.22 Lakhs</td>
</tr>
<tr>
<td>25.</td>
<td>Study of Effect of Mining Activities on Surrounding Water Quality</td>
<td>Tnta Steel, Noamundi,</td>
<td>9.70 Lakhs</td>
</tr>
<tr>
<td>26.</td>
<td>Testing of Rice Mills in Midnapore District</td>
<td>Midnapore Rice Miller's Assn., Midnapore,</td>
<td>0.50 Lakhs</td>
</tr>
</tbody>
</table>
27. Testing the efficacy of controlled-release fertilizer multigro for different crops

28. Utilization of unused and barren land

Technology Transferred

1. ASMA - Developing of training software for Sabai Grass based Product Development : Rs. 4.00 Lakh
2. Progressive Farmers, Entrepreneurs -
   Microirrigation and Protected Cultivation Technology : Rs. 0.00 Lakh
3. Potters of Lodhasuli (WB) - Paddle operated Potter's Wheel : Rs. 0.50 Lakh
4. SODA, Orissa - Sal Leaves Plate & Sabai Grass Rope Making Machines : Rs. 1.10 Lakh
5. Midnapore Cult. & Welfare Assoc. (WB) - Sisal Leaf Fibre Making : Rs. 0.10 Lakh
6. Midnapore Cult. & Welfare Assoc. (WB) - Sugarcane Juice preservation : Rs. 0.01 Lakh
7. R K Mission, Belurmath (WB) - Sustainable Agril. with Low Cost : Rs. 0.53 Lakh

Patents (filed / granted)

1. A Crustless Bread Baking Oven
2. A system for extraction of essential oil from plants/parts thereof bearing essential oil
3. Development of an integrated reservoir based canal irrigation model
4. Digital Slip Meter for 2-wheeled Drive Tractors
5. Improved Design of Pumping System for Hand Pumps
6. IRCIM Integrated Reservoir Based Canal Irrigation Model
7. Novel technique for production of soluble green tea powder and granules
8. Paddle operated Potter's Wheel
9. Process for Fish Scale Protein Concentrate as Adhesive
10. Process technology for manufacture of dahi (curd) powder
11. Rain Harvester : User-friendly software package for the planning, design and analysis of rainwater harvesting systems
12. Sensor for Automated Micro-irrigation System

Visits Abroad by Faculty Members

1. Mitra, Adinpunya
   Research stay (Technical University of Braunschweig, Germany) May 19 to July 16
2. Ghosh, Bijoy Chandra
   Participated in International Conference on Agricultural and Biological Engineering (Rhode Island) July 2008, 4 days
3. Raghuwanshi, Narendra Singh
   To co-author a book (University of Guelph) May 18-July 18
4. Dutta Gupta, Snehasish
   Collaborative Project (Yamaguchi University) May 31 June 30, 2008
5. Panda, Rabindra Kumar
   For Oral Presentation of a Paper (Asian Institute of Technology, Bangkok) January 5-8, 2009
6. Swain, Dillip Kumar
   Participated in Second International Symposium on Food and water Sustainability in Asia 2008 (Macau, China) October 68, 2008
7. Singh, Rajendra
   Co-authoring a text book (University of Guelph, Canada) May 18 - July 18
8. Panda, Sudhindra Nath
   Disaster Management Programme under DAAD Fellowship (Leibniz University Hannover, Germany) May 626, 2008
9. **Panda, Sudhindra Nath** To present a paper in the ASABE Annual International Meeting (Providence, Rhode Island, USA) June 29 - July 2, 2008

10. **Mishra, Hari Niwas** To attend Bilateral Meeting on Indo-Danish Education & Research Collaboration (Danish Agency of Science Technology & Innovation, Copenhagen) May 4-7

11. **Mishra, Hari Niwas** Member of Indian Delegation for interacting with Danish companies, Copenhagen University and DTU (Copenhagen, Denmark) November 9-12

**Invited Lectures by Faculty Members**

1. Hydrological measurements by Raghuwanshi, Narendra Singh (Hazaribagh)
2. Theoretical concepts of GIS by Raghuwanshi, Narendra Singh (DVC, Hazaribagh)
3. Decision support system for management and operation in canal command. by Raghuwanshi, Narendra Singh (Jabalpur)
4. Furrow irrigation modeling: Present and future by Raghuwanshi, Narendra Singh (Delhi)
5. Methodology for Rural Development by Bhadoria, P B Singh (Kolaghat, Engineering Collage)
6. Rural Technology Action Group by Bhadoria, P B Singh (Kalyani)
8. Development of roaster for ready to eat foods by Srivastav, Prem Prakash (NERIST, Nirjuli, Itanagar, Arunachal Pradesh)
9. Active and intelligent food packaging by Srivastav, Prem Prakash (NERIST, Nirjuli, Itanagar, Arunachal Pradesh)
10. Cold chain development in horticultural produce in India by Srivastav, Prem Prakash (NERIST, Nirjuli, Itanagar, Arunachal Pradesh)
11. Development of air recirculatory tray dryer for fruits and vegetables by Srivastav, Prem Prakash (NERIST, Nirjuli, Itanagar, Arunachal Pradesh)
12. Cost-Effective Methods for Sustainable Groundwater Management by Jha, Madan Kumar (New Delhi)
13. Development of an integrated reservoir based canal irrigation model by Singh, Rajendra (IIT Madras (DAAD-IIT Alumni Meet))
15. Hydrological research at IIT Kharagpur by Singh, Rajendra (IIT Delhi (DST initiative on e-Hydrology))
16. Reservoir sedimentation survey by Chatterjee, Chandranath (DVC, Hazaribagh)
17. Application of remote sensing and GIS in watershed and flood management by Chatterjee, Chandranath (DVC, Hazaribagh)
18. Research and development activities related to Farm Machinery & Power in IIT Kharagpur by Raheman, Hifjur (M/s John Deere, Pune)
19. Production, processing and marketing of Betel leaf by Guha, Proshanta (TSR & TBK Degree & PG College, Visakhapatnam)
20. Role of Agril Engineering in the Sustainable Development of Indian Aquaculture for Food Security by Mal, Bimal Chandra (Rajendra Agricultural University, Pusa)
21. Techno-economic Feasibility of Integrated Agri-aquaculture A Case Study. by Mal, Bimal Chandra (Shillong, Indian Science congress)
22. Post Harvest Handling and Processing Technologies for Perishable Foods by Prasad, Suresh (G B Pant University if Agriculture and Technology, Pantnagar)
23. Innovations in Drying Technologies for Food Processing by Prasad, Suresh (Anand Agricultural University, Anand, Gujrat)
24. Reservoir Sedimentation and Treatment Plan in Upper DVC by Tiwari, Kamlesh Narayan (Soil Conservation Department, DVC, Hazaribagh, Jharkhand) 
25. Fertigation and Chemigation by Tiwari, Kamlesh Narayan (IARI, New Delhi) 
26. Automation in Microirrigation by Tiwari, Kamlesh Narayan (PFDC, UAS, GKV, Bangalore) 
28. Automation in Protected Cultivation by Tiwari, Kamlesh Narayan (Precession Farming Development Centre, IIT Kharagpur) 
29. Indo-US Bilateral Workshop on Post Harvest Technology, Cold Chain Management and Food Safety Issue by Prasad, Suresh (Amity University, Noida, Delhi) 
30. Process and machinery development for production of Indian dairy foods by Das, Hrishikes (Panjim, Goa) 
31. Food processing experimentation and drawing meaningful conclisions and Vacuum drying of foods by Das, Hrishikes (NERIST, Arunachal Pradesh) 
32. Principles of food preservation by Das, Hrishikes (Kendriya Vidyalaya, IIT Kharagpur) 
33. Vehicle Integration (06 Lectures) by Pandey, Keshaw Prasad (Mahindra & Mahindra Ltd Mumbai) 
34. Tractor Design Trends in India by Pandey, Keshaw Prasad (IIT Kharagpur) 

Books Published 

Seminars, Conferences and Workshops Organised
1. Efficient Rural Technology 
2. Launching Workshop of NAIP Projects on HPP of High Value Pewrishables 
3. National Meet on Tractor and Allied Machinery Manufacturers (TAMM-2008) 
4. RuTAG NGOs 
5. Workshop of Farm Implements and Machinery (FIM) 

Short-Term Courses, Training Programmes and Workshops organized
1. Awareness on Plasticulture Technology (April 27, 2008) 
2. Engineering & Management in Fisheries & Aquaculture (April 29 May 09) 
3. Engineering Orientation Course for Fishery & Aquaculture Scientists Officers & Teachers (September 02-12) 
4. Engineering Orientation Course for Fishery & Aquaculture Scientists, Officers and Teachers (September 02-12, 2008) 
5. Greenhouse Technology for nursery management (August 28-29, 2008) 
6. Industrial Safety Engineering for TATA Steel Officials (12.5.08-8.8.08) 
8. Micro-irrigation and greenhouse technology (December 0203, 2008) 
9. National Resources Planning for Rural Livelihood in Murshidabad District, West Bengal (4 Days) 
10. Precision Farming in Horticulture (November 1819, 2008) 
11. Precision Farming Technology (December 29-30, 2008) 
12. Precision Farming Technology for Floriculture (September 08-09, 2008) 
13. Pressurized Irrigation (September 2324, 2008) 
14. Protected Cultivation Technology (July 17-18, 2008) 
15. Sprinkler and Micro Irrigation (July 2930, 2008) 
16. Trainers Training Programme on Modern Rice Mill Operation & Maintenance (2 weeks) 
17. Training Program on - 'Natural Resources Planning for Rural Livelihood in Murshidabad District, West Bengal (November 10-14, 2008)
DEPARTMENT OF ARCHITECTURE & REGIONAL PLANNING

HEAD : Professor Arif Noman Merchant

FACULTY

Professors
Banerjee, Uttam Kumar Ph.D. (IIT Kharagpur)
Datta, Rabindranath Ph.D. (IIT Kharagpur), Urban Planning, Transportation Planning
Merchant, Arif N Ph.D. (Cincinnati, USA), Urban Design, City Planning, GIS in Planning
Sen Gupta, Biplab Kanti MCP (IIT Kharagpur), Urban and Regional Planning, Architectural Design for Institutional Buildings

Associate Professors
Basu, Sanghamitra Ph.D. (IIT Kharagpur), Urban Conservation, Land Use Land Cover Dynamics
Chattopadhyay, Subrata Ph.D. (IIT Kharagpur), Housing
Sen, Joy Ph.D. (IIT Kharagpur), Regional Infrastructure Planning and Settlement Dynamics, Architectural Heritage Studies, Community Livability Studies
Sen, Somnath Ph.D. (IIT Kharagpur), Water Sensitive Urban Planning and Environmental Planning

Assistant Professors
Ahmed, Mokaddes Ali Ph.D. (IIT Kharagpur)
Chakraborty, Banhi Ph.D. (IIT Kharagpur), Planning and Technology Transfer
Dutta, Joydeep MUP (Illinois), Graphic Design and Visual Communication, Decision Modelling for Retail Location
Majumdar, Tapan Kumar MCP (IIT Kharagpur), Working environment in industries
Mazumder, Tarak Nath Ph.D. (IIT Kharagpur), City Planning
Pandit, Deapratim Ph.D. (University of Tokyo), Environmental Systems, Land Use and Transportation Planning, Transit Planning, GIS and Remote Sensing, Urban and Regional Planning, Real Estate Development

Faculty Appointments
Dr. Abraham George Associate Professor

ANNUAL REPORT 2008-2009 [44]
Faculty Resignation
Dr. Joydeep Dutta Assistant Professor
Dr. Mokaddes Ali Ahmed Assistant Professor

Brief Description of on-going activities
3. Infrastructure and Spatial Planning (Transportation Planning, Traffic Engineering and Management, Hazards and Disaster Mitigation and Management, Urban Design, Eco-tourism, Recreation and Landscape Planning, Conservation and Preservation Studies, Housing and Shelter, Social Infrastructure)

Thrust Areas
1. Urban information system
2. Energy efficient building design

New Acquisitions
1. 10 licenses of DesignBuilder and EnergyPlus Building Energy simulation software from USAID ECO-III project

Lectures by Visiting Experts
1. Care Retirement Community Design by Shekhar Bhushan (SB-Architecture, P.C., Inc, Denver Colorado)

Doctoral and MS Degrees Awarded
1. Maiti Maitreyi Development Approach of a Metropolitan Fringe in Transition : Kolkata Metropolis (Ph.D.)

Fellow - Professional Bodies
1. Datta, Rabindranath (1998) Fellow - Institute of Town Planners India
4. Sen, Somnath (2007) Nominated Fellow - Institute of Town Planners, India

Member - Editorial Board
5. Sen Gupta, Biplab Kanti (2007) Member of Editorial Board - ABACUS

Awards & Honours
1. Chattopadhyay, Subrata (2008) Plaque of Recognition presented by President IAHS for conducting 37th IAHS World Congress in India and contribution to the field of housing

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Development of Women Technology Park in Nayagram, Tribal Block, Paschim Medinipur, WB</td>
<td>Department of Science and Technology, New Delhi</td>
<td>Rs. 24.71 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Environmental Impact of Coal Mines Closer and Ecological Rehabilitation of Mining Area of India and Romania</td>
<td>Department of Science and Technology, New Delhi</td>
<td>Rs. 5.18 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>Historical Evolution of India - An AV documentation (III Workshops completed between Feb 07 - July 08)</td>
<td>R.K.M. Institute of Culture, Golf Park</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>National Programme for Capacity Building of Architects for Earthquake Risk Management</td>
<td>Ministry of Home Affairs, New Delhi</td>
<td>Rs. 25.45 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>Study of Ancillary Industry of POSCO-India</td>
<td>POSCO Research Institute</td>
<td>Rs. 21.00 Lakhs</td>
</tr>
<tr>
<td>6</td>
<td>Technology Development and Transfer for Selected Medicinal Plants : Approach through T&amp;D and Ex-situ cultivation</td>
<td>National Medicinal Plants Board, New Delhi</td>
<td>Rs. 15.00 Lakhs</td>
</tr>
</tbody>
</table>

Consultancy Projects

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<tr>
<th>#</th>
<th>Title</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A Concept plan for Proposed Campus of Aliah University at Kolkata</td>
<td>Aliah University at Kolkata, Government of West Bengal</td>
<td>Rs. 0.35 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Administrative Office Building of Bankura Zilla Parishad</td>
<td>Bankura Zilla Parishad, West Bengal</td>
<td>Rs. 7.50 Lakhs</td>
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<tr>
<td>3</td>
<td>Advisory Services for Development of New Campus for RGIIM, Shillong</td>
<td>Rajiv Gandhi Indian Institute of Management, Shillong</td>
<td>Rs. 1.12 Lakhs</td>
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<tr>
<td>4</td>
<td>Annexe Building of IIT Extension Centre, Salt Lake City, Kolkata</td>
<td>IIT Kharagpur</td>
<td>Rs. 7.50 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>Architectural Design and Drawing of Chawk Bazar Market Complex</td>
<td>Chairperson Bankura Municipality</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
<tr>
<td>6</td>
<td>Architectural Design for New Academic Complex at Bankura Unnayani Institute of Engineering</td>
<td>Bankura Unnayani Institute of Engineering Subhankar Nagar, Pobagan, Bankura</td>
<td>Rs. 8.97 Lakhs</td>
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<tr>
<td>7</td>
<td>Architectural Design of the proposed School of Medical Science &amp; Technology and Rubber Technology Centre</td>
<td>IIT Kharagpur</td>
<td>Rs. 4.50 Lakhs</td>
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<tr>
<td>8</td>
<td>Bus Stand at Khatra</td>
<td>Khatra Panchayat Samity, Bankura, West Bengal</td>
<td>Rs. 2.50 Lakhs</td>
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<tr>
<td>9</td>
<td>City Development Plan</td>
<td>Haldia Development Authority</td>
<td>Rs. 20.00 Lakhs</td>
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<tr>
<td>10</td>
<td>City Development Plan for Burdwan Planning Area</td>
<td>Bardhaman Development Authority</td>
<td>Rs. 11.20 Lakhs</td>
</tr>
</tbody>
</table>
11. Concept Plan for City Centre, Midnapur-Kharagpur
   MKDA, Rs. 2.50 Lakhs

12. Ecocity : Environmental Development Project of Vrindavan (GTZ) (ASEM) Germany,
   Central Pollution Control Board, New Delhi, Rs. 8.00 Lakhs

13. Establishment of Indian Institute of Corporate Affairs
   Ministry of Corporate Affairs, Rs.160.70 Lakhs

14. Interior Design of Auditorium of Bankura Zilla Parishad Mobility Improvement Plan
   Bankura Zilla Parishad Haldia Development Authority, Rs. 20.00 Lakhs
   Rs. 15.50 Lakhs

15. Perspective Plan - Vision 2030 & Comprehensive Development Plan for Bhubaneswar Cuttack Urban Complex
   Orissa Housing & Urban Development Department, Rs.169.00 Lakhs

   ADDA, Rs. 27.55 Lakhs

17. Perspective Plan for Midnapore-Kharagpur Planning Area
   Midnapore-Kharagpur Development Authority, Rs. 18.08 Lakhs

18. Preparation of Aizawl master Plan
   Aizawl Development Authority, Rs. 70.00 Lakhs

19. Preparation of City Developemnt Plan for Bardhaman Planning Area
   Burdwan Development Authority, Rs. 11.23 Lakhs

20. Preparation of Concept Note & EOI for establishment of Biotechnology Park at Kharagpur
   West Bengal Industrial Dev. Corporation Ltd., Rs. 26.45 Lakhs

21. Rani Laxmi Bai Girls Hostel At I.I.T Kharagpur
   I.I.T Kharagpur, Rs. 18.00 Lakhs

22. Vikram Sarabhai Residential Complex at IIT Kharagpur
   SRIC, IIT Kharagpur, Rs. 9.60 Lakhs

Visits Abroad by Faculty Members
1. Chattopadhyay, Subrata
   Expert Adviser (Sri Lanka) May 28-30 (sufffixing Saturday and Sunday)

2. Sen, Somnath
   Invited speaker in the SCJ symposium on “Water Resource Management in Asia” (Tokyo, Japan) 4 days

3. Sen, Somnath
   Paper Presenter in 11th International Conference on “Urban Drainage” (Edinburgh, Scotland) 5 days

4. Sen, Joy
   paper in 8th Int. Conference on “Eco-Balance” and Visiting Lecture at IR3S, University of Tokyo (Tokyo, Japan) 5 days

5. Sen Gupta, Biplab Kanti
   DST Project on “Env. Impact of Coal Mine Closer and Rehabilitation of Mining Areas” (IRJ) (Visited Petrosan University, Romania) 15 Days

6. Basu, Sanghamitra
   Conference (Germany) 15-17 February

Invited Lectures by Faculty Members
1. Water management to water sensitive planning - a contemporary approach for sustainable urban dev. by Sen, Somnath (Science Council of Japan Symposium, Tokyo)

2. Macro-micro systems approach to Sustainability Studies : a involutionary - evolutionary perspective by Sen, Joy (Center for Sustainability Studies (IR3S) in The University of Tokyo at Japan)


4. Functional Graphics in Built Environment by Barman, Jaydip (Department of Design, Indian Institute of Technology, Guwahati)

5. Sustainable Land Use Plan & Good Governance by Sen Gupta, Biplab Kanti (Port Blair, Andaman)

6. Health facility Planning by Sen Gupta, Biplab Kanti (BIT Meshra)
**Books Published**


**Seminars, Conferences and Workshops Organised**

1. 36th IAHS World Congress on Housing Science

2. XXXVI IAHS World Congress on Housing Science
DEPARTMENT OF BIOTECHNOLOGY

HEAD : Professor Ananta Kumar Ghosh

FACULTY

Professors
Das, Amit Kumar  Ph.D. (Calcutta University), Structural Biology and Protein Chemistry, Crystallographic study of M.tuberculosis and S.aureus proteins
Das, Debabrata  Ph.D. (IIT Delhi), Biochemical Engineering, Biohydrogen Production Technology, Environmental Biotechnology, Microbial Fuel Cell
Dey, Satyahari  Ph.D. (IIT Kharagpur), Bioprospecting, Metabolomics, Molecular farming
Ghosh, Ananta Kumar  Ph.D. (Calcutta University), Molecular virology, Recombinant DNA technology
Kundu, Subhas Chandra  Ph.D. (BHU, Varanasi), Molecular genetics, silk biomaterials, cell based tissue engineering

Associate Professors
Ghosh, Sudip Kumar  Ph.D. (Kalyani University), Molecular and Cellular Parasitology and Nanobiotechnology
Maiti, Tapas Kumar  Ph.D. (Kalyani University), Mushroom derived glucan as Biological response Modifiers, Lectin and lectin derived peptides in cancer therapy, Skin and Bone tissue engineering, Biomicrofluidics and Biochip development

Assistant Professors
Ghosh, Anindya Sundar  Ph.D. (Calcutta University), Microbial genetics, Antimicrobial chemotherapy
Maiti, Mrinal Kumar  Ph.D. (Calcutta University), Plant Molecular Biology, Transgenic Plants, Metabolic Engineering, Biotechnology
Sar, Pinaki  Ph.D. (BHU, Varanasi), Environmental Microbiology and Biotechnology
Sen, Ramkrishna  Ph.D. (IIT Madras), Probiotics and Nutraceuticals

Faculty Appointments
Dr. Mrinal Kumar Maiti  Assistant Professor

Brief Description of on-going activities
1. Process development & optimization for the production of an anti-tumor biosurfactant
2. Alkaline lipase production
3. Production of Biodiesel and its evaluation
4. Bioremediation of heavy metals, radionuclides and organic pollutants; molecular analysis of microbial community structure and function at contaminated sites
5. Development of methods of o-antigens and its relation with pathogenicity in Gram negative bacteria
6. Bioreactor strategies for the enhanced production of probiotic endospores for Nutraceutical formulations and their clinical evaluation
7. Molecular characterization of metronidazole activation and deactivation pathways in Entamoeba histolytica
8. Molecular cloning and expression of E. invadens chitinase
9. Recombinant protein (therapeutic & diagnostic) expression in plant, animal and microbial systems
10. Structural and functional studies of protein from M. tuberculosis and S. aureus aiming at drug and inhibitor design
11. Improvement of hydrogen production from industrial waste using hybrid bioreactor
12. Continuous hydrogen production by immobilized recombinant E. coli BL-21
13. Molecular analysis of cypovirus infecting tasar silkworm
14. Phytomedicine and molecular farming
15. Development of silk (fibroin and sericin) based Biomaterials and cell based tissue (skin and bone) engineering
16. Development of low fat content transgenic oilseed plant
17. Biomicrofluidics and Biochip development
18. Microbial fuel cell

**Thrust Areas**
1. Healthcare Biotechnology (Prospecting novel therapeutics / diagnostics molecules for tuberculosis, cancer)
2. Bio-energy (Production of bio-diesel, bio-ethanol and bio-hydrogen)
3. Bioremediation, Biomaterials and Tissue engineering

**New Acquisitions**
1. Liquid Scintillation counter, Carbon dioxide incubator, Microtome, Laboratory Microscope, cold centrifuge, Ice making machine, Laminar flow cabinet, vertical autoclave, COD analyzer, UPS, UV-Vis spectrophotometer, Gel apparatus, Microcentrifuge.

**International Collaborations**
1. Prof. S. C. Kundu has two collaborative projects on silk protein for developing drug delivery system and cell based tissue engineering with the University of New South Wales, Australia and Tufts University, USA.
2. Prof. A. K. Das has initiated a collaborative project on M. tuberculosis with EMBL, Hamburg, Germany.
3. Prof. D. Das has initiated a multidisciplinary project on renewable hydrogen production with Norwegian foreign ministry, Norway.

**Lectures by Visiting Experts**
1. Structural diversity and generation of ligand specificity. A case study involving plant lectins. by Prof. M. Vijayan (Indian Institute of Sciences, Bangalore)
2. Recombinant Antibodies: Playing with magic bullets by Dr. Biplab Bose (Department of Biochemistry, All India Institutes of Medical Sciences, New Delhi)
3. Tasar sericulture in India by Dr. N. Suryanarayana (Director, CTR&TI, Ranchi)
4. Biopolymer control release of molecules by Dr. G. R. Castro (National University deLaPlanta, Argentina)
5. Bone remodelling: Concerted action of osteoblast and osteoclast by Dr. Prajjal Sinha (University of Texas Health Science Centre, USA)
6. Hepatitis C virus related pathogenesis by Dr. Ratna Roy (St. Louis University, USA)
7. Hypertension and glucose homeostasis: Insight from gene targeted mice and human genomics by Dr. Sushil Mahato (University of California San Diego, USA)
8. Polymeric Biomaterias: Tailoring systems for drug delivery by Dr. Laura Poole-Warren (University of NewSouth Wales, Australia)
9. Application of Luminex technology in molecular diagnosis by Dr. Kakoli Bandopadhyay (Centre for Disease Control and Prevention, Atlanta, USA)
10. Absence of Drosophila melanogaster GSTS-1 protein results massive muscle degeneration and flightless fly. by Dr. Ashis Mondal (University of Arkansas Medical Sciences, USA)


12. Role of Sharp-1 in skeletal muscle regeneration by Dr. Sujata Chatterjee (Mount Sinai School of Medicine)

13. Bacillus probiotics and vaccines by Dr. Simon Cutting (Royal Holloway University of London, UK)

14. Role of intracellular cAMP in resistance against macrophage oxidative damage in Leishmania donovani by Dr. Pijush K. Das (Indian Institute of Chemical Biology, Jadavpur, Kolkata)

15. Regulation of 15-hydroxygenase expression in human blood monocytes by Dr. Ashis Bhattacharya (Lerner Research Institute, Cleveland Clinic Foundation, USA)

16. Role of bacterial cell surface molecule in cellular physiology and infection by Dr. Raja Biswas (University of Tubingen)

17. Electropun fibre architecture as modulators of cellular response in tissue engineering by Prof. Sankha Bhowmick (University of Massachusetts Dartmouth, N. Dartmouth, USA)

18. The other side of Maillard reaction by Dr. Ashis Biswas (Cleveland Clinic Foundation, Cleveland, USA)

19. Targeting Parasitism: Staying one step ahead of microbes by Dr. Vishal Trivedi (Tufts New England Medical centre, Boston, USA)

20. 3D cell culture and tissue engineering principles to understand pathological mechanism by Dr. Sourabh Ghosh (Indian Institute of Technology, Delhi)

21. Biochemical studies on regulators of GTPase cycle of Rab GTPase by Dr. Sunanda Datta (Max Plank Institute, Dresden, Germany)

22. Embryonic stem cell and bacterial artificial chromosome: Tools for the analysis of mutation in the human disease related genes by Dr. Kajal Biswas (National Cancer Institute at Fredrick, Maryland, USA)

23. Structure determination of a DapD from mycobacterium tuberculosis by Ms. Linda Schuldt (EMBL, Hamburg, Germany)

24. Novel Bioactive inhibitors of proprotein convertase Furin as potential therapeutic agents. by Dr. Ajay Basak (Ottawa Health Research Centre, Canada)

25. A tale of Two IF proteins-In health and Disease by Dr. kaushik Sengupta (Northwestern University)

26. Structural and Functional analysis of the Herpes Simplex Virus triplex protein VP19C by Dr. Alakesh Bera (Texas A&M University, USA)

**Doctoral and MS Degrees Awarded**

1. Tumpa Dutta Purification and characterization of Fe-hydrogenase from Enterobacter cloacae IIT-BT08 (Ph.D.)

2. Srirupa Das Genetic dissection of the molecular mechanism operating in cytoplasmic male sterile indica rice with wild abortive cytoplasm (Ph.D.)

3. Dibyarupa Pal Cloning and characterization of genes responsible for activation and inactivation of the drug metronidazole in Entamaeba histolytica (Ph.D.)

4. Chitrangada Acharya Development and characterization of fibroin protein based cell culture matrices from antheraea mylitta and Bombyx mori silkworms (Ph.D.)

5. Rupesh Das Molecular characterization of sericine from tropical tasar silkworm, antheraea mylitta and its protection against oxidative stress (Ph.D.)

6. Sampurna Sattar Molecular characterization of anovel vegetativebinsecticidal protein from Bacillus thuringensis effective against sap sucking insect pest (Ph.D.)

7. HariHara Surya Kumar Potula Cloning, in planta expression and characterization of bioactive human fibroblast growth factor 8b. (Ph.D.)
Fellow - Professional Bodies
1. Das, Debabrata (0)  
   Nominated - INAE
   Nominated - West Bengal Academy of Science and Technology
3. Das, Debabrata (0)  
   Nominated - TWAS2009

Member - Editorial Board
1. Das, Debabrata (2008)  
   Guest Editor (WBT2008) - International Journal of Hydrogen Energy
   Member - Indian Journal of Biotechnology
   Member - Biotechnology for Biofuels
   Member - International Journal of Hydrogen Energy
   Member - International Journal of BioSciences and Technology
   Honourary Member - International Journal of Bioscience & Technology (Online)

Awards & Honours
1. Sar, Pinaki (2007)  
   BOYSCAST Fellowship (DST) to carry our advance research at Rice University, Houston, USA for one year

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A study of microscale transport processes leading to the development of cooling strategy for electronic components</td>
<td>DIT</td>
<td>Rs. 89.75 Lakhs</td>
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<tr>
<td>2.</td>
<td>Amelioration of hydrogen production from sewage sludge using Enterobacter cloacae IIT-BT 08</td>
<td>DBT, GOI</td>
<td>Rs. 14.03 Lakhs</td>
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<tr>
<td>3.</td>
<td>Analysis of microbial community structure present in uranium mine area, Jadugoda</td>
<td>Department of Atomic Energy</td>
<td>Rs. 27.55 Lakhs</td>
</tr>
<tr>
<td>4.</td>
<td>Assessment of microbial diversity and community structure and their role in arsenic transformation and mobilization</td>
<td>Department of Biotechnology</td>
<td>Rs. 29.15 Lakhs</td>
</tr>
<tr>
<td>5.</td>
<td>Baseline survey of microbial community structure present in uranium mine areas of UCIL, Jaduguda, Jharkhand</td>
<td>Department of Atomic Energy</td>
<td>Rs. 46.65 Lakhs</td>
</tr>
<tr>
<td>6.</td>
<td>Biocatalytic production of biodiesel</td>
<td>DST (India)-CNPq (Brazil),</td>
<td>Rs. 1.89 Lakhs</td>
</tr>
<tr>
<td>7.</td>
<td>BioCO2: An integrated multidisciplinary project using solar energy for production of renewable hydrogen combined with CO2 capture, to address global</td>
<td>Norwegian Foreign Ministry, Norway,</td>
<td>Rs. 300.00 Lakhs</td>
</tr>
<tr>
<td>8.</td>
<td>Biohydrogen production by investigation on the hydrogenase coding gene of high yielding strain of Enterobacter cloacae IITBT08 in fast growing E coli</td>
<td>Department of Science &amp; Technology and National Science Foundation (USA)</td>
<td>Rs. 5.25 Lakhs</td>
</tr>
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<td>9.</td>
<td>Bioinformatics SUB-DIC Programme (DIC)</td>
<td>DBT, New Delhi</td>
<td>Rs. 10.00 Lakhs</td>
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<tr>
<td>10.</td>
<td>Bioprocess Development &amp; Optimization for the Production and Characterization of a Biosurfactant of Marine Origin for Commercial &amp; Health-care Applica</td>
<td>Department of Biotechnology (DBT)</td>
<td>Rs. 35.16 Lakhs</td>
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<tr>
<td>No.</td>
<td>Project Title</td>
<td>Funding Agency</td>
<td>Budget (Lakhs)</td>
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<td>11.</td>
<td>Bioprocess Development and Optimization for the Production of an Anti-tumor Biosurfactant</td>
<td>SRIC, IIT, Kharagpur</td>
<td>3.00</td>
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<td>12.</td>
<td>Bioprocess Development, Optimization and Bioreactor Strategies for the Laboratory Scale Manufacture of Nutraceutical Formulations</td>
<td>Council of Scientific &amp; Industrial Research (CSIR)</td>
<td>13.00</td>
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<tr>
<td>14.</td>
<td>Biosynthetic silk hydrogel extracellular matrix analogues for mammalian cell support and drug delivery (IAB)</td>
<td>DBT, New Delhi</td>
<td>45.42</td>
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<tr>
<td>15.</td>
<td>Biotechnology based value addition of jatropha and neem leaves, oilcakes and oil</td>
<td>NOVOD, ICAR,</td>
<td>9.70</td>
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<td>16.</td>
<td>Cell culture inside the microfluidic channels with extended air-water interface</td>
<td>DBT</td>
<td>0.00</td>
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<td>17.</td>
<td>Characterization of silk protein sericin from Indian tropical tasar silkworms (TSM)</td>
<td>DST, New Delhi</td>
<td>23.18</td>
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<td>18.</td>
<td>Characterization of two histidine kinases and their cognate response regulator involved in signal Transduction system of Mycobacterium tuberculosis</td>
<td>DBT, GOI</td>
<td>23.68</td>
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<td>19.</td>
<td>Cloning and characterization of a fungal protease inhibitor from the hemolymph of tasar silkworm Antheraea mylitta</td>
<td>ICMR</td>
<td>18.00</td>
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<td>20.</td>
<td>Comparative and evolutionary dynamics of repetitive DNA in Indian tropical tasar silkworm -TTS</td>
<td>CSIR, New Delhi</td>
<td>13.00</td>
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<td>21.</td>
<td>Continuous hydrogen production in a photo bioreactor using spent medium of dark fermentation process</td>
<td>DRDO</td>
<td>21.72</td>
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<td>22.</td>
<td>Crystal structure determination of a â-Carbonic anhydrase (mCA) from Mycobacterium tuberculosis</td>
<td>DST, GOI</td>
<td>19.88</td>
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<td>23.</td>
<td>Crystal structure determination of hypothetical secretory proteins from M. tuberculosis</td>
<td>DBT, GOI</td>
<td>26.01</td>
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<tr>
<td>24.</td>
<td>Design and Development of Microbial Fuel Cell</td>
<td>BRNS</td>
<td>13.17</td>
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<tr>
<td>25.</td>
<td>Development of novel nano-composite osteogenic metrics for cell based bone tissue engineering-DRDO (P.I.) [1.7.08-30.6.11]</td>
<td>DRDO</td>
<td>21.60</td>
</tr>
<tr>
<td>26.</td>
<td>Development of durable water-repellant jute geotextiles with natural eco-friendly additive for application in erosion control in river banks and other</td>
<td>JMDC</td>
<td>170.00</td>
</tr>
<tr>
<td>27.</td>
<td>Development of ecofriendly/biodegradable rigid jute based composites</td>
<td>JMDC</td>
<td>0.00</td>
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<td>28.</td>
<td>Development of herbal skin-nourishing gel</td>
<td>TePP, DSIR</td>
<td>5.20</td>
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<td>29.</td>
<td>Development of silk proteins based biomaterials (SPB)</td>
<td>DBT, New Delhi</td>
<td>56.00</td>
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<tr>
<td>30.</td>
<td>Establishment of an in vivo Method for Detection of O-antigens in Gram-Negative Bacteria</td>
<td>Department of Biotechnology, Govt. of India,</td>
<td>21.03</td>
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<tr>
<td>31.</td>
<td>Establishment of Center of Bioprospecting in IIT Kharagpur</td>
<td>DBT</td>
<td>66.50</td>
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<td>32.</td>
<td>Exchange Travel visits program on biofuel and healthcare biotech between University of California, Berkeley and IIT Kharagpur</td>
<td>IUSSTF</td>
<td>29.24</td>
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<tr>
<td>.</td>
<td>Project Title</td>
<td>Funding Agency</td>
<td>Funding Amount</td>
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<tr>
<td>33</td>
<td>Exploring the immunomodulatory potential of mushroom glucan / proteogluolan</td>
<td>DST, Rs. 24.49 Lakhs</td>
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<td>as Biological response modifier in cancer therapy</td>
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<td>34</td>
<td>Expression optimization and partial purification of soluble penicillin-binding</td>
<td>SRIC, IIT, Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
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<td>protein 6 and fusion proteins of PBP 5 and 6 from E. coli</td>
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<td>35</td>
<td>Extraction characterisation and optimised production of a natural dye from</td>
<td>DBT</td>
<td>Rs. 24.40 Lakhs</td>
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<td>Amaranthus for commercial applications</td>
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<td>36</td>
<td>Functional characterization of soluble penicillin-binding protein 6 of E.</td>
<td>DST, GOI</td>
<td>Rs. 21.38 Lakhs</td>
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<td>coli</td>
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<td>37</td>
<td>Generation and Cataloguing of Bast-fibre</td>
<td>DBT, GOI</td>
<td>Rs. 36.45 Lakhs</td>
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<td>Developmental Stage-specific EST library From Jute</td>
<td></td>
<td>Rs. 37.00 Lakhs</td>
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<td>38</td>
<td>Genetic Engineering of Lignin Biosynthetic Pathway in Sorghum</td>
<td></td>
<td>Rs. 47.21 Lakhs</td>
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<td>39</td>
<td>High throughput Glycomics with Lectin microarray (P.I.)</td>
<td>DBT</td>
<td>Rs. 38.46 Lakhs</td>
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<tr>
<td>40</td>
<td>Indo-US Joint Centre on Silk protein matrix for cell based tissue engineering</td>
<td>IUSSTF, New Delhi</td>
<td>Rs. 50.33 Lakhs</td>
</tr>
<tr>
<td>41</td>
<td>Maximization of gaseous energy recovery by simultaneous hydrogen production</td>
<td>DBT, GOI</td>
<td>Rs. 21.55 Lakhs</td>
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<td>and biomethanation</td>
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<td>42</td>
<td>Metabolic engineering of fatty acid biosynthesis to develop nutritionally</td>
<td>DBT, GOI</td>
<td>Rs. 47.21 Lakhs</td>
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<td>improved Brassica seed oil</td>
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<td>43</td>
<td>Metabolic engineering of gibberellins signal transduction pathway for</td>
<td>DST, GOI</td>
<td>Rs. 26.35 Lakhs</td>
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<td>increasing the yield potential of indigenous aromatic rice cultivar</td>
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<td>44</td>
<td>Microbial removal of heavy metals and radionuclides from industrial wastes</td>
<td>DST, GOI</td>
<td>Rs. 7.57 Lakhs</td>
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<tr>
<td>45</td>
<td>Microorganism based bioremediation of heavy metals and radionuclides</td>
<td>CSIR</td>
<td>Rs. 13.46 Lakhs</td>
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<td>containing wastes : understanding the mechanism and process development</td>
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<tr>
<td>46</td>
<td>Molecular analysis of Antheraea mylitta cytoplasmic polyhedrosis virus genome</td>
<td>DST</td>
<td>Rs. 19.74 Lakhs</td>
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<td></td>
<td>segment 1 and 2.</td>
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<td>47</td>
<td>Molecular Analysis of genome segments 6 of Antheraea mylitta cypovirus.</td>
<td>CSIR</td>
<td>Rs. 14.00 Lakhs</td>
</tr>
<tr>
<td>48</td>
<td>Molecular approach for monitoring drug resistant malaria parasite in the</td>
<td>DST</td>
<td>Rs. 6.36 Lakhs</td>
</tr>
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<td>malaria endemic zone in West Bengal</td>
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<tr>
<td>49</td>
<td>Molecular characterization of microbial strains relevant to bioremediation</td>
<td>ISIRD, SRIC, IIT,</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
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<td></td>
<td>Kharagpur</td>
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<tr>
<td>50</td>
<td>Molecular epidemiology and identification of immunodominant antigen of</td>
<td>ICMR, India,</td>
<td>Rs. 20.00 Lakhs</td>
</tr>
<tr>
<td></td>
<td>Entamoeba in amoebic patients</td>
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<tr>
<td>51</td>
<td>Molecular tools for exploitation of heterosis, yield and oil quality in</td>
<td>NAIP-ICAR, GOI</td>
<td>Rs. 395.51 Lakhs</td>
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<td>52</td>
<td>Optimisation of human fibroblast growth factors (diagnostic) production in</td>
<td>MHRD</td>
<td>Rs. 15.00 Lakhs</td>
</tr>
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<td></td>
<td>recombinant plant cells in bioreactor</td>
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<tr>
<td>53</td>
<td>Recombinant DNA for development of a male-sterility system in jute</td>
<td>DBT, GOI</td>
<td>Rs. 37.25 Lakhs</td>
</tr>
<tr>
<td>54</td>
<td>Reconstruction of Epidermal and Dermal cells of skin in collagen three</td>
<td>DBT</td>
<td>Rs. 23.92 Lakhs</td>
</tr>
<tr>
<td></td>
<td>Dimensional Scaffold for Skin Tissue Engineering</td>
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</tbody>
</table>
55. Role of Penicillin-binding proteins and O-antigens in the development of beta-lactam antibiotic resistance in Gram negative bacteria
   ICMR Rs. 15.00 Lakhs

56. Scale-up studies on production of hydrogen from Enterobacter cloacae IIT-BT 08
   Ministry of Non-Conventional Energy Sources Rs. 24.90 Lakhs

57. Selection aided molecular marker system for improvement of tasar silkworm Antheraea mylitta drury.
   Ministry of Textiles, Govt. of India, Rs. 12.00 Lakhs

58. Silencing of gene expression in protozoan parasite Entamoeba histolytica by RNAi
   CSIR, Rs. 14.00 Lakhs

59. Studies on magnetic nanoparticle assisted hyperthermia activation of enediyne in cancer cells
   DBT, Govt. of India, Rs. 29.61 Lakhs

60. Studies on the immunomodulatory properties of Aloe vera gel and its products
   DARL, Pithoragarh, Rs. 9.97 Lakhs

61. Synthesis characterization and application of surface functionalized magnetic metal nano-particles for bioseparation and diagnostics
   DBT, Rs. 60.72 Lakhs

62. Synthesis characterization and application of surface functionalized magnetic metal nano-particles for bioseparation and diagnostics
   DBT, GOI, Rs. 60.72 Lakhs

63. Targeted gene integration in rice and cotton
   NAIP-ICAR, GOI Rs. 83.27 Lakhs

64. Technology development & transfer for selected National Medicinal medicinal plants: approach through R&D and ex-situ cultivation
   National Medicinal Plant Board Rs. 15.00 Lakhs

65. Understanding the signalling mechanism from the crystal structures of the two component system proteins and protein phosphatases of Mycobacterium tube
   DBT, GOI, Rs. 292.80 Lakhs

Consultancy Projects
1. Biocatalyst based continuous production of biodiesel
   PfP Technology LLC., Rs. 10.80 Lakhs Houston, Texas, USA,

2. Establishment of Biotechnology Park Kharagpur : Concept Paper
   WBIDC Rs. 24.00 Lakhs

3. Herbal / bioproduct development: preparation of preliminary report
   B Singha & Co, Rs. 10000.00 Lakhs

Patents (filed / granted)
1. A process for biological production of hydrogen
2. A biofuel additive for diesel engines
3. A Continuous process for the production of ethanol from starchy materials
4. A kit for semi-quantification of CRP in whole blood and process related for manufacture of the same
5. An antihyperglycemic exopolysaccharide (EPS) isolated from Bacillus coagulans RK-02 and a process for the preparation thereof

Visits Abroad by Faculty Members
1. Kundu, Subhas Chandra To deliver invited Lecture in conference (Melbourne, Australia) 31/03/08-3/04/08
2. Kundu, Subhas Chandra Research work on silk proteins and to deliver invited lectures. (University of California, San Diego; Tufts University, Boston; Virginia Commonwealth University, USA) May 16, 2008 to June 18, 2008
Invited Lectures by Faculty Members

1. Microbial biofuel - An alternative source of energy by Sen, Ramkrishna (Belur Math R K Mission Vidyamandira)
2. Environmental Bioremediation - A Biosurfactant based Approach by Sen, Ramkrishna (West Bengal University of Technology, Kolkata)
3. Management and Mitigation of Hazardous Industrial Wastes by Sen, Ramkrishna (Confederation of Indian Industries (CII), Haldia Zonal Office)
4. Nutraceuticals - New generation health boosters by Sen, Ramkrishna (Biotechnology Research Society of India (BRSI), Osmania University, Hyderabad)
5. A Biofuel in need is a biofuel indeed by Sen, Ramkrishna (Institution of Engineers (India), IIT Kharagpur Chapter)
6. Biosurfactants: Jack of all trades - Master of Some by Sen, Ramkrishna (Calcutta University)
7. Therapeutic and Environmental Applications of Microbial surfactants by Sen, Ramkrishna (Central Institute of Fisheries Education (CIFE), Mumbai)
8. Non-mulberry silk fibroin protein as biomaterials by Kundu, Subhas Chandra (Melbourne, Australia)
9. Self assembled silk sericin/poloxamer nanoparticles as nanocarriers of hydrophobic and hydrophilic drugs by Kundu, Subhas Chandra (Sydney, Australia)
10. Natural biopolymers from silkworm by Kundu, Subhas Chandra (San Diego, University of California)
11. Silk protein matrices for potential uses in Biomedical and tissue engineering applications by Kundu, Subhas Chandra (Virginia Commonwealth University, USA)
12. Bacteria like Enzymes of Giardia, Entamoeba and Trichomonas activate and inactivate metronidazole by Ghosh, Sudip Kumar (Molecular Parasitology Meeting, Woods Hole, Massachusetts, USA)
13. Giardia, Entamoeba and Trichomonas activate (nitroreductases) and inactivate (NIMs) metronidazole by Ghosh, Sudip Kumar (77th Annual Meeting of Society of Biological Chemists (India) at IIT Madras, Chennai)
14. Biological Databases and their uses in Bioinformatics by Ghosh, Sudip Kumar (Department of Microbiology, Vidyasagar University, Midnapur (W))

15. Introduction to Bioinformatics and EST database by Ghosh, Sudip Kumar (Bioinformatics Centre, Vidyasagar University, Midnapur (W))

16. Biology of Drug activation and encystation in Entamoeba, the protozoan parasite by Ghosh, Sudip Kumar (Department of Chemistry, NIT Rourkela)

17. Biotechnology and Human Welfare (Keynote Address) by Ghosh, Sudip Kumar (Department of Zoology, Govt. Autonomous College, Rourkela)

18. Prospects of endogenous peptide in cancer. by Maiti, Tapas Kumar (New Delhi)


20. Protein structure and drug design by Das, Amit Kumar (Vidyasagar University)

21. Molecular analysis of cypovirus infecting tasar silkworm by Ghosh, Ananta Kumar (Vidyasagar University)

22. "Improvement of hydrogen production from sewage sludge using microbial consortium" by Das, Debabrata (Mussorrie (Indo-France Workshop on Biohydrogen Production ))

23. Biohydrogen Production Processes: Present state of art by Das, Debabrata (NIT Surathkal)

24. Recent progresses on the Biohydrogen Production Processes by Das, Debabrata (University of Florida, USA)

25. Biohydrogen production as a sustainable future energy resource by Das, Debabrata (University of Miami, USA)

Seminars, Conferences and Workshops Organised

1. Bioinformatics in genomics and proteomics
2. Inception Workshop on "BioCO2: An integrated multidisciplinary project using solar .... production"
3. International Workshop on Biomaterials for Tissue engineering and Biotechnological Applications
4. National Innovation Day
DEPARTMENT OF CHEMICAL ENGINEERING

HEAD : Professor Amar Nath Samanta

FACULTY

Professors
Das, Gargi Ph.D. (IIT Kharagpur), Multiphase Flow, CFD Simulation, Two phase Instrumentation
DasGupta, Sunando Ph.D. (RPI, USA), Microscale Transport Process, Membrane Separation
De, Sirshendu Ph.D. (IIT Kanpur), Membrane Separation, Transport Phenomena, Mathematical Modeling
Mukherjee, Dibyendu Ph.D. (IIT Kharagpur), Multi Phase Flow, Column Flotation, Modeling and Simulation
Samanta, Amar Nath Ph.D. (IIT Kharagpur), Nonlinear Process Control, Process Dynamics and Control

Associate Professors
Basu, Jayanta Kumar Ph.D. (IIT Kharagpur), Reaction Engineering, Adsorption and Separation Science, Waste Water Treatment
Chakraborty, Sudipto Ph.D. (IIT Kharagpur), Real-Time Process Modelling and Simulation, CFD and Heat Transfer
Ganguly, Saibal Ph.D. (IIT Kanpur), Refinery, Petrochemicals, Polymer, Coal, Real-Time Simulation, Control, Optimization
Kundu, Gautam Ph.D. (IIT Kharagpur), Multiphase Operations, Mineral Beneficiation
Meikap, Bhim Charan Ph.D. (IIT Kharagpur), Pollution Prevention and Control, Environmental Pollution Control
Neogi, Sudarsan Ph.D. (Ohio University, USA), PECVD, Surface engineering for Biomedical Application, Thin Film Coatings
Neogi, Swati Ph.D. (Ohio University, USA), Polymer matrix composite development, Development of Thermoset polymer matrix composite : material and manufacturing technologies, Modeling of RTM technology to optimize and to develop a scale-up methodology, Reliability and failure investigation, Development of biobased thermoset composite : material and manufacturing technology, Development nanoparticle filled resin : Characterization and effect of altered properties in ma, Manufacturing and characterization of Long Fiber Thermoplastic Composites, Modeling of LFTC, Manufacturing and characterization of Nanoparticle filled thermoplastic composite
Patwardhan, Anand Vinayak Ph.D. (UDCT Mumbai), Green Technology, Mass Transfer Operations, Heterogeneous Reactions, Microchannel Reactors
Assistant Professors
Chakrabarty, Saikat Ph.D. (University of Houston, USA), Biomedical Engineering, Biofuels, Chemical Reaction Engineering
Ganguly, Somenath Ph.D. (University of Kansas, USA), Flow in thin channel and porous media, Hydrogel, Improved recovery of hydrocarbon
Jana, Amiya Kumar Ph.D. (IIT Kharagpur), Nonlinear control, Modeling and simulation, Process intensification
Kar, Debdulal Ph.D. (IIT Kharagpur), Fluidization Engineering, Mineral Beneficiation,
Ray, Subhabrata M.Tech. (IIT Kharagpur), Petroleum Refining, Process Control
Sengupta, Sonali Ph.D. (UDCT Mumbai), Heterogeneous and Homogeneous Catalysis, Reaction Engineering, Petroleum and Petrochemical Engineering

Scientific Officer
Brahma, Nitosh Kumar Biomedical Engineering and Bact.-Pathogene, Biochemical Microbial Engineering and Biotechnolog, Nano-biotech and Biol. Env. Pollution Control, Organic and Bio-chemistry in CEP, Bioleaching and Nano-technology of Mineral

Faculty Promotions
Dr. Bhim Charan Meikap Associate Professor
Dr. Gargi Das Professor

Faculty Re-employment (Upto 65 years age)
Dr. Ranajit Kumar Saha Emeritus Professor

Faculty Resignation
Dr. Anand Vinayak Patwardhan Associate Professor
Dr. Somenath Ganguly Associate Professor

Brief Description of on-going activities
1. Heterogeneous reactions with application to chemical process development with special emphasis on greener alternatives
2. Utilisation of non-edible oils for manufacturing of value-added chemicals
4. Advanced separation processes involving membranes with emphasis on water purification, dye removal, effluent treatment processes etc.
5. Simulation and modeling of coal & biomass combustion processes in pulverized and fluidized combustors
7. Development of innovative catalysts from fly ash for organic chemical synthesis (alkylation, isomerisation etc.)
8. Plasma assisted surface modification for chemical engineering applications
10. Technology of composite materials
11. Pattern Formation of Soft Materials utilizing Interfacial Instability
12. Microfluidics and fabrionics for chemical engineering applications

Thrust Areas
1. Green chemical process technology
2. Advanced separation processes & environmental process engineering
3. Multiphase flow and reaction engineering
4. Petroleum reaction engineering & petrochemical processes
5. Nonlinear process control
6. CFD application in chemical processes and equipment design
7. Technology of composite materials
8. Thin Films, Interfacial and Nano Science
9. Hydrogen Production by steam reforming in microreactor
10. Manufacture and testing of Polymer Composites
11. Plasma treatment
12. Microfluidics and Fabrionics

New Acquisitions
1. PLC Trainer Kit
2. Batch Distillation Equipment
3. Heat Transfer in Natural Convection
4. Heat Transfer Through Composite wall
5. Monolith Flow Reactor
6. Cloud & Pour Point Apparatus
7. Ambient Air Monitoring System
8. Spectrometer
9. P/I & I/P Converter
10. Heat Transfer Equipment
11. Distillation Analyzer
12. Research Microscope
13. UV-VIS Spectrometer

International Collaborations
1. Indo-Us Workshop on Microfluidics and Fabrionics (Microfabrication) 2009. January 911, IIT Kharagpur, Jointly organized by Chemical and Mechanical Engineering Department of IIT Kharagpur as a part of the Indo-US Centre on Fabrionics, Sponsored by Indo-US Science and Technology Forum, New Delhi, 2008-2011. Invited lectures by eminent scientists from IIT Kharagpur, IIT Kanpur, IISc. Bangalore, University of California, Irvine, USA, University of Illinois at Urbana-Champaign, USA, Northwestern University, USA, Nagoya Institute of Technology, Japan, Bengal Engineering and Science University, University of Missouri, USA.

2. IIT-Kharagpur has set-up faculty-to-faculty collaborations as well as an annual undergraduate student summer exchange program with the Energy Biosciences Institute at University of California at Berkeley (UCB). As a part of this endeavour, Dr. Saikat Chakraborty, who is the coordinator for the Bioenergy Center that is being established at IIT Kharagpur, has set up research collaborations on cellulose hydrolysis for bioethanol production with Prof. Alex Bell and Prof. Douglas Clark of the Department of Chemical Engineering, UCB. Dr. Saikat Chakraborty visited UCB from February 2428, 2009 to further the collaborations, and delivered an invited lecture on Bioenergy Scenario in India and new Bioenergy Center of IIT Kharagpur at Energy Biosciences Institute of UCB on February 27, 2009.
Lectures by Visiting Experts

1. Hydroformilation of 1-octene using Rhodium Phosphide in a thermomorphic solvent system by Prof. Binay K. Dutta (University Petronas, Malaysia)
2. Development of SMC Composites by Mr. Prabir Guha (CSP Plastics, MI, U.S.A.)
3. Liquid transportation fuels from biomass and coal: A brief overview by Dr. Arun Basu (Gas Technology Institute, Chicago, IL, U.S.A.)

Doctoral and MS Degrees Awarded

1. Chandan Das Treatment of tannery effluent and removal of pollutants using micellar - enhanced ultrafiltration (Ph.D.)
2. Srikanta Dinda Studies in multiphase reactions (kinetics of reactive absorption of carbon dioxide with solutions of amines in aqueous and non-aqueous solvents: Epoxidation of vegetable oils) (Ph.D.)
3. Arun Kumar Jana Hydrodynamics of liquid-liquid two phase upflow through vertical pipeline (Ph.D.)
4. Tapas Kumar Mandal Some studies on liquid-liquid slug flow (Ph.D.)
5. Pinakpani Biswas Nonlinear control and estimation of chemical processes (Ph.D.)
6. Biswajit Sarkar Electric field enhanced ultrafiltration (Ph.D.)
7. Animes K. Golder Studies on electroremediation of aqueous effluents containing heavy metals (Ph.D.)
8. Mitali Das Hydrodynamic studies of gas-solid single and mixed particle systems in a circulating fluidized bed (Ph.D.)
9. B. Rajamohan Wet scrubbing of air pollutants from hot flue gases in a spray-cum bubble column scrubber (Ph.D.)
10. Saptarshi Majumdar Simulation studies on conducting thin film based drug delivery systems (Ph.D.)
11. S. Manigandan Formation and characterization of nano structure and nanopatterns of conducting polymer (MS)

Fellow - Professional Bodies

1. DasGupta, Sunando (2008) Awarded - Senior Associate, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy
3. Mukherjee, Dibyendu (2006) Nominated - The Institution of Engineers (India)

Member - Editorial Board

2. Chakrabarty, Saikat (2008) Honorary Editorial Board Member - International Journal of Medical Sciences and Technology
8. De, Sirshendu (2008) *Guest Editor*
   - International Journal of Environmental and Waste Management
   - International Journal of Biosciences and Technology
10. Meikap, Bhim Charan (2007) *Editorial Board Member*
    - Research Journal of Environmental Sciences
    - International Journal of Environmental Pollution Control and Management
12. Meikap, Bhim Charan (2008) *Guest Editor*
    - Special Issue of "International Journal of Environmental and Waste Management"
    - The Open Chemical Engineering Journal
    - International Journal of Bio-Sciences and Technology

**Awards & Honours**

1. DasGupta, Sunando (2008) *Herdillia Award for Excellence in Basic Research in Chemical Engineering by Indian Institute of Chemical Engineers*

**Sponsored Research Projects**

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A study of Microscale transport processes leading to the development of a cooling strategy for electronics components</td>
<td>Department of Information Technology</td>
<td>Rs. 89.76 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Abatement of Dust, SO2 and NOx by Wet Scrubbing Process</td>
<td>Ministry of Human Resource Development</td>
<td>Rs. 8.00 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>Ammonia Production By Using Urea For Flue Gas Conditioning</td>
<td>National Thermal Power Corporation (NTPC), New Delhi,</td>
<td>Rs. 65.00 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Bio Gas development &amp; training Centre.</td>
<td>Ministry of New &amp; Renewable Energy</td>
<td>Rs. 6.00 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>CFD and experimental study of multi-phase systems (solid-liquid and gasliquid)</td>
<td>IIT Kharagpur - ISIRD, TIFAC, DST, New Delhi, MHRD, Govt. of India,</td>
<td>Rs. 3.00 Lakhs, Rs.346.20 Lakhs, Rs. 9.00 Lakhs</td>
</tr>
<tr>
<td>6</td>
<td>Composite Applications Laboratory</td>
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<td>7</td>
<td>Computational fluid dynamics modeling and flow visualization of a gas liquid mixture through a nozzle and subsequent spray</td>
<td></td>
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<tr>
<td>8</td>
<td>Design of bench scale unit for chemical beneficiation</td>
<td>Tata Steel</td>
<td>Rs. 15.00 Lakhs</td>
</tr>
<tr>
<td>9</td>
<td>Design, Analysis and Control of Internally Heat Integrated Distillation Columns</td>
<td>DST,</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>10</td>
<td>Development of Catalysts for Petroleum Refining from Flyash</td>
<td>MHRD,</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
<tr>
<td>11</td>
<td>Development and application of ceramic foam supported catalysts in petrochemical industries</td>
<td>(Council of Scientific and Industrial Research IIT Kharagpur)</td>
<td>Rs. 8.04 Lakhs, Rs. 3.00 Lakhs</td>
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<tr>
<td>12</td>
<td>Development and characterization of a high efficiency wet scrubber with internals for air pollution control</td>
<td></td>
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<tr>
<td>13</td>
<td>Development of client server and GUI based optimization and control network for utilization in the chemical leaching pilot plant of Tata Steel</td>
<td>Tata Steel Limited, Jamshedpur,</td>
<td>Rs. 11.60 Lakhs</td>
</tr>
<tr>
<td>14</td>
<td>Development of low cost household filter for arsenic and other pollutant free drinking water using modified laterite</td>
<td>Department of Science and Technology</td>
<td>Rs. 20.40 Lakhs</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Funding Agency</td>
<td>Amount</td>
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<tr>
<td>15</td>
<td>Development of new regeneration process with the chemical leaching circuit to upgrade high ash Indian coal</td>
<td>Tata Steel Jamshedpur</td>
<td>Rs. 13.00 Lakhs</td>
</tr>
<tr>
<td>16</td>
<td>Development of sensors for gas-liquid and liquid-liquid two phase flow</td>
<td>MHRD</td>
<td>Rs. 14.00 Lakhs</td>
</tr>
<tr>
<td>17</td>
<td>Flow visualization and theoretical prediction of transition criteria during up flow of liquid-liquid and gas-liquid-liquid mixtures through Vertical aeration</td>
<td>DST, Under the Fast Track Scheme for Young Scientists</td>
<td>Rs. 7.32 Lakhs</td>
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<td>18</td>
<td>Flux enhancement and fouling reduction during effluent (leather &amp; dye) treatment using membrane separation</td>
<td>Department of Science &amp; Technology</td>
<td>Rs. 22.00 Lakhs</td>
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<tr>
<td>19</td>
<td>Formation of ordered meso patterns using interfacial instability and dewetting polymers</td>
<td>DST</td>
<td>Rs. 20.00 Lakhs</td>
</tr>
<tr>
<td>20</td>
<td>Hydrodynamics Studies on Micro Bubble Generators</td>
<td>M/s Tata Steel, Jamshedpur,</td>
<td>Rs. 4.62 Lakhs</td>
</tr>
<tr>
<td>21</td>
<td>Indo-US Centre on Fabrionics</td>
<td>Indo-US Science and Technology Forum, IIT, Kharagpur, under the Mission Project</td>
<td>Rs.495.00 Lakhs</td>
</tr>
<tr>
<td>22</td>
<td>Investigations on oil-water core-annular flow through experiments and theoretical analysis for the production and processing of heavy oils</td>
<td>DST, Govt. of India</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>23</td>
<td>Micellar enhanced ultrafiltration for removal of organic and inorganic pollutants from aqueous streams</td>
<td>DST, Govt. of India</td>
<td>Rs. 10.00 Lakhs</td>
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<tr>
<td>24</td>
<td>Nonlinear State Estimation and Control of a Heterogeneously Catalyzed Reactor</td>
<td>ISIRD</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>25</td>
<td>Performance Evaluation of Bag Filters in the Sponge Iron Plants in Orissa-Field Investigation (State Pollution Control Board, Orissa)</td>
<td>Ministry of Environment &amp; Forest, Govt. of Orissa</td>
<td>Rs. 32.00 Lakhs</td>
</tr>
<tr>
<td>26</td>
<td>Performance Evaluation of Bag Filters in the Sponge Iron Plants in Orissa-Field Investigation Phase-II (PEO) (State Pollution Control Board, Orissa)</td>
<td>Ministry of Environment &amp; Forest, Govt. of Orissa</td>
<td>Rs. 19.00 Lakhs</td>
</tr>
<tr>
<td>27</td>
<td>Performance Evaluation of bag Filters System Installed at Sponge Iron Plants of Orissa (Phases I and II)</td>
<td>State Pollution Control Board, Orissa</td>
<td>Rs. 43.48 Lakhs</td>
</tr>
<tr>
<td>28</td>
<td>Performance study of a hydrocyclone</td>
<td>Tata Steel, Jamshedpur</td>
<td>Rs. 8.00 Lakhs</td>
</tr>
<tr>
<td>29</td>
<td>Process development and engineering analysis of greener routes for commercially important organic diisocyanates, and epoxidised non-edible oils</td>
<td>Sponsored Research &amp; Industrial Consultancy, I.I.T., Kharagpur,</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
<td>30</td>
<td>Removal of Toxic Dyes from Industrial Effluent using a Copmbination of Adsorption and Membrane Separation Process</td>
<td>MHRD</td>
<td>Rs. 8.00 Lakhs</td>
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<tr>
<td>31</td>
<td>Setting up a research and development centre for Damodar Valley Corporation at Kolkata (Phase-I)</td>
<td>Damodar Valley Corp., Kolkata-700054</td>
<td>Rs.2132.70 Lakhs</td>
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<td>32</td>
<td>Steel Technology Centre</td>
<td>DST</td>
<td>Rs.2025.00 Lakhs</td>
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<tr>
<td>33</td>
<td>Studies in Reforming of Metnae to Syn Gas in Mini &amp; Micro-reactor for Production of Hydrogen</td>
<td>Ministry of Chemical &amp; Fertilizer</td>
<td>Rs. 50.00 Lakhs</td>
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<tr>
<td>34</td>
<td>Studies on Effective Use of Microwave Energy for Green Mineral Beneficiation and Pipe Line Slurry Transport</td>
<td>CSIR, New Delhi</td>
<td>Rs. 13.30 Lakhs</td>
</tr>
<tr>
<td>35</td>
<td>Studies on in-situ Reaction and Separation of Steam Reforming Product Mixtures in Membrane Reactor</td>
<td>Ministry of Chemicals &amp; Fertilizer</td>
<td>Rs. 71.53 Lakhs</td>
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<td>36</td>
<td>Studies on Industrially Important Reactions of Aromatics, Alcohols and Alkenes on Large Pore Molecular Sieve Catalysts</td>
<td>IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>No.</td>
<td>Project Description</td>
<td>Funding Agency</td>
<td>Budget (Lakhs)</td>
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<tr>
<td>37</td>
<td>Surfactant based separation processes for the treatment of industrial effluent</td>
<td>MHRD</td>
<td>13.00</td>
</tr>
<tr>
<td>38</td>
<td>Synthesis &amp; Characterization of Semiconducting Polymers</td>
<td>ISIRD grant, SRIC, IIT, Khagagpur,</td>
<td>3.00</td>
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<tr>
<td>39</td>
<td>Synthesis &amp; Engineering of Advanced Materials Using RF Plasma for Chemical, Microelectronic, Biochemical and Biomedical Applications</td>
<td>DST</td>
<td>58.13</td>
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<tr>
<td>40</td>
<td>Upgradation of Coal Fines in a Column Flotation Cell</td>
<td>CSIR, New Delhi</td>
<td>6.13</td>
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<tr>
<td>41</td>
<td>Utilization of Hydrogen Sulphide for the Production of Value-Added Chemicals</td>
<td>Council of Scientific and Industrial Research</td>
<td>11.96</td>
</tr>
<tr>
<td>42</td>
<td>Water lubricated transport of heavy oils experimentation and theory</td>
<td>DST</td>
<td>19.00</td>
</tr>
</tbody>
</table>

**Consultancy Projects**

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Description</th>
<th>Funding Agency</th>
<th>Budget (Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analysis of Blast Furnace Gases</td>
<td>M/s. Tata Metalik Limited, Kharagpur,</td>
<td>0.11</td>
</tr>
<tr>
<td>2</td>
<td>Establishment of Composite Development Center (CDC) to develop and evaluate the components for railway application</td>
<td>Research, Development Standards Organisation, Ministry of Railway, India</td>
<td>7.42</td>
</tr>
<tr>
<td>3</td>
<td>Behavior of coating on optical fiber performance</td>
<td>Sterlite Optical Technologies</td>
<td>0.30</td>
</tr>
<tr>
<td>4</td>
<td>Consultancy input for Data Acquisition and Control at Tata Steel</td>
<td>Tata Steel</td>
<td>2.00</td>
</tr>
<tr>
<td>5</td>
<td>Consultancy Input for design and optimization &amp; evaluation of Technoeconomics</td>
<td>Tata Steel Jamshedpur, Ministry of Railway, India</td>
<td>9.17</td>
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<tr>
<td>6</td>
<td>Consultancy Input for design of operator station with structured database for pilot unit</td>
<td>Tata Steel Jamshedpur, Ministry of Railway, India</td>
<td>6.25</td>
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<tr>
<td>7</td>
<td>Consultancy input for upgradation of Indian Coal at Tata Steel</td>
<td>Tata Steel</td>
<td>9.00</td>
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<tr>
<td>8</td>
<td>Consultancy Input on Design and Hydrodynamics Studies of Micro Bubble Generator</td>
<td>M/s Tata Steel, Jamshedpur</td>
<td>2.50</td>
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<tr>
<td>9</td>
<td>Design and development of a mathematical model for ultra fast cooling of steel strips</td>
<td>Tata Steel, Jamshedpur, Bhubaneswar,</td>
<td>5.61</td>
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<tr>
<td>10</td>
<td>Design of an industrial scale hydrocyclone</td>
<td>Tata Steel</td>
<td>6.56</td>
</tr>
<tr>
<td>11</td>
<td>Design of bubble column with external bubble generator</td>
<td>Tata Steel</td>
<td>6.00</td>
</tr>
<tr>
<td>12</td>
<td>Design verification and critical analysis of bag filters installed at sponge iron plant in Orissa</td>
<td>Orissa State Pollution Control Board, State Pollution Control Board, Orissa, Bhubaneswar,</td>
<td>11.00</td>
</tr>
<tr>
<td>13</td>
<td>Design Verification of Bag Filters installed at various Sponge Iron Plants in Orissa</td>
<td>Orissa State Pollution Control Board, Orissa, Bhubaneswar,</td>
<td>11.82</td>
</tr>
<tr>
<td>14</td>
<td>Design, material development and process Improvement of Optical Fiber cable</td>
<td>Sterlite Technologies Limited, Ind,</td>
<td>4.80</td>
</tr>
<tr>
<td>15</td>
<td>Development of mixing model for alloy dissolution in steel ladles</td>
<td>Tata Steel</td>
<td>4.00</td>
</tr>
<tr>
<td>16</td>
<td>Development Of Software For Design Of Two Phase Flow System With Simple Geometries</td>
<td>Tata Iron and Steel Company Limited, Jamshedpur</td>
<td>2.12</td>
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<tr>
<td>17</td>
<td>Development of Synthetic Resins</td>
<td>Suparna Chemicals Limited, Mumbai,</td>
<td>4.00</td>
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<tr>
<td>18</td>
<td>Exploratory Work on Dry Beneficiation of Iron Ore and Coal Fines</td>
<td>Tata Steel, Neyveli Lignite Corporation Limited,</td>
<td>2.97</td>
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<td>19</td>
<td>Feasibility Study on Calcium Reduction in Ground and Blowdown Water of Thermal Power Stations Using Zeolite to be Synthesized from Lignite Fly Ash</td>
<td>Neyveli Lignite Corporation Limited,</td>
<td>19.00</td>
</tr>
</tbody>
</table>

**ANNUAL REPORT**

2008-2009
20. Lime Calcination project at TISCO | TISCO | Rs. 2.00 Lakhs
21. Optical fiber cable design & process | Sterlite Optical Fiber Technologies Limited | Rs. 0.30 Lakhs
22. Performance Evaluation of Bag Filters System of Sponge Iron Plants in Orissa (Phases I and II) | State Pollution Control Board, Orissa, | Rs. 19.10 Lakhs
23. Real Time Simulator and expert GUI for Blast Furnaces | NML Jamshedpur | Rs. 40.00 Lakhs
24. Scoping Study for development of Chemical Leaching pilot plant for Tata Steel | Tata Steel Jamshedpur | Rs. 3.00 Lakhs
25. Technical Support and guidance to Improve Quality of Lead Acid Battery | Bright Solar, | Rs. 0.25 Lakhs
26. Testing & prototype manufacture of composite products | Various Organizations | Rs. 5.00 Lakhs
27. Training Programme on Pultrusion Technology with Introduction to other Fabrication Method | ZOOM Developers | Rs. 0.44 Lakhs

**Technology Transferred**

1. Rangpur Tea Association Ltd., Alipurduar - Extraction and purification of polyphenol from green tea leaves : Rs. 15.00 Lakh
2. M/s Trimurti Industries Ltd., Assam - Production of Polyphenol powder from green tea leaves : Rs. 40.00 Lakh
3. M/s Trimurti Industries Limited - Technology for extraction of polyphenol from green tea leaves : Rs. 40.00 Lakh

**Patents (filed / granted)**

1. A method for suppressing air core in hydrocyclones and dense medium cyclones with Tata Steel
2. A Modified Multi-Stage Bubble Column for Versatile, High Efficiency Gas-liquid /Gas-Liquid-Solid Contacting, in the name of IIT, Kharagpur
3. An online device for in-situ measurement of low gas flow rates
4. Development of high capacity and cost effective arsenic adsorbent using modified laterite
5. Electric field assisted membrane separation of pectin
6. Implantable Device having Antimicrobial Coating and a Method of Manufacturing the same
7. Membrane based water-extraction of polyphenols from green tea leaves
8. Optical Probe for Multiphase Flow
9. Production of organic fertilizer from tannery effluent
10. Vaginal Microencapsulated Effervescent Contraceptive and its delivery system

**Visits Abroad by Faculty Members**

1. Neogi, Sudarsan | Meeting and Technical discussion for Adhesion Research (International Adhesion Society Meeting at Savannah, USA) 4 days
2. Chakrabarty, Saikat | To attend International Symposium on Chemical Reaction Engineering (ISCRE) - 20 (Kyoto, Japan) September 6-11, 2008
3. Chakrabarty, Saikat | To initiate Institute collaborations with the Biofuels Centers of these universities (University of California at Berkeley, University of California at Davis, Purdue University) Feb 21 to Mar 2, 2009
4. Samanta, Amar Nath | To attend IFAC Congrees (Seoul, South Korea) 7 days

**Invited Lectures by Faculty Members**

1. Pollution Control in Sponge Iron Plants of Orissa by Meikap, Bhim Charan | (State Pollution Control Board, Orissa, Bhubaneswar)
2. Hazardous Waste Treatment Technologies and Management by Meikap, Bhim Charan (Confederation of Indian Industries, Haldia Regional Office, held at Tata Metalicks)
3. Fluidization Engineering and its Application to Energy Conversion Processes by Saha, Ranajit Kumar (NIT Rourkella)
4. Air Pollution Problems and Control Measures in Sponge Iron Plants by Meikap, Bhim Charan (Haldia Institute of Technology, Haldia)
5. India’s Energy Landscape & Biofuels Center at IIT Kharagpur by Chakrabarty, Saikat (University of California at Berkeley)
6. Modified Downflow Bubble Column with Ejector by Mukherjee, Dibyendu (Department of Chemical Engineering, UDCT, Bombay)
7. Composite Applications Laboratory by Neogi, Swati (ICERP-2008, Mumbai)
8. Membrane applications in industries by De, Sirshendu (Jadavpur University)
9. Micellar enhanced ultrafiltration and arsenic removal by De, Sirshendu (Jadavpur University)
10. Membrane based separation technology - some case studies by De, Sirshendu (Tata Bearings, Kharagpur)
11. Fundamentals and modeling of Membrane based processes by De, Sirshendu (Jawaharlal Nehru Technical University, Anantapur)

Books Published

Seminars, Conferences and Workshops Organised
1. ChemInsIghT 2009
2. Composite Moulding Techniques
3. Manufacturing and characterization of polymer matrix composites using molding technology
4. Plasma Technology for Biomedical Application
FACULTY

Professors

Basak, Amit Ph.D. (Calcutta), D.Phil. (Oxon), Design and Synthesis of Novel Enediynes as DNA Cleaving Agents, Artificial peptide cleaving agents, Asymmetric synthesis, Polyphenols, Enzyme inhibition approach to drug design

Bhattacharjee, Manish Ph.D. (NEHU), Inorganic

Chattaraj, Pratim Kumar Ph.D. (IIT Bombay), Density functional theory, Chemical reactivity, ab initio calculations, Quantum chaos, Aromaticity in metal clusters

Mal, Dipak Ranjan Ph.D. (Missouri), Organic synthesis

Pal, Tarasankar Ph.D. (Burdwan University), D.Sc. (Visva Bharati University), Nanoparticle catalysis spectroscopy micellar chemistry environmental chemistry

Pathak, Tanmaya Ph.D. (Uppsala Sweden), Modification of nucleosides and carbohydrates

Pramanik, P Ph.D. (IIT Kharagpur), Nanoscience and technology, Solid-state chemistry

Ray, Debashis Ph.D. (Jadavpur University), Synthesis spectroscopic and magnetic characterizations of paramagnetic cluster complexes, Metallacrown complexes using ketooxime ligands, Catecholase activity of aqua bridged dicopper complexes, Non-hydrothermal route of synthesis of MOFs

Ray, Jayanta Kumar Ph.D. (Calcutta University), Synthesis of Carbocyclic and Heterocyclic Compounds

Roy, Sujit Ph.D. (IIT Kanpur), Organometallic Chemistry, Homogeneous Catalysis

Sarkar, Nilmoni Ph.D. (Jadavpur University), Chemical dynamics in organized assemblies and ionic liquids

Sarkar, Tarun Kumar Ph.D. (Calcutta University), Synthetic organic and organometallic chemistry

Srivastava, Suneel Kumar Ph.D. (IIT Kharagpur), Inorganic Materials and Polymer Nanocomposites

Associate Professors

Bandyopadhyay, Sanjoy Ph.D. (IISc., Bangalore), Molecular modeling and simulations of soft condensed matter, Hydration properties of biomolecules, Protein folding, Protein-DNA complexes and protein-protein association, Self-assembled surfactant films at interfaces

Biradha, Kumar Ph.D. (Hyderabad), Supramolecular Chemistry, Crystal Engineering, Coordination Polymers, Metal-Organic Frameworks, Structural Chemistry, Porous Materials, Polymorphism

Dasgupta, Swagata Ph.D. (RPI New York), Protein Chemistry: Protein ligand binding, Protein Structure Analysis

Dey, Joykrishna Ph.D. (Kanpur), Molecular Self-Assembly Drug Delivery and Enantioseparations
Hajra, Saumen Ph.D. (Pune University), Asymmetrical catalysis and synthesis, Organocatalysis, Asymmetric synthesis of biologically important natural and unnatural compounds, Stereoselective syntheses of paraconic acids, lignans, sesquiterpene lactones etc., Asymmetric synthesis of dopamine D1 agonists

Maiti, Mrinal Mohan Ph.D. (IIT Kharagpur)

Raj, C Retna Ph.D. (M.K University, Madurai), Optical and Electrochemical Biosensors, Inorganic Nanomaterials, Electrocatalysis

Taraphder, Srabani Ph.D. (IISc., Bangalore), Theoretical Physical Chemistry, Computer simulation studies on protein dynamics

Assistant Professors

Dhara, Dibakar Ph.D. (Osmania University, Hyderabad), Polymer Chemistry

Halder, Mintu Ph.D. (IACS, Kolkata), Spectroscopy, Spin-chemistry, Chemical Education

Mahanty (Pathak), Amita Ph.D. (IIT Kharagpur), Synthesis and Characterization of Nanostructured Materials (MoS2, WS2; other sulphides, oxides)

Mani, Ganesan

Nag, Ahindra Ph.D. (Jadavpur University), Bioorganic

Nanda, Samik Ph.D. (IICT, Hyderabad), Organic synthesis, Biocatalysis

Rajakumar Ananthakrishnan Ph.D. (M.K.University, Madurai), Analytical Chemistry, Inorganic Chemistry, Environmental Chemistry

Singh, N D Pradeep Ph.D. (Madras University), Synthesis of new photoremovable protecting groups, Functional group photolithography and its applications, Photochemistry of secondary plant metabolites, Solid state photochemistry

Faculty Appointments

Dr. Ananthakrishnan Rajakumar Assistant Professor

Dr. Dibakar Dhara Assistant Professor

Faculty Promotions

Dr. Nilmoni Sarkar Professor

Dr. C Retna Raj Associate Professor

Dr. Kumar Biradha Associate Professor

Brief Description of on-going activities

The department is actively pursuing research embracing both basic and applied aspects of chemistry. Currently, the department is handling over 40 sponsored projects from various agencies. The department is equipped with various sophisticated instruments: Brucker-Nonius MACH 3 Single Crystal X-ray Diffractometer, a Bruker AC 400 NMR Spectrometer, Bruker AC 400 NMR Spectrometer, Shimadzu DT-40 model 883 IR Spectrometer, PW-1729/1710 X-Ray Diffractometer, Cyclic Voltameter Model P9001, Chrompac Gas Chromatograph and JASCO DIP 370 digital polarimeter, Spex Fluorolog 3 fluorimeter, and a Perkin Elmer C, H, N Analyzer. Active research in synthetic chemistry is underway on the design and synthesis of novel enediyynes as DNA cleaving agents, on the total synthesis of bioactive natural products such as anthracyclines, angucyclines, furocoumarins, indole alkaloids, furoterpenes, lactams and heterocyclic quinonoids. Enzyme mediated synthesis and a substrate analog approach to determine the active site of enzymes is being studied as is the enzyme inhibition approach to drug design. Isolation and characterization of an angiogenic protein is in progress with an aim to determine the specificity by studying several dinucleotide substrates. Supramolecular chemistry relating to thia azarenes and redox switchable receptors is in progress. Development of highly selective and green methodologies based on organometallic, radical and chiron approaches. In the area of catalysis, micellar, zeolite, and bimetallic catalysts are being developed. In the field of Bioinorganic chemistry, research is being pursued on
electron transfer processes with emphasis in dioxygen chemistry. Active research is also underway in the areas of crystal engineering and electroanalytical chemistry. Notable research on various aspects of nanochemistry involve development of metal nanoparticles, nanocrystalline ferrites, ceramics and composites. Materials for high temperature and superconducting applications and solar energy conversion is also underway. Catalysis involving photoactivation techniques and micelle stabilized nanoparticles are currently being investigated to solve environmental pollution related problems. Investigation of solution properties of a number of polymers using a variety of tools is in progress. Studies are also being conducted on the aggregation behavior of polyelectrolytes and block copolymers in aqueous media. Capillary electrophoresis is being employed for the chiral separation of drugs. Photophysical studies of different organic molecules in pure solution and organized assemblies are being investigated using fluorescence spectroscopy. Theoretical physical chemistry in the department includes studies relating to density functional theory, chemical reactivity, ab initio calculations, quantum chaos; chemical reaction dynamics in liquids and biological macromolecules, molecular modeling and computer simulation studies of complex biological systems such as: membranes, proteins etc. Protein structure analysis on the loop regions in proteins is also underway.

Thrust Areas
1. Biomimics
2. Transition Metal Cluster Complexes
3. Structural Coordination Chemistry
4. Ferromagnetic Metal Complexes
5. Drug Design
6. Chemical and Electrochemical Sensors
7. Molecular Modeling
8. Protein Folding & Enzymatic Catalysis
9. Spectroscopy of Assemblies
10. Green Chemistry; Nanochemistry
11. Catalysis.

Lectures by Visiting Experts
1. From Porous Capsules to Encapsulation Chemistry: Perspectives of Chemistry Under Confined Conditions by Dr. Sanjit Konar (Universitat Bielefeld, Fakultat fur Chemie, Bielefeld, Germany)
2. Exchange-Coupled Polynuclear Compounds: Phosphonae an Old Ligand with New Faces by Dr. Sumit Khanra (Department of Chemistry, University of Glasgow, UK)
5. Polymers, Amphiphiles & Polyelectrolyte Multilayer (PEM) In Applied Biotechnology by Dr. Kaushik Mukherjee (Department of Chemistry, MIT, USA)
6. Chemistry through electrostatic Viewglasses by Prof. S. R. Gadre (Department of Chemistry, University of Pune)
7. Modifications of natural Aminoglycosides in the search for antibiotic or antiviral agents by Prof. Jean-Luc Decout (Department of Molecular Pharmacology, University of Grenoble/CNRS, France)
8. Quantum Chemistry in the Age of the Second Coming of Plastics by Prof. S. Ramasesha (Solid State and Structural Chemistry Unit, Indian Institute of Science, Bangalore)
9. Tailored Electroceramics: Role of Nanoscience and Crystallographic Structure by Dr. A. K. Tyagi (Head, Solid State Chemistry Section, Chemistry Division, Bhabha Atomic Research Centre, Mumbai)
10. Cationic Amphiphiles: Promising Carriers of Genetic Materials in GeneTherapy by Dr. Arabinda Chaudhuri (IICT, Hyderabad)
11. Total Synthesis of Natural Products and Natural Product-like Molecules from amino acids and their Pharmacological Evaluation by Dr. Gautam Panda (Medicinal and Process Chemistry Division, Central Drug Research Institute, Lucknow)

12. Laser Spectroscopic Investigation on the Binding of Biomolecular Complexes Using by Dr. Chayan Kanti Nandi (Institut fur Physikalische und Theoretische Chemie, J. W. Goethe Universitat, Frankfurt Am Main, Germany)

13. DNA-methylation and Cancer Epigenetics: A Role for Ras-MAPK Signaling Originating from Plasma membrane Lipid Raft by Dr. Samir Kumar Patra (Department of Experimental Medicine, University of Parma, Parma, ITALY)

14. 3d-4f Heterometallic Trinuclear Compounds: A New Family of Single-Molecule Magnets. by Prof. V. Chandrasekhar (Lalit Kapoor Chair Professor & Head, Department of Chemistry)

15. Understanding the Ionic Liquids by Studying Photo-induced Processes in these Media by Prof. Anunay Samanta (Department Of Chemistry, University of Hyderabad)

16. Stoichiometric application of p-organoiron complexes to organic synthesis by Dr. Subhabrata Chaudhury (Medical College of Wisconsin, USA)

17. The Other Side of Maillard Reaction by Dr. Ashis Biswas (Department of Pathobiology, Cleveland Clinic Foundation, Cleveland, OH, USA)

18. Structure-Property studies in Cobaloximes by Prof. B. D. Gupta (Department of Chemistry, IIT Kanpur)

19. CrSi2 - Thermoelectric Material for High Temperature Applications? by Prof. Arun M. Umarji (Materials Research Centre, Indian Institute of Science, Bangalore)

20. New Methods for Chiral Discrimination and Asymmetric Control Utilizing the Cooperative Effect of Dynamic and Axial Chiralities by Dr. Kalluri V.S. Ranganath (Institute for Materials Chemistry and Engineering, Kyushu University, Fukuoka, Japan)

21. Towards Development of Novel Strategies for Synthesis of Heterocyclic Compounds using the Baylis-Hillman Adduct by Prof. D Basavaiah (School of Chemistry, Central University of Hyderabad)

22. HSAB and Ore Genesis: A Tentative Approach by Prof. J L Vigneresse (Universite Henri Poincare, Nancy, France)

23. Materials for Tomorrow by Prof. J M Saiter (Laboratoire D'Etudes et de Caracterisation des Amorphes, Rouen, France)

24. Dr. J.C. Ghosh Memorial Lecture - Molecular and Cellular Approaches to Understand and Treat Some Diseases of the Eye by Prof. D. Balasubamanian (L.V. Prasad Eye Institute, Hyderabad)

25. National Chemistry Week Celebration and Inauguration of CRSI Local Chapter - Glimpses into the Magical World of Chemistry by Prof. B.M. Deb (IISER, Kolkata)

Doctoral and MS Degrees Awarded

1. Arjun Ghosh
   Physicochemical Characterization, Self-assembly Formation, and Enantioselectivity of N-(2-Hydroxyalkyl)-L-amino Acid Amphiphiles (Ph.D.)

2. Sagar Pal
   Synthesis, Characterization, Flocculation and Rheological Characteristics Polysaccharides (Ph.D.)

3. Sudip Nath
   Synthesis, characterization, spectroscopic and catalytic aspects of nanoparticles (Ph.D.)

4. Manindranath Bera
   Studies on mono-, di- and tetranuclear complexes of 3d transition elements: synthetsi and bioinorganic model aspects (Ph.D.)

5. Subhas Chandra Ghosh
   Synthesis of beta lactams, lactam based peptidomimetics (Ph.D.)

6. Sumita Roy
   Synthesis, Characterization and Self Assembly Studies of Some Selected N-Acylamino Acid surfactants and Corresponding Polyssoaps in Water (Ph.D.)

7. Kalyan Sundar Ghosh
   Inhibition Studies of Ribonuclease A and Angiogenin: Interactions of the Inhibitors with Serum Albumin (Ph.D.)

8. Susmita Behera
   Electroanalytical Applications of Self-Assembled Monolayer of Organosulfur Compounds (Ph.D.)
2. Chattaraj, Pratim Kumar (2009) Fellow: Indian Academy of Sciences, Bangalore
8. Basak, Amit (0) Nominated - National Academy of Sciences
9. Basak, Amit (0) Nominated - Indian National Science Academy

Member - Editorial Board
1. Basak, Amit (2007) Editorial Advisory Board Member - Chemical Communications
7. Dasgupta, Swagata (5) Editorial Board Member - Protein and Peptide Letters
11. Pathak, Tanmaya (2009) Member of the Editorial Board - Carbohydrate Research
12. Pramanik, P (2005) Member of national committee - Indian Journal of Chemistry, Section A
15. Srivastava, Suneel Kumar (2008) Advisory Committee Member - Recent Patents on Nanotechnology

Awards & Honours
2. Sarkar, Tarun Kumar (2009)  
   *P. C. Dutta Memorial Lecture Award*


   *Top-cited Author Awards from Elsevier (for two of our Bioorg. Med. Chem. Papers). Many papers have become hot/most-cited/most-accessed/cover articles.*

**Fellowships**

   *The Royal Society, India-UK Science Network*

**Sponsored Research Projects**

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
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<tbody>
<tr>
<td>1</td>
<td>A conceptual DFT approach towards metal toxicity</td>
<td>BRNS, Mumbai</td>
<td>Rs. 7.00 Lakhs</td>
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<tr>
<td>2</td>
<td>Application of high resolution NMR spectroscopy in complex chemical and biochemical systems</td>
<td>DST</td>
<td>Rs. 198.00 Lakhs</td>
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<td>3</td>
<td>Application of nanoparticles for delivery of drug to drug resistant bacteria and oral squamous carcinoma cell line.</td>
<td>DBT</td>
<td>Rs. 15.00 Lakhs</td>
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<td>4</td>
<td>Assessment of biological activity and toxicity : An in Silico investigation based on the combined quantum mechanics and molecular dynamics study</td>
<td>CSIR, New Delhi</td>
<td>Rs. 12.00 Lakhs</td>
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<td>5</td>
<td>Asymmetric Methods for the Synthesis of Substituted Butyrolactones: Enantioselective Synthesis of Biologically Active Compounds</td>
<td>CSIR, New Delhi</td>
<td>Rs. 10.50 Lakhs</td>
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<td>6</td>
<td>Biotechnology based value-addition to leaves, oilseeds &amp; cakes of neem and Jatropha</td>
<td>NOVAD</td>
<td>Rs. 10.00 Lakhs</td>
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<td>7</td>
<td>Carbon nanotube supported electrocatalyst for fuel cells and metal air battery applications</td>
<td>DRDO</td>
<td>Rs. 34.96 Lakhs</td>
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<td>8</td>
<td>Catalyst Designing and its Application in Organic Synthesis</td>
<td>ISIRD, SRIC, IIT KGP</td>
<td>Rs. 5.00 Lakhs</td>
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<td>9</td>
<td>Catalytic and Enantioselective 1,2-Halo-Nucleophilic Addition Reactions of Alkenes</td>
<td>DST, New Delhi</td>
<td>Rs. 23.12 Lakhs</td>
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<td>10</td>
<td>Characterization of Micelles, Reverse Micelles in Room temperature ionic liquids (RTILs) using Dynamic Light Scattering, Fluorescence Spectroscopy and</td>
<td>DST</td>
<td>Rs. 38.55 Lakhs</td>
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<td>11</td>
<td>Combinatorial biocatalysis: Generation of compound libraries based on small molecule scaffold, taking the lead from nature</td>
<td>DST, ISIRD (IIT-KGP)</td>
<td>Rs. 20.00 Lakhs</td>
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<td>12</td>
<td>Cooperative Bimetallic Catalysis</td>
<td>DST,</td>
<td>Rs. 31.00 Lakhs</td>
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<td>13</td>
<td>Crystal Engineering Studies on Derivatives Containing 2° Amide and Pyridine Functional Groups: Design and Applications</td>
<td>CSIR,</td>
<td>Rs. 11.46 Lakhs</td>
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<td>14</td>
<td>Design of 'anion recognition' short peptide motifs: an approach towards designing 'model scaffolds' for binding</td>
<td>DBT Multi Institutional</td>
<td>Rs. 3.20 Lakhs</td>
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<td>15</td>
<td>Design of Organic-Inorganic Hybrid Materials with Porous and/or Chiral Properties</td>
<td>DST</td>
<td>Rs. 18.72 Lakhs</td>
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<td>16</td>
<td>Design, Synthesis and Characterization of Lipophilic Polyelectrolyte Gels</td>
<td>DST, New Delhi</td>
<td>Rs. 20.40 Lakhs</td>
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<td>17</td>
<td>Design, Synthesis and Reactivity of Azobenzene-Based Peptide and DNA Cleaving Agents</td>
<td>CSIR,</td>
<td>Rs. 16.00 Lakhs</td>
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<td>Amount (Lakhs)</td>
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<td>18.</td>
<td>Development and characterization of nanofillers in polymer composites</td>
<td>MHRD</td>
<td>20.00</td>
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<td>19.</td>
<td>Development and characterization of organic polymer-inorganic materials nanocomposites</td>
<td>CSIR</td>
<td>6.60</td>
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<td>20.</td>
<td>Development and characterization of semiconducting thin films of layer transition metal dichalcogenides</td>
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<td>21.</td>
<td>Development of nanorods, nanotubes and mesoporous metal oxide gas sensors,</td>
<td>CSIR, New Delhi</td>
<td>15.00</td>
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<td>22.</td>
<td>Development of nanostructured transducer for amperometric and microgravimetric applications</td>
<td>DST</td>
<td>31.43</td>
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<td>23.</td>
<td>Development and characterization of semiconducting nanotubes and nanorods for thermoelectric applications</td>
<td>DST</td>
<td>17.00</td>
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<td>24.</td>
<td>Early Transition Metal Catalysts for Aqueous Medium</td>
<td>DST</td>
<td>24.00</td>
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<td>25.</td>
<td>Electrophoresis of Polyethylene Glycol Copolymers</td>
<td>SRIC, IIT Kharagpur</td>
<td>3.00</td>
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<td>27.</td>
<td>Epoxy-reinforced inorganic material filled organic polymer composites in tribological applications</td>
<td>DRDO</td>
<td>24.60</td>
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<tr>
<td>28.</td>
<td>Generation &amp; reactivity of bimetallic tin-transition metal complexes</td>
<td>CSIR</td>
<td>3.00</td>
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<td>29.</td>
<td>Hyperthermia on Enediyenes</td>
<td>DBT,</td>
<td>36.00</td>
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<td>30.</td>
<td>Interaction of dietary polyphenols and their copper complexes with human serum albumin</td>
<td>DST</td>
<td>29.00</td>
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<tr>
<td>31.</td>
<td>Interactions between Water-Soluble Hydrophobically Modified Polymers and Surfactants : Rheology, Fluorescence Probe, and Calorimetric Studies.</td>
<td>BRNS, DAE</td>
<td>14.90</td>
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<td>32.</td>
<td>Investigations on development and characterization of new layer type ternary and quaternary chalcogenides with ZnIn2S4 IIIa and a FeGa2S4 structures</td>
<td>CSIR</td>
<td>8.68</td>
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<td>33.</td>
<td>Investigations on development and characterization of polyolefinic elastomer nanocomposites</td>
<td>CSIR</td>
<td>14.36</td>
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<td>34.</td>
<td>Isolation of phosphatase from Mycobacterium and development of inhibitors</td>
<td>DBT</td>
<td>300.00</td>
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<td>35.</td>
<td>Magnetic Field Effect on Radical-pair Recombination in Chemical and Bio-chemical Systems : An Optical Spectroscopic Study</td>
<td>DST</td>
<td>15.70</td>
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<tr>
<td>36.</td>
<td>Mono-, Di- and Bisvinyl Sulfone-Modified Carbohydrates as Versatile Synthons: A New &quot;Chiron Approach&quot; to Heterocycles, Carbocycles, Sugar Cluster</td>
<td>DST</td>
<td>21.72</td>
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<td>37.</td>
<td>New functional group photolithography methods to pattern self assembled monolayers</td>
<td>DST</td>
<td>19.00</td>
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<tr>
<td>38.</td>
<td>New photoremovable protecting groups for SAM systems</td>
<td>SRIC, IIT Kharagpur</td>
<td>5.00</td>
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<td>39.</td>
<td>Olefin polymerizations by organolanthanide catalysts</td>
<td>CSIR, New Delhi</td>
<td>15.00</td>
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<td>40.</td>
<td>Organocatalytic and Enantioselective 1,2-Halo-functionalization of Alkenes</td>
<td>DST, New Delhi</td>
<td>23.90</td>
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<tr>
<td>41.</td>
<td>Photoinduced electron and energy transfer of some organic molecules in biologically relevant organized media</td>
<td>DST</td>
<td>38.50</td>
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<tr>
<td>42.</td>
<td>Physico-Chemical Characterization of Metal Based Drugs</td>
<td>DST</td>
<td>20.00</td>
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<tr>
<td>No.</td>
<td>Project Title</td>
<td>Sponsor</td>
<td>Costs</td>
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<tr>
<td>43.</td>
<td>Physico-Chemical Properties of Ayurvedic Metal-Based Drug: A Case Study on Rasasindu</td>
<td>DST</td>
<td>Rs. 20.00 Lakhs</td>
</tr>
<tr>
<td>44.</td>
<td>Preparation and Tribological Properties of MoS2-Graphite-Viton Nanocomposites</td>
<td>DST FAST-TRACK</td>
<td>Rs. 9.55 Lakhs</td>
</tr>
<tr>
<td>45.</td>
<td>Preparation of Stable Vesicles of Catanionic Surfactants. Characterization by Surface Tension, Fluorescence Probe, Light Scattering, and Microscopy</td>
<td>DST, New Delhi</td>
<td>Rs. 24.00 Lakhs</td>
</tr>
<tr>
<td>46.</td>
<td>Processing and Performance of Biodiesel</td>
<td>DST</td>
<td>Rs. 19.00 Lakhs</td>
</tr>
<tr>
<td>47.</td>
<td>Role of water in predicting the protein folding-unfolding pathways: Computer simulation studies</td>
<td>DST, New Delhi</td>
<td>Rs. 26.70 Lakhs</td>
</tr>
<tr>
<td>48.</td>
<td>Screening for hydroxynitrile lyase from cyanogenic plant species in Indian subcontinent: their application in asymmetric organic synthesis</td>
<td>IFS, Sweden; DBT, India</td>
<td>Rs. 15.00 Lakhs</td>
</tr>
<tr>
<td>49.</td>
<td>Simulation and fabrication of a CVD/CVI set up for Ceramic Matrix Composites in general and SiC reinforced Graphite Matrix composites in particular</td>
<td>DRDO</td>
<td>Rs. 13.60 Lakhs</td>
</tr>
<tr>
<td>50.</td>
<td>Size &amp; shape controlled mono- &amp; bimetallic nanoparticles synthesis for sensing org. &amp; important biomolecules in diff. organized media</td>
<td>DST</td>
<td>Rs. 76.03 Lakhs</td>
</tr>
<tr>
<td>51.</td>
<td>Spectroscopic Study of Solvation dynamics and Photochemical reactions in solution and organized assemblies</td>
<td>CSIR</td>
<td>Rs. 6.36 Lakhs</td>
</tr>
<tr>
<td>52.</td>
<td>Spin-Chemistry of photo-generated Radical-pairs in Room Temperature Ionic Liquids (RTILs) and in organized molecular assemblies: Studies on some more</td>
<td>CSIR, New Delhi</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
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<td>53.</td>
<td>Studies on copper complexes of green tea polyphenols and and their effects on the activities of ribonuclease A and angiogenin</td>
<td>CSIR</td>
<td>Rs. 8.20 Lakhs</td>
</tr>
<tr>
<td>54.</td>
<td>Studies on the physico-chemical properties of surface water and bed sediment of the Kasai River in Paschim Medinapur District</td>
<td>ISIRD-SRIC-IITKGP</td>
<td>Rs. 3.00 Lakhs</td>
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<td>55.</td>
<td>Study of ultrafast processes in ionic liquid containing micro hetero geneous media</td>
<td>CSIR</td>
<td>Rs. 10.46 Lakhs</td>
</tr>
<tr>
<td>56.</td>
<td>Synthesis and Biological Studies of Azido and Aminohexopyranosyl Nucleosides and Aminohexopyranose Containing Oligomers: Towards New Classes of Anti-virals</td>
<td>IndoFrench Centre for the Promotion of Advanced Research</td>
<td>Rs. 35.00 Lakhs</td>
</tr>
<tr>
<td>57.</td>
<td>Synthesis and optical Properties of Metal Nanoparticles in aqueous and Non-aqueous Reverse Micelles and Investigation of solvent relaxation in Reverse</td>
<td>BRNS</td>
<td>Rs. 20.70 Lakhs</td>
</tr>
<tr>
<td>58.</td>
<td>Synthesis and structural characterization of organolanthanide complexes and their applications</td>
<td>DST, New Delhi</td>
<td>Rs. 39.00 Lakhs</td>
</tr>
<tr>
<td>59.</td>
<td>Synthesis of Inorganic Fullerene-type MoS2 and WS2 Nanoparticles and Study of their Lubrication Properties</td>
<td>ISIRD</td>
<td>Rs. 4.15 Lakhs</td>
</tr>
<tr>
<td>60.</td>
<td>Synthesis, Structure and Reactivity of Bimetallic Complexes by using Metalloligands</td>
<td>CSIR</td>
<td>Rs. 9.45 Lakhs</td>
</tr>
<tr>
<td>61.</td>
<td>Synthetic Approaches to Nine-member Enediyne</td>
<td>CSIR</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>62.</td>
<td>Synthetic studies towards fused and bioactive gamma lactam derivatives: conversion of gamma lactam carboxylic acids to N-aryl formylpyroles and synthesis</td>
<td>DST</td>
<td>Rs. 23.61 Lakhs</td>
</tr>
<tr>
<td>63.</td>
<td>Synthetic Studies Towards Sesquiterpenes through Palladium Catalysed Intramolecular Cyclisation Reactions</td>
<td>CSIR, New Delhi</td>
<td>Rs. 18.76 Lakhs</td>
</tr>
</tbody>
</table>
64. Theoretical Modelling of the Role of Hydration in Proton Transfer Processes in Proteins  
   CSIR, New Delhi  Rs. 9.51 Lakhs
65. Total synthesis of chlorocyclinones, PPARY Antagonists of Natural Origin  
   CSIR, New Delhi  Rs. 19.00 Lakhs
66. Total Synthesis of Chrymutasins  
   DST, New Delhi  Rs. 23.00 Lakhs
67. Transition-metal catalyzed activation of C(aryl)-Cl bond and its application in C-N, C-O and C-S bond forming reactions (SERC Fast Track Scheme for Young Scientists)  
   DST, New Delhi  Rs. 19.20 Lakhs
68. Ultracapacitor for Electric and Hybrid Electric Vehicles  
   DST, New Delhi  Rs. 43.09 Lakhs
   DRDO  Rs. 49.79 Lakhs
70. Use of Allylsilanes in the Synthesis of Biologically Significant Benzoisoquinoline Alkaloid Chrysanthone A and Non-natural Conduiritol Analogues  
   CSIR, New Delhi  Rs. 12.62 Lakhs
71. Use of Kinugasa Reaction for the Synthesis of Heterocycle-Enediyne Chimera  
   DST, New Delhi  Rs. 37.00 Lakhs
72. White Biotechnology: Biocatalysis using enzymes and microorganisms, synthesis of fine chemicals and APIs.  
   CSIR, New Delhi  Rs. 11.50 Lakhs

**Consultancy Projects**

1. Laboratory preparation of DIBOC  
   Suparna Chemicals Ltd, Rs. 23.61 Lakhs
2. Setting up a research and development centre for Damodar Valley Corporation at Kolkata (Phase-1)  
   Damodar Valley Corporation, Kolkata, Rs. 0.00 Lakhs
3. Synthesis of Nano-sized Ceramics  
   Bharat Heavy Electrical Limited  Rs. 5.00 Lakhs

**Technology Transferred**

1. A technology for designing a chemical reactor for production of nanosized oxide ceramics has been completed with BHEL, Bangalore Ceramic Division.  
   Rs. 5.00 Lakh
2. M/S Modi & Co. Jamshedpur - A technology for making snow-white aluminium phosphate useful for pigment industry:  
   Rs. 1.00 Lakh

**Patents (filed / granted)**

1. Electrically Conductive Compositions and Method of Manufacture Thereof
2. Polycarbonate Copolymer Composition and Method of Making
3. Polycarbonate-Poly(alkylene oxide) Copolymer Compositions and Articles Formed Therefrom
4. Polycarbonate-Poly(alkylene oxide) Copolymer Compositions and Articles Formed Therefrom
5. Polycarbonates with Fluoroalkylene Carbonate End Groups
6. Process of Making Polycarbonate Nanocomposites
7. Radiation Stable Aromatic Carbonate Polymer Compositions
8. Ultra Sensitive Simultaneous Electrochemical Determination of Arsenic, Mercury and Copper

**Visits Abroad by Faculty Members**

1. Ray, Jayanta Kumar  
   Visiting Professor (University of LaCorunna, Spain) May-July
2. Mani, Ganesan  
   Research collaboration (Department of Chemistry, National University of Singapore) one month
3. Pal, Tarasankar  
   Visiting Professor (Taiwan) about 2 months
4. Taraphder, Srabani  
   To initiate collaboration (Albert Einstein College of Medicine of the Yeshiva University, New York, USA) May 2-8
5. Taraphder, Srabani To deliver an invited lecture (Department of Computer and Information Science, Indiana University-Purdue University, Indianapolis, USA) May 9-11

6. Taraphder, Srabani Scientific interaction and invited lecture (Laboratory of Chemical Physics, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, USA) May 12

7. Biradha, Kumar Editorial Board Meeting of New Journal of Chemistry (CNRS, Paris) March 10-13

8. Biradha, Kumar Chaired a Micro-symposium *MS7 : Water Clusters in Molecular Crystals, Coordination polymers, IUCR2008 (Osaka, Japan) August 23-31

9. Dasgupta, Swagata Collaborative Research (Visiting Professor, University of the Balearic Islands, Spain) May-July 2008

10. Biradha, Kumar Collaboration (National University of Singapore) May-15 to July 15

11. Pathak, Tanmaya Visiting Professor (Department of Molecular Pharmacology, CNRS/Universite Joseph Fourier-Grenoble 1, France) One month

12. Chattaraj, Pratim Kumar To deliver an Invited Talk (Los Alamos National Laboratory, New Mexico, USA) July 27-30

Invited Lectures by Faculty Members

1. Halovinyl aldehyde in Organic Synthesis by Ray, Jayanta Kumar (North Orissa University)

2. Halovinyl aldehydes in Organic Synthesis and Chemoselective Functional Group Transformations in Lac by Ray, Jayanta Kumar (University of Alicante, Spain)

3. f Element Complexes of Dipyrrrole and Monopyrrole Ligands, and Neutral Cr(III) Catalysts.... by Mani, Ganesan (Department of Chemistry, National University of Singapore)

4. Dipyrrrole and 2,5-Dimethylpyrrolide Sm(II), Yb(II) Complexes: Dinitrogen Activation and Synthesis by Mani, Ganesan (Department of Chemistry, Western Michigan University, USA)

5. Dipyrrrole and 2,5-Dimethylpyrrolide Sm(II), Yb(II) Complexes: Dinitrogen Activation and Synthesis by Mani, Ganesan (Indian Institute of Technology, Chennai, India, March, 2005)

6. Dipyrrrole and 2,5-Dimethylpyrrolide Sm(II), Yb(II) Complexes: Dinitrogen Activation and Synthesis by Mani, Ganesan (Indian Institute of Science, Bangalore, India, March 22, 2005)

7. Dipyrrrole and 2,5-Dimethylpyrrolide Sm(II), Yb(II) Complexes: Dinitrogen Activation and Synthesis by Mani, Ganesan (University of Pondicherry, India, April, 2005)

8. Hauser annulation in the synthesis of aromatic and hydroaromatics polyketide by Mal, Dipak Ranjan (Indian Chemical Society at Kolkata)

9. The first total synthesis of euplectin, a natural product with an indeno[h]chromone motif by Mal, Dipak Ranjan (Kalyani University)

10. Water around biomolecules by Bandyopadhyay, Sanjoy (Center for Theoretical Studies, Indian Institute of Technology, Kharagpur)

11. Biomolecular hydration: Computer simulation studies by Bandyopadhyay, Sanjoy (S. N. Bose National Centre for Basic Sciences, Kolkata)

12. Dynamics of biomolecular hydration by Bandyopadhyay, Sanjoy (Indian Institute of Science and Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore)

13. Design and Development of Nanoarchitectoned Biosensors by Raj, C Retna (North Orissa University, Baripada, Orissa)

14. Metal and Metal Oxide nanoparticles in Nanometer Length Scale by Pal, Tarasankar (Heritage Institute of Technology, Kolkata)

15. Metal Nanoparticles in Catalysis by Pal, Tarasankar (Charuchandra College, Kolkata)

16. Metal and Metal Oxide nanoparticles in Nanometer Length Scale by Pal, Tarasankar (University of Calcutta)

17. Metal Nanoparticles in Spectroscopy by Pal, Tarasankar (Allahabad University)

18. Oxide Nanoparticles as Thin Films by Pal, Tarasankar (PSG College, Coimbatore)

19. Metal Oxide Nanoparticles by Pal, Tarasankar (Bhabha Atomic Research Center, Mumbai)
20. Arsenic in Water by Pal, Tarasankar (Taiwan)
21. Identification of Proton Transfer Pathways in Proteins by Taraphder, Srabani (Department of Biophysics and of Biochemistry, Albert Einstein College of Medicine of the Yeshiva University, New York, USA)
22. Proton Transfer Pathways in Proteins by Taraphder, Srabani (Department of Computer and Information Science, Indiana University-Purdue University, Indianapolis, USA)
23. Identification of Proton Transfer Pathways in Proteins by Taraphder, Srabani (Laboratory of Chemical Physics, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, USA)
24. Nanoparticles for Environmental by Pal, Tarasankar (Bhilai Institute of Technology)
25. Asymmetric aldol reactions under normal and inverse addition modes of the reagents: Studies towards by Hajra, Saumen (NOST Symposium, Goa)
26. Never Ending Journey on Asymmetric 1,2-Halo-functionalizations and Aldol Reactions for the Synthesis by Hajra, Saumen (CRSI Symposium, IIT-Guwahati)
27. Asymmetric Synthesis Towards Butyrolactone Natural Products by Hajra, Saumen (North Bengal University, Siliguri)
28. Asymmetric Aziridoarylation and Aldol Reactions Towards Synthesis g-Butyrolactone Natural Products a by Hajra, Saumen (Indo-KOSEF (Korea) Symposium; National Chemical Laboratory, Pune)
29. Crystal engineering with molecules containing multiple amide functionalities: interference of haloge by Biradha, Kumar (Mysore, INDO-US symposium)
30. Crystal Engineering: Molecules to Supramolecules by Biradha, Kumar (COORG, Orange County)
31. Divinyl Sulfone-Modified Carbohydrates by Pathak, Tanmaya (Department of Organic Chemistry, Indian Institute of Science, Bangalore)
32. Synthetic Strategies for the Modification of Nucleosides by Pathak, Tanmaya (North Eastern Hill University, Shillong (96th Science Congress))
33. Synthesis of Biologically Relevant Modified Nucleosides by Pathak, Tanmaya (Department of Chemistry, University of Delhi)
34. Crystal Engineering: Molecules to Network Materials by Biradha, Kumar (University of Hyderabad)
35. Crystal Engineering in Assembling Molecules to Functional Supramolecular Architectures by Biradha, Kumar (University of Delhi)
36. Crystal Engineering: Molecules to Supramolecules by Biradha, Kumar (Indian Institute of Technology, Kharagpur)
37. Design and development of inhibitors for the ribonuclease family by Dasgupta, Swagata (University of the Balearic Islands, Spain.)
38. A Bohmian Analysis of the Possible Field Induced KAM-like Transitions in Anharmonic Oscillators by Chattaraj, Pratim Kumar (International Workshop on “Quantum Trajectories”, Centre for Nonlinear Studies, Los Alamos National Laboratory, New Mexico, USA)
39. Aromaticity in Metal Clusters by Chattaraj, Pratim Kumar (International Symposium on “Clusters, Cluster Assemblies, and Nano-scale Materials”, Harish-Chandra Research Institute, Allahabad, India)
40. Member, NOC and Chairman, Technical Session, by Chattaraj, Pratim Kumar (“Theoretical Chemistry Meeting-2009”, IISc Bangalore)
41. Chemical Dynamics in Confined media and Ionic Liquids by Sarkar, Nilmoni (S. N. Bose National centre for basic Sciences, kolkata)
42. Chemical Dynamics in Organized assemblies and room temperature ionic liquids by Sarkar, Nilmoni (Vivekananda Mahavidyalaya, Burdwan)
43. Crystal Engineering in Assembling Molecules To Functional Supramolecules by Biradha, Kumar (ICES, 1, Jurang Island, Singapore)
44. Assembling Molecules To Functional Supramolecules by Biradha, Kumar (Department of Chemistry, National University of Singapore)
45. Molecular Assemblies and Metal Nanoarchitectures in the Development of Biomolecular Sensors by Raj, C Retna (IIT Kharagpur)
46. Studies on Self Quenching Diradical Generating Processes by Basak, Amit (Orange County Bangalore)
47. Science at the Nanoscale by Raj, C Retna (Scott Christian College, Nagercoil)
48. Studies towards expanding the scope of diradical generating processes by Basak, Amit (IIT Kanpur)
49. A new mandelonitrile lyase from prunus armeniaca: Asymmetric synthesis of cyanohydrins and enzymolog by Nanda, Samik (BAMU, Aurangabad)
50. Promise of Nanoscience, Invited Talk for Refresher Course of Chemistry, UGC ETCE-2008 by Pramanik, P (Smbalpur University, Department of Chemistry)
51. Promise of nanoscience in chemical technology (Invited Talk) by Pramanik, P (Institute of Engineers, Jamshedpur Chapter)
52. Nano-science: its impact on physics and chemistry, Workshop of Advanced Material-2008 (Invited Talk) by Pramanik, P (Manipur University, Imphal, Department of Physics)
53. Nano-biotechnology: A new promise (Invited Talk) by Pramanik, P (Manipur University, Imphal, Department of Biology)
54. Bifunctional Motifs and Chemoselective Transformations in Organic Synthesis by Ray, Jayanta Kumar (North Bengal University)
56. Chaired a session in the International Symposium on Material Chemistry (ISM-2008) by Pramanik, P (Bhabaha Atomic Resrearch Centre, Trombay)
57. Palladium Catalysed Intramolecular Oxidative Cyclizations and C-H Activation: Novel protocol for Syn by Ray, Jayanta Kumar (KIITS, Bhubaneswar)
58. Magnetic nanoparticle and its use (Invited talk) and chaired a session by Pramanik, P (Sastra University, Tanjavur for Indo-Japan Workshop on Nano-Biotechnology-2009)
59. Promise of nanomaterials in biotechnology (Invited talk and chaired a session) by Pramanik, P (NIPER, Chandigar for National Workshop on nanobiotechnology-2009)
60. Nanomaterials in Biology (Invited talk), Workshop on Current trends in Chemistry-2009 by Pramanik, P (Biswa Bharati University)

Books Published

Seminars, Conferences and Workshops Organised
1. Crystal Engineering and Noncovalent Interactions: Contemporary Themes and Futuristic Development
2. MS7: Water Clusters in Molecular Crystals, coordination polymers and biological macromolecule
3. One-day Symposium on Chemistry and Physics of Materials and Fluids
4. Sir J. C. Ghosh Memorial Lecture
5. Sixth One Day National Symposium in Chemistry
DEPARTMENT OF CIVIL ENGINEERING

HEAD : Professor Sriram Kumar Bhattacharyya

FACULTY

Professors

Baidya, Dilip Kumar Ph.D. (IISc Bangalore), Soil Dynamics, Pile Foundations, Machine Foundations
Bandyopadhyay, Janendra Nath Ph.D. (IIT Kharagpur), Shell Structures and Bridge Engineering
Bhattacharyya, Sriram Kumar Ph.D. (IIT Kharagpur), Fluid-structure Interactions; FRP-concrete Composite Systems; Structural Health Monitoring
Das Gupta, Shambhu Pada Ph.D. (IIT Kanpur), Constitutive Modelling; Soil-structure Interacion; Foundation Dynamics
Dey, Subhasish Ph.D. (IIT Kharagpur), Hydrodynamics, Turbulence, Sediment Transport
Dhang, Nirjhar Ph.D. (IIT Kharagpur), Structural Dynamics and Control, Biomechanics
Ghosh, Deba Prasad Ph.D. (IIT Kharagpur), Soil Anchors, Batter Piles, Vibration of pile Foundations
Ramachandra, Lingadahally Ph.D. (IIT Madras), Stability of Structures, Analysis of Structures, Impact Response of Structures
Reddy, Kusam Sudhakar Ph.D. (IIT Kharagpur), Pavement Engineering

Associate Professors

Barai, Sudhir Kumar Ph.D. (IISc Bangalore), Soft Computing Applications, Structural Health Monitoring, Recycled Construction Materials, Genetic Expression Programming, Fracture in Concrete
Bhattacharya, Baidurya Ph.D. (Johns Hopkins University), Computational materials science, Risk and reliability analyses of infrastructure systems
Desai, Venkappayya R Ph.D. (Clemson University), Water Resources Engineering, Integrated Water Management, Hydrology, Hydropower Engineering
Ghangrekar, Makarand Madha Ph.D. (IIT Bombay), Environmental Engineering, Water and Wastewater Treatment, Anaerobic treatment using UASB reactor, Microbial Fuel Cell
Gupta, Ashok Kumar Ph.D. (IIT Bombay), Environmental Engineering
Maitra, Bhargab Ph.D. (IIT Bombay), Transportation Planning, Traffic Engineering and Management
Maity, Damodar Ph.D. (IIT Kharagpur), Seismic Analysis of Dam Considering Fluid-Structure-Soil Interaction, Seismic Control of Highrise Buildings Using TLCD, Health Monitoring of Structures, Cost Effective Housing, Structural Engineering
Roy, Debasis Ph.D. (University of British Colombia), Ground Improvement, Geotechnical Earthquake Engineering, Site Characterization
Sen Gupta, Aniruddha Ph.D. (Illinois University), Geotechnical Earthquake Engineering, Landslide Mitigation
Sen, Dhrubajyoti Ph.D. (IIT Delhi), Hydraulics and Water Resources Engineering

Assistant Professors

Chakraborty, Sushanta Ph.D. (IIT Kharagpur), Structural System Identification, Finite Element Model Updating, Fibre Reinforced Plastics Composite Structures, Modal Testing of Civil Engineering Structures
Deb, Arghya Ph.D. (Princeton University), Modeling Failure and Damage in Concrete, Finite Element Analysis
Deb, Kousik Ph.D. (IIT Kanpur), Soil-Structure Interaction, Ground Improvement, Numerical Modeling, Foundation / Embankment on Soft, Pile Foundation


Goel, Sudha Ph.D. (Johns Hopkins University), Environmental Engineering

Maity, Rajib Ph.D. (IISc. Bangalore)

Pal, Anjali Ph.D. (Calcutta University), Environmental Engineering and Science, Nanoscience and Nanotechnology, Analytical Chemistry

Reddy, M Amaranatha Ph.D. (IIT Kharagpur), Transportation Engineering

Senior Lecturers

Hossain, Shaikh Jahangir Ph.D. (IIT Kharagpur), Structural Mechanics, Continuum Mechanics, Composite Structures, Nonlinear Continuum Mechanics, Advanced Theories of Plates and Shells, Mixed-Hybrid Finite Element Method

Verma, Shubha Ph.D. (IIT Bombay), Atmospheric aerosols transport modelling, Air pollution source characteristics, control measures, and climate impacts, Contaminant transport in water and mitigation measures, Environmental Impact Assessment, Sustainable Development, and Climate Change issues

Faculty Appointments

Dr. Rajib Maity Assistant Professor
Dr. Kaushik Deb Assistant Professor
Dr. Anirban Dhar Assistant Professor (Visiting)

Faculty Promotions

Dr. Nirjar Dhang Professor
Dr. Dilip Kumar Baidya Professor
Dr. Aniruddha Sen Gupta Associate Professor
Dr. Debasish Roy Associate Professor
Dr. Subha Verma Assistant Professor
Dr. Arghya Deb Assistant Professor

Faculty Re-employment (Upto 65 years age)

Dr. S. Majumdar Professor
Dr. B. B. Pandey Professor

Brief Description of on-going activities

1. **EnvE** : Microbial Fuel Cells: Application for wastewater treatment and energy recovery, Onsite treatment of domestic sewage from small community, Studies on granulation in UASB reactor treating low strength wastewater to enhance efficiency of the reactor, Water quality and health assessment, Biological treatment of solid waste, Factors affecting the use of chlorine in water supply systems; Nanoparticle synthesis, their characterization and application; Photodegradation of organic pollutants; Adsolubilization/adsorption; Monitoring and modelling of tropospheric solid state polydisperse aerosols and ozone and assessment of pulmonary deposition in Kolkata urban region; Monitoring and modelling of ambient air quality in residential, commercial and industrial regions of Kolkata; Removal of Fluoride from ground water using low cost adsorbents; Removal of Arsenic from ground water using low cost adsorbent; Photocatalytic degradation of dye containing effluents using Ag+ doped TiO2.
2. **SE**: Recycled construction materials, Stability of plates and shells, Biomechanics, Reliability of bridge structures, Low cost housing, Seismic analysis of dams, Fluid-structure Interactions, Structural Health Monitoring, Finite Element Model updating

3. **TE**: Cell filled low cost rural roads, Analysis and Evaluation of Concrete and flexible pavements, Specifications for bituminous mixes and Urban transportation planning.

4. **HWRE**: Investigations of effect of lateral flow on turbulent submerged jets, Study of coherant turbulent structure over gravel beds and bed-forms, development and comparative study of flood inundation models, drought characterization and forecasting, development and comparison of different models for flood forecasting.

5. **GTE**: Landslides and slope stabilisation, Geotechnical Earthquake engineering, and Shallow and deep foundations

**Thrust Areas**

1. **EnE**: Water and Wastewater treatment, Solid Waste Engineering, Environmental Microbiology, Environmental Impact Assessment, Air Pollution Modeling, Bio-energy


5. **GTE**: Geotechnical Earthquake Engineering, Rock Slope Stability, Ground Improvement with Natural additives and Foundation Strengthening of Monumental Structures.

**New Acquisitions**

1. Direct shear apparatus
2. Automated compaction machines (2)
3. Cyclic triaxial system
4. Gas chromatograph (GC)
5. UV-Vis spectrophotometer and sun photometer
6. Sediment Feeder
7. UTM 14 kN Pneumatic Asphalt testing system with Creep and ITS test facility
8. Corelok system for Volumetric analysis of aggregate and bituminous mix
9. Laser Doppler Vibrometer
10. Digital concrete test hammer
11. Ultrasonic Pulse Velocity meter

**Lectures by Visiting Experts**

1. Asset Management Strategies to Optimize Transportation Investment by Prof. S Khasnabis (Professor of Civil Engineering and Interim Associate Dean of Research, College of Engineering, Wayne State University, Detroit, Michigan, USA and Fulbright Research Scholar 2004, Visiting Faculty, Indian Institute Of Technology Bombay, India)

2. Traffic Management in the German Region Frankfurt RheinMain by Prof. Manfred Boltze (Professor, Darmstadt University, Germany)

3. Smooth Finite Elements through Tensor-product and Triangular B-splines by Prof. Debasish Roy (Department of Civil Engineering, Indian Institute of Science, Bangalore)

4. Statistical Methods in Civil Engineering by Prof. Ashok Deshpande (Former Deputy Director, NEERI, Nagpur and Chair, Berkeley Initiative in Soft Computing)

5. Probabilistic Methods for Nonlinear Structural System Identification by Prof. C.S. Manohar (Civil Engineering Department, Indian Institute of Science, Bangalore)

**Doctoral and MS Degrees Awarded**

1. Dipanjana Maulik Sequential Analytical Solution for Modelling Water Quality in Tidal Rivers. (Ph.D.)
2. Ashok Kumar Mishra  Drought Characterization and Forecasting-A Hybrid Approach. (Ph.D.)
3. Kakoli Karar  Monitoring and characterization of ambient air quality in residential, commercial and industrial regions of an urban area (Ph.D.)
5. Soumendra Nath Kuiry  Development of Finite Volume Shallow Water Flow Models and Application to Floodplain Inundation (Ph.D.)
6. Rajkumar V. Raikar  Characteristics of Flow over Gravel-Beds and Scour within Contractions (Ph.D.)
7. Umesh Kumar Dewangan  Studies on Structural Damage Detection and Health Monitoring (Ph.D.)
9. Debasish Bandyopadhyay  Structural Health Monitoring using Statistical system identification technique from limited dynamic responses (Ph.D.)

Fellow - Professional Bodies
3. Dey, Subhasish (2002)  Fellow - Institution of Engineers
4. Bandyopadhyay, Janendra Nath (1988)  Fellow (F011326) - The Institution of Engineers (India).

Member - Editorial Board
1. Barai, Sudhir Kumar (2008)  Member
   - Journal of Information Technology in Construction
2. Bhattacharya, Baidurya (2008)  Editorial Board Member
   - International Journal of Engineering Under Uncertainty: Hazards, Assessment and Mitigation
   - Journal of earth system sciences
   - Journal of Water Resources Management
   - Indian Water Resources Society (IWRS) Journal
6. Dey, Subhasish (2009)  Associate Editor
   - Journal of Hydraulic Engineering, ASCE
7. Dey, Subhasish (2009)  Member of Editorial Board
   - Flow Measurement and Instrumentation
8. Dey, Subhasish (2009)  Associate Editor
   - Journal of Hydro-Environment Research
9. Dey, Subhasish (2009)  Associate Editor
   - Sedimentology
10. Dey, Subhasish (2004)  Member of Editorial Board
    - Water Management, ICE London
11. Dey, Subhasish (2009)  Associate Editor
    - International Journal of Sediment Research
12. Dey, Subhasish (2009)  Associate Editor
    - Journal of Numerical Mathematics and Stochastics
13. Dey, Subhasish (2009)  Member of Editorial Board
    - Engineering Applications of Computational Fluid Mechanics
14. Dey, Subhasish (2009)  Member of Editorial Board
    - KSCE Journal of Civil Engineering
15. Ghangrekar, Makarand Madha (2008) **Associate Editor**  
   - Renewable and Sustainable Energy (RSE)
16. Ghangrekar, Makarand Madha (2008) **Member**  
   - International Journal of Wastewater Treatment and Green Chemistry (IJWTGC)
17. Ghangrekar, Makarand Madha (2008) **Associate Editor**  
   - Transactions of Biosystems and Agricultural Engineering (BAE)
18. Gupta, Ashok Kumar (2008) **Co-Guest Editor**  
   - Int. J. of Environment and Waste Management (IJEWM), ISSN (Online):1478-9868 -ISSN (Print): 1478-9876
   - Recent Patents on Chemical Engineering, ISSN: 1874-4788
20. Gupta, Ashok Kumar (2006) **Associate Editor**  
   - International Journal of Ecology and Development
   - Research Journal of Chemistry and Environment
   - Recent Patents on Nanotechnology
23. Roy, Debasis (2009) **Associate Editor** - Geomechanics and Engineering  
   - An International Journal
24. Roy, Debasis (2009) **Associate Editor**  
   - Transactions of Civil Engineering and Construction Management
25. Sen, Dhrubajyoti (2008) **Associate Editor**  
   - Australian Journal of Water Resources

**Awards & Honours**

2. Dey, Subhasish (2009) **Brahmaputra Chair Professor** for Water Resources
3. Deb, Kousik (2008) **Excellent Paper Award to Junior Individuals 2008** given by International Association for Computer Methods and Advances in Geomechanics, USA

**Fellowships**

2. Deb, Kousik (2008) **Selected for Endeavour Research Fellowship - 2008** to undertake a Postdoctoral Research programme in Australia
4. Ghangrekar, Makarand Madha (2008) **Marie Curie Fellowship under 6th frame work programme of European Union**
5. Verma, Shubha (2008) **Young Scientist travel fellowship, NOAA, USA**

**Sponsored Research Projects**

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A multi-scale investigation of the strength and durability of carbon nanotube based nano-electrode arrays used as biological sensors</td>
<td>DBT</td>
<td>Rs. 19.00 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>A study on The Effects of Layering on The Dynamic Response of Foundations</td>
<td>CSIR</td>
<td>Rs. 8.50 Lakhs</td>
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<td></td>
<td>Project Description</td>
<td>Department</td>
<td>Cost</td>
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<tr>
<td>3</td>
<td>Assessment of Microbial Diversity and Community Structure of Arsenic Contaminated Ground Water of West Bengal</td>
<td>Department of Biotechnology, New Delhi</td>
<td>Rs. 29.15 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Bridge scour estimation, measurement and protection and use of various time systems like TDR, TTS and SA</td>
<td>RDSO</td>
<td>Rs. 151.00 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>Chemical and optical characteristics of aerosols over the Indo-Gangetic plain</td>
<td>Sponsored Research Consultancy SRIC</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
<td>6</td>
<td>Coupled sloshing Response in a stiffened composite container</td>
<td>Aeronautical Research &amp; Development Board</td>
<td>Rs. 5.17 Lakhs</td>
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<tr>
<td>7</td>
<td>Design of Stilling Basin under variable hydraulic conditions</td>
<td>Ministry of Water Resources, Government of India</td>
<td>Rs. 19.50 Lakhs</td>
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<tr>
<td>8</td>
<td>Development of durable, water-repellent jute geotextiles</td>
<td>Jute Manufacturer's Development Council</td>
<td>Rs. 168.72 Lakhs</td>
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<tr>
<td>9</td>
<td>Development of Low-cost Technology for Arsenic Removal and an Easy to Detect Method for Arsenic Analysis for the Rural Areas of West Bengal</td>
<td>Department of Science and Technology,</td>
<td>Rs. 5.60 Lakhs</td>
</tr>
<tr>
<td>10</td>
<td>Evaluation of Bituminous mixes using Bituminous Pavement Analyzer</td>
<td>SRIC, IIT Kharagpur</td>
<td>Rs. 5.00 Lakhs</td>
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<tr>
<td>11</td>
<td>Exploratory investigation on development of damage mechanics based methodologies for lifting of aeroengine components</td>
<td>DMRL Hyderabad</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>12</td>
<td>First order seismic microzonation of Kolkata area</td>
<td>Ministry of Earth Sciences, Govt of India</td>
<td>Rs. 62.10 Lakhs</td>
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<td>13</td>
<td>Joint Networked Centre Research Project on Highway and Airport Pavement Engineering</td>
<td>Indo-US Scientific Technology Forum (IUSSTF), New Delhi</td>
<td>Rs. 65.00 Lakhs</td>
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<tr>
<td>14</td>
<td>Modeling &amp; Monitoring of Landslide Hazard in Sikkim Himalayas</td>
<td>Department of Science &amp; Technology, Govt of India</td>
<td>Rs. 23.00 Lakhs</td>
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<tr>
<td>15</td>
<td>Multi-scale modeling to study the role of atomic scale defects in CNT-based nanocomposites</td>
<td>DST</td>
<td>Rs. 20.50 Lakhs</td>
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<tr>
<td>16</td>
<td>Multiscale modeling of small scale interfacial phenomena in carbon nanotube reinforced composites</td>
<td>SRIC</td>
<td>Rs. 3.00 Lakhs</td>
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<td>17</td>
<td>Production of bioenergy during wastewater treatment</td>
<td>Ministry of Environment and Forest, New Delhi</td>
<td>Rs. 13.22 Lakhs</td>
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<td>18</td>
<td>Recycled Aggregate based concrete (RAC)</td>
<td>UGC</td>
<td>Rs. 8.96 Lakhs</td>
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<td>19</td>
<td>Resource mapping / Flood analysis of Ajay and Mayurakshi rivers using RS/GIS</td>
<td>DST</td>
<td>Rs. 15.00 Lakhs</td>
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<td>20</td>
<td>Rural Roads Performance Study</td>
<td>National Rural Roads Development Agency (NRRDA)</td>
<td>Rs. 10.00 Lakhs</td>
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<tr>
<td>21</td>
<td>Seasonal characteristics of submicron aerosols: Chemical composition, source identification, and climate impacts impacts</td>
<td>DST</td>
<td>Rs. 13.50 Lakhs</td>
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<td>22</td>
<td>Seismic Evaluation of Aged Concrete Gravity Dams</td>
<td>IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
<td>23</td>
<td>Simulation studies of mechanical behaviour and failure of carbon nanotubes</td>
<td>DMRL, Hyderabad</td>
<td>Rs. 10.00 Lakhs</td>
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<td>24</td>
<td>Status of Landslide Problem in Sikkim</td>
<td>Department of Science and Technology, Govt. of India, New Delhi</td>
<td>Rs. 0.30 Lakhs</td>
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<tr>
<td>25</td>
<td>Studying Failure and Debonding in concrete</td>
<td>SRIC, IIT Kharagpur (ISIRD grant)</td>
<td>Rs. 1.00 Lakhs</td>
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<td>No.</td>
<td>Description</td>
<td>Consultant/Location</td>
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<td>26.</td>
<td>Swaralipi: a system for scripting Tagore's musical notes and transcoding</td>
<td>Society for Natural Language Technology Research</td>
<td>Rs. 9.00 Lakhs</td>
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<tr>
<td>27.</td>
<td>Synthesis and characterization of mono and bimetallic nanoparticles on supported systems and their application for the degradation of organic pollutants</td>
<td>SRIC, IIT KGP (under ISIRD)</td>
<td>Rs. 5.00 Lakhs</td>
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<td>28.</td>
<td>Theoretical &amp; Experimental Investigation of Strain Localization in Cohesive Soils under Plane Strain Condition</td>
<td>DST, New Delhi</td>
<td>Rs. 13.00 Lakhs</td>
</tr>
</tbody>
</table>

**Consultancy Projects**

1. Adequacy of measures taken by Rourkela Steel Plant regarding the sewage treatment system of Rourkela Steel Plant Township  
   - Rourkela Steel Plant, SAIL, Rourkela  
   - Rs. 8.08 Lakhs

2. Assessment of MSE wall distress  
   - NHAI  
   - Rs. 4.50 Lakhs

3. Assessment of Tunnel Distress  
   - Hooghly Met coke & Power Ltd., Hooghly Met Coke & Power Co.Ltd, Tata Centre 43, Jawaharlal Nehru Road Kolkata- 700 071  
   - Rs. 9.55 Lakhs

4. Bridge girder design review (BGDR)  
   - ITD-CEMINDIA(JV  
   - Rs. 1.12 Lakhs

5. Characterisation of Sinter Matallcalcs & Muck Dump Materials  
   - Tata Steel Ltd, Jamshedpur,  
   - Rs. 0.00 Lakhs

7. Checking of Design of siphon aqueduct over river Sagada at RD 2820m of Upper Indravati right main extension canal  
   - Upper Indravati Irrigation Project, Govt. of Orissa,  
   - Rs. 5.00 Lakhs

8. Checking of Launching scheme for Railway over bridges on NH-41 (CWHEC-HCIL  
   - J.V  
   - Rs. 3.50 Lakhs

9. Checking of Structural Designs & Drawings of Lucknow Airport  
   - S. Ghosh & Associates  
   - Rs. 9.00 Lakhs

10. Checking of the design of lighting masts  
    - B. P. Projects, Kolkata Executive Engineer, P.H. Division-III, Bhubaneswar  
    - Rs. 1.50 Lakhs

11. Checking of the Distressed water tank  
    - B. P. Projects, Kolkata Executive Engineer, P.H. Division-III, Bhubaneswar  
    - Rs. 1.01 Lakhs

12. Checking the Soundness of Civil Foundation Of LRP Crusher of Noamundi  
    - Tata Steel Limited  
    - Rs. 5.51 Lakhs

13. City Development Plan for Haldia  
    - Haldia Development Authority, Haldia,  
    - Rs. 22.47 Lakhs

14. Collapse of girders of Rushikulya Bridge  
    - National Highways Authority of India, Berhampur, Orissa,  
    - Rs. 4.00 Lakhs

15. Collection & characterization of environmental quality for water, wastewater, air & soil  
    - Various govt. and private agencies  
    - Rs. 0.00 Lakhs

16. Construction of Arterial Road & Backup Area Behind Berth No. 2 of Haldia Dock Complex  
    - Kolkata Port Trust, Haldia Dock Complex  
    - Rs. 0.00 Lakhs

17. Construction of Girls' Hostel - Rani Laxmibai Hall of Residence  
    - IIT Kharagpur  
    - Rs. 17.60 Lakhs

18. Construction of Rotary in front of Raj Bhavan Square, Bhubaneswar  
    - Engineer-in-Chief (Civil), Bhubaneswar, PMO  
    - Rs. 0.63 Lakhs

19. Cyclone Shelter at Orissa coast  
    - National Highways Authority of India, Kolkata  
    - Rs. 25.00 Lakhs

20. Damage of deck slab in span P1-P2 of Kangsabati Bridge  
    - National Highways Authority of India, Kolkata  
    - Rs. 6.00 Lakhs

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<table>
<thead>
<tr>
<th>No.</th>
<th>Project Description</th>
<th>Contractor</th>
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<tr>
<td>21.</td>
<td>Design checking of Road Over Bridges</td>
<td>IRCON International Ltd.</td>
<td>Rs. 6.07</td>
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<td>22.</td>
<td>Design of Bituminous mix</td>
<td>Intercontinental Consultants</td>
<td>Rs. 0.35</td>
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<td></td>
<td>and Technocrats Pvt Ltd, Southeastern Coalfields Limited, Bilaspur</td>
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<td>23.</td>
<td>Design of Coal Transportation Roads</td>
<td>Kalaikunda Airforce</td>
<td>Rs. 0.75</td>
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<td>24.</td>
<td>Design of Observatory Tower</td>
<td>Industrial Water Engineers,</td>
<td>Rs. 4.00</td>
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<td></td>
<td>Malaysia.</td>
<td>Kalaikunda Airforce</td>
<td>Rs. 0.60</td>
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<td>25.</td>
<td>Design of UASB reactor for bio-diesel wastewater treatment</td>
<td>Phoenix-Yule Ltd.</td>
<td>Rs. 9.50</td>
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<td>26.</td>
<td>Design of Water Tank</td>
<td>BARC</td>
<td>Rs. 2.20</td>
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<td>27.</td>
<td>Development of reliability based criteria for containment design</td>
<td>Ministry of Corporate Affairs,</td>
<td>Rs. 160.70</td>
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<td></td>
<td>New Delhi</td>
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<td>28.</td>
<td>Development of Software for the analysis of steel-cord pipe conveyor belt</td>
<td>M/s Span Consulatnats Pvt Ltd,</td>
<td>Rs. 0.60</td>
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<td></td>
<td></td>
<td>Forbesganj, Bihar</td>
<td></td>
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<td>29.</td>
<td>Drainage plan for Shantiniketan - Sriniketan</td>
<td>Shantiniketan - Sriniketan Rs.</td>
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<td>Development Authority,</td>
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<td>30.</td>
<td>Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for</td>
<td>Superintending Engineer,</td>
<td>Rs. 20.22</td>
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<td></td>
<td>the proposed Dwarakeswar Gandheswari Reservoir project (West Bengal)</td>
<td>Investigations &amp; Planning</td>
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<td>Circle, No. II, I &amp; W</td>
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<td>directorate (Kolkata) Govt.,</td>
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<td>31.</td>
<td>Establishment of Indian Institute of Corporate Affairs (Infrastructure)</td>
<td>Ministry of Corporate Affairs,</td>
<td>Rs. 0.60</td>
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<td></td>
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<td>32.</td>
<td>Evaluation of CRMB samples for Strengthening of NH- 57 Road Works</td>
<td>M/s Span Consulatnats Pvt Ltd,</td>
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<td>Forbesganj, Bihar</td>
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<td>33.</td>
<td>Evaluation of Milled Sample of Bituminous Mix</td>
<td>Consulting Engineering Services (India) Pvt Ltd,</td>
<td>Rs. 1.00</td>
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<td></td>
<td>PWD, Coochbehar, West Bengal</td>
<td>Rs. 0.35</td>
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<td>34.</td>
<td>Evaluation of PMB for strengthening of NH-31 road work</td>
<td>Inland Waterways Authority of</td>
<td>Rs. 10.00</td>
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<td></td>
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<td>India, West Bengal</td>
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<td>35.</td>
<td>Farakka Barrage Pond Stabilisation and Bagmari Canal Syphon Aqueduct Problem</td>
<td>West Bengal Housing Board,</td>
<td>Rs. 3.00</td>
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<td></td>
<td>Kolkata</td>
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<td>36.</td>
<td>Health Monitoring of a building Structure</td>
<td>Titagarh Wagons Ltd.</td>
<td>Rs. 4.00</td>
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<td>Haldia Dock Complex, Haldia,</td>
<td>Rs. 20.50</td>
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<td>37.</td>
<td>Health monitoring of Factory building structure</td>
<td>Keventer Fresh Limited, Kolkata,</td>
<td>Rs. 2.02</td>
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<td>38.</td>
<td>Improvement of Drainage Facilities at dock and adjoining area at haldia Dock Complex</td>
<td>Espace Planning Services Pvt. Ltd.,</td>
<td>Rs. 3.00</td>
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<td>39.</td>
<td>Improvement of Road Connectivity, Traffic Mobility and Safety in the Influence Area</td>
<td>Progressive Construction Rs. 3.00 Lakhs</td>
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<td>of Keventer Premises in Barasat</td>
<td>Keventer Projects Limited,</td>
<td>Rs. 2.70</td>
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<td>40.</td>
<td>Investigation of Rutting Failure on NH-2</td>
<td>NHAI, Siliguri,</td>
<td>Rs. 4.49</td>
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<td>41.</td>
<td>Measures for Improving Traffic Mobility around the Proposed Mixed Use Development at</td>
<td>Keventer Projects Limited,</td>
<td>Rs. 2.70</td>
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<td>Rishra</td>
<td>NHAI, Siliguri,</td>
<td>Rs. 4.49</td>
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<td>42.</td>
<td>MSE Wall Failure investigation and reconstruction at Kisanganj</td>
<td>Keventer Fresh Limited, Kolkata,</td>
<td>Rs. 2.02</td>
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<td>43.</td>
<td>Non-destructive testing at BRBNML, Salboni</td>
<td>Espace Planning Services Pvt. Ltd.,</td>
<td>Rs. 3.00</td>
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<td>44.</td>
<td>Optimized properties of galvanized steel</td>
<td>Tata Steel</td>
<td>Rs. 5.30</td>
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<td>45.</td>
<td>Performance evaluation of UASB reactor treating molasses</td>
<td>MM Enviro Pvt. Ltd.</td>
<td>Rs. 0.50</td>
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<td>46.</td>
<td>Preparation of Aizawl Master Plan</td>
<td>Aizawl Development Authority, New Capital Complex, Khatla, Aizawl, Mizoram,</td>
<td>Rs. 70.22</td>
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<td>47.</td>
<td>Preparation of City Development Plan for Burdwan Planning Area (BDAP)</td>
<td>Burdwan Development Authority, Burdwan 713101</td>
<td>Rs. 11.23 Lakhs</td>
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<td>48.</td>
<td>Preparation of detailed project Report for periphery road</td>
<td>Bharatiya Note Mudran Ltd., Salboni</td>
<td>Rs. 10.00 Lakhs</td>
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<td>49.</td>
<td>Preparation of Master Plan of Drainage System in Planning Area of Sriniketan Santiniketan Development Authority (SSDA)</td>
<td>Executive Officer, SSDA Bholpur,</td>
<td>Rs. 15.00 Lakhs</td>
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<td>50.</td>
<td>Preparation of Perspective Plan- Vision 2030 and Comprehensive development Plan areas of Bhubaneswar and Cuttack development Authority</td>
<td>Housing and Urban Development Department Government of Orissa, Bhubaneswar,</td>
<td>Rs. 165.29 Lakhs</td>
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<td>51.</td>
<td>Preparation of Storm Water drainage Master Plan for Haldia Municipal Area</td>
<td>Haldia development Authority Haldia,</td>
<td>Rs. 25.84 Lakhs</td>
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<td>52.</td>
<td>Rainwater Harvesting in BRBNMPL Campus, Salboni</td>
<td>Bharatiya Reserve Bank Note Mudran (P) Ltd., Salboni</td>
<td>Rs. 5.00 Lakhs</td>
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<td>53.</td>
<td>Review of alternative foundation proposal based on bored piles for bridge piers at ch.422/1 and 430/1 of NH-31</td>
<td>ITD Cementation India Ltd.,</td>
<td>Rs. 1.13 Lakhs</td>
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<td>54.</td>
<td>Review of Bund Stability of the Existing Red Mud and Ash Ponds at Vedanta Aluminium Plant, Rayagода</td>
<td>Pollution Control Board, Bhubaneswar, Orissa,</td>
<td>Rs. 0.00 Lakhs</td>
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<td>55.</td>
<td>Scrutiny of Technical Proposals for Pradhan Mantri Gram Sadak Yojana work</td>
<td>NRRDA, Delhi</td>
<td>Rs. 5.50 Lakhs</td>
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<td>56.</td>
<td>Seismic design parameters for Barmer - Salaya pipeline</td>
<td>L&amp;T Gulf</td>
<td>Rs. 3.00 Lakhs</td>
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<td>57.</td>
<td>Sewerage Master Plan for Haldia Municipal Area</td>
<td>Haldia Development Authority,</td>
<td>Rs. 22.06 Lakhs</td>
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<td>58.</td>
<td>Software capabilities for reliability analysis of ship structures</td>
<td>Indian Register of Shipping,</td>
<td>Rs. 4.00 Lakhs</td>
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<td>59.</td>
<td>Soil Test for Proposed BLLRO Office Building at Nayanjuli, Kharagpur</td>
<td>Govt. of West Bengal</td>
<td>Rs. 0.00 Lakhs</td>
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<td>60.</td>
<td>Stress Analysis of Steel Cord Reinforced Pipe Conveyor Belt (SCPC)</td>
<td>Phoenix Yule Limited, Kolkata-700020,</td>
<td>Rs. 0.00 Lakhs</td>
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<td>61.</td>
<td>Structural Health monitoring of Factory building Client: Titagarh Wagon Ltd.</td>
<td>Titagarh Wagon Ltd., Kolkata,</td>
<td>Rs. 3.00 Lakhs</td>
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<td>62.</td>
<td>Study of water supply distribution/storage and source availability for Darjeeling Municipality</td>
<td>District Magistrate, Darjeeling,</td>
<td>Rs. 4.82 Lakhs</td>
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<td>63.</td>
<td>Sump model study for CW system pkg - NTPC</td>
<td>Kirloskar Brothers Ltd.</td>
<td>Rs. 9.00 Lakhs</td>
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<td>64.</td>
<td>Sump model study for Dadri, Simhadri and Farakka CW pumps</td>
<td>WPIL Limited, Kolkata</td>
<td>Rs. 27.00 Lakhs</td>
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<tr>
<td>65.</td>
<td>Technical advice for pile load test and evaluation of pile load capacity</td>
<td>Ramsarup Lohh Udyog Ltd, (Webel Mediatronics Ltd)</td>
<td>Rs. 1.45 Lakhs</td>
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<td>66.</td>
<td>Testing &amp; Evaluation of 100m Transmission Tower at AIR Kohima</td>
<td>ITC Limited</td>
<td>Rs. 2.70 Lakhs</td>
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<td>67.</td>
<td>Testing of sub-grade water etc</td>
<td>Span Consultant Pvt Ltd</td>
<td>Rs. 0.40 Lakhs</td>
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<td>68.</td>
<td>Traffic Study for Project- ITC East India, Kolkata</td>
<td>ITC Limited</td>
<td>Rs. 2.40 Lakhs</td>
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<td>69.</td>
<td>Traffic Study for the Proposed Mixed Use Township Complex in Kasba Area, Kolkata</td>
<td>Bengal-NRI</td>
<td>Rs. 4.00 Lakhs</td>
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<td>70.</td>
<td>Vetting of design and drawing of railway crossingstructure at chainage of 175-20 of right main canal and at chainage 244-00 of left main canal of Bhar</td>
<td>Chief Engineer, Water resources Department ranchi, Govt of Jharkhand</td>
<td></td>
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</tbody>
</table>
71. Vetting of Pavement Design for Tezpur Airfield—CE (AF), Shillong Zone, Rs. 1.50 Lakhs

72. Vikram Sarabhai Residential Complex—IIT Kharagpur, Rs. 9.60 Lakhs

**Visits Abroad by Faculty Members**

1. Bandyopadhyay, Janendra Nath
   To present one paper at the Asian Conference on Mechanics and Functional Materials and Structures (Matsue, Japan)
   October 31 to November 3, 2008

2. Dey, Subhasish
   To offer a short-course (Università della Calabria, Italy) 5 days

3. Dey, Subhasish
   To offer a short-course (University of Florence, Italy) 4 days

4. Dey, Subhasish
   To offer a short-course (University of Oulu, Finland) 4 days

5. Dey, Subhasish
   To attend ICHE2008 (Nagoya University, Japan) 4 days

6. Pal, Anjali
   Research collaboration (Taiwan) May-June

7. Gupta, Ashok Kumar
   To develop research collaboration in the area of air quality (Texas A&M University Kingsville, Texas, USA) July 1-15

8. Verma, Shubha
   Conference (Annecy, France) 7 days

9. Barai, Sudhir Kumar
   To Avail Erskine Visiting Fellowship (University of Canterbury, Christchurch, NZ) 2 months

10. Barai, Sudhir Kumar
    To Present Invited Lecture and paper during EASEC-11 (National Taiwan University, Taiwan) 1 Week

11. Barai, Sudhir Kumar
    To Present the work (HP Labs, Palo Alto, USA) 4 days

12. Ghangrekar, Makarand Madha
    Marie Curie Fellowship (Newcastle upon Tyne, UK) September 24 to December 31

**Invited Lectures by Faculty Members**

1. Parallel Neuro Models Applications in Structural Engineering Domain by Barai, Sudhir Kumar
   (National Taiwan University, Taipei, Taiwan)

2. Monitoring and Analyses of Landslides in North-East India by Sen Gupta, Aniruddha (University of Manipur, Imphal)

3. Bending Behaviour of Carbon Nanotubes—Plenary Lecture by Bhattacharya, Baidurya
   (International Conference on Materials Discovery, University of Tlemcen, Oran, Algeria)

4. Molecular dynamics simulation of solids: a case study on carbon nanotubes by Bhattacharya, Baidurya
   (AICTE/MHRD sponsored winter school on Nanoparticle-Science and Technology, National Institute of Technology, Durgapur)

5. Molecular dynamics simulation of fracture: a look at carbon nanotubes by Bhattacharya, Baidurya
   (Indo US workshop on Materials Design: Measurement Modeling and Informatics, Bengal Engineering and Science University)

6. Introduction to Partial Safety Factor in Engg. Design by Bhattacharya, Baidurya (5th Indo-German Theme Meeting on Structural Integrity of Pressure Retaining Components, Jadavpur University)

7. Anionic surfactant adsorption on waste tire rubber granules by Pal, Anjali (Bhilai Institute of Technology, Bhilai Nagore)

8. Liquefaction of soils and related issues by Roy, Debasis (Andhra University, Visakhapatnam)

9. Geotechnical earthquake engineering activities by Roy, Debasis (IIT Madras)

10. Geotechnical earthquake engineering by Roy, Debasis (Jadavpur University, Salt Lake Campus)

11. Geotechnical issues - seismic design of bridges by Roy, Debasis (IIT Kanpur)

12. Fluoride in Drinking water—A Global perspective by Gupta, Ashok Kumar (Angul, Orrisa)

13. Solid Waste Management: A Recent Trends by Gupta, Ashok Kumar (IIT Durgapur)

14. Parallel Neuro Models Applications in Structural Engineering Domain by Barai, Sudhir Kumar
   (University of Canterbury, Christchurch, New Zealand)

15. Neuro Air Quality Predictors by Barai, Sudhir Kumar (Lincoln University, Christchurch, New Zealand)

ANNUAL REPORT
2008-2009
16. Neural Networks and its Applications in Structural Engineering by Barai, Sudhir Kumar (SVNIT, Surat)
17. Fuzzy Logic and its Engineering Applications by Barai, Sudhir Kumar (IIT Kharagpur)
18. Microbial Fuel Cell by Ghangrekar, Makarand Madha (Birla Institute of Technology and Science (BITS) Pilani, Goa Campus)
20. Wastewater treatment using microbial fuel cell by Ghangrekar, Makarand Madha (University of Newcastle upon Tyne, UK)
22. Better management practices for floods and droughts by Desai, Venkappayya R (GBpant Univ. of Agriculture and Technology)
23. Recycled Aggregate as construction materials by Bhattacharyya, Sriman Kumar (Kolkata)
24. Concrete Mix design - A review by Bhattacharyya, Sriman Kumar (CET, Bhubaneswar)

Books Published

Short-Term Courses, Training Programmes and Workshops organized
1. Application of Finite Element Technique in Engineering (3-7 December 2008)
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

HEAD : Professor Indranil Sengupta

FACULTY

Professors
Chakrabarti, Partha Pratim Ph.D. (IIT Kharagpur), Artificial Intelligence, CAD for VLSI, Formal Verification
Dasgupta, Pallab Ph.D. (IIT Kharagpur), Design Verification
Ghose, Sujoy Ph.D. (IIT Kharagpur), Operating System, Networks, Algorithms
Kumar, Rajeev Ph.D. (Sheffield), Programming Language & Software Engineering, Multiobjective Optimization & Evolutionary Computing, EDA & Embedded Systems, Multimedia Systems & Video Transcoding
Majumder, Arun Kumar Ph.D. (Calcutta), Ph.D. (Florida), Multimedia Systems, Medical Informatics and Telemedicine, Data Security, Design Automation
Mall, Rajib Ph.D. (IISc. Bangalore), Software Engineering
Mukhopadhyay, Jayanta Ph.D. (IIT Kharagpur), Image Processing, Medical Informatics, Multimedia Systems, Bio-informatics
Pal, Ajit Ph.D. (Calcutta University), Low Power VLSI Circuits, Sensor Networks, Optical Communication
Pal, Sudebkumar Prasant Ph.D. (IISc. Bangalore), Design and analysis of algorithms, Computational geometry, Graph theory and algorithms
Roychowdhury, Dipanwita Ph.D. (IIT Kharagpur), Cryptography, VLSI Testing, Cellular Automation
Sarkar, Dipankar Ph.D. (IIT Kharagpur), Formal Verification of Circuits and Systems
Sarkar, Sudeshna Ph.D. (IIT Kharagpur), Machine Learning, Text Mining, Natural Language Processing
Sengupta, Indranil Ph.D. (Calcutta University), Cryptography and network security, VLSI design and testing

Associate Professors
Ganguly, Niloy Ph.D. (BESU, Calcutta), Peer-to-peer Networks, Complex Network Theory, Social Networks Modelling
Gupta, Arobinda Ph.D. (Iowa), Distributed Systems, Ad Hoc Networks
Mandal, Chittaranjan Ph.D. (IIT Kharagpur), Formal Verification, VLSI Design

Assistant Professors
Bhowmick, Partha Ph.D. (ISI, Kolkata), Digital geometry, Shape analysis, Pattern recognition
Das, Abhijit Ph.D. (IISc. Bangalore), Cryptography, Computational Number Theory
Harit, Gaurav Ph.D. (IIT, Delhi), Image Processing, Document Image Analysis, Pattern Recognition, Video analysis, Semantics in Multimedia
Mitra, Pabitra Ph.D. (ISI Calcutta), Machine Learning, Information Retrieval
Mukhopadhyay, Debdeep  Ph.D. (IIT Kharagpur), Cryptography and Side Channel Analysis, VLSI of Cryptographic Algorithms, Cellular Automata

Lecturer

Faculty Appointments
Dr. Gaurav Harit  Assistant Professor
Dr. Partha Bhowmik  Assistant Professor
Dr. Debdeep Mukhopadhyay  Assistant Professor

New Academic Programmes
1. Joint M.Tech. + PhD program,
2. Joint M.S. + PhD program

Brief Description of on-going activities

Thrust Areas
1. Artificial Intelligence
2. Image Processing and Computer Vision
3. Natural Language Processing
4. VLSI Design and CAD tools

New Acquisitions
1. The laboratory for "Geometric, Combinatorial and Algebraic Computation" is a new thematic laboratory in CSE department.

Lectures by Visiting Experts
1. Weathering the Storm in Cloud Computing by Vipin Chaudhary (University at Buffalo, SUNY)
2. Relation Learning from Text by Indrajit Bhattacharya (IBM India Research Lab)
3. Context Sensitive Software Model Checking by Dr. Swarat Chaudhuri (Pennsylvania State University)
4. NetPrints: Diagnosing Home Network Misconfigurations using Shared Knowledge by Ranjita Bhagwan (Microsoft)
5. Multimodal Systems in general by Dr Prasenjit Dey (HP Labs India)
6. Designing a Virtual Information Telescope Using Mobile Phones and Social Participation by Romit Roy Choudhury (Duke University)
7. Polynomial hierarchy, Betti numbers and a real analogue of Todas theorem by Saugata Basu (Department of Mathematics, Purdue University.)
8. A Two-Stage Constraint Based Dependency Parser for Free Word Order Language by Prof. Rajeev Sanghal (IIIT Hyderabad)
9. Information spreading in mobile agent systems: from myxobacterial collective motion to broadcasting and routing in Delay Tolerance Networks by Fernando Peruani (Institute of Complex System Paris, France)

Doctoral and MS Degrees Awarded
1. Manojit Chowdhury Computational Models of Real World Phonological Change (Ph.D.)
2. P. K. Singh Enhancing Solution Quality of Multiobjective Combinatorial Optimization with Hybridization of Evolutionary Algorithms (Ph.D.)
3. Prasenjit Basu Design Intent Verification by Formal Property Coverage (Ph.D.)
4. V. Pallavi Trajectory Analysis and Video Summarization with Application to Soccer Videos (Ph.D.)
5. Suchismita Roy SAT Based Solutions for Timing and Power Estimation in Gate Level Circuits (Ph.D.)
6. Abhishek Somani New Methods in Design Space Exploration and Optimization of Analog Circuits (Ph.D.)
7. Ashok Kumar Das Design and Analysis of Key Distribution Mechanisms in Wireless Sensor Networks (Ph.D.)
8. Sandip Aine New Approaches to Design and Control of Anytime Algorithms (Ph.D.)
9. T. Tuithung Motion Compensated JPEG 2000: A New Video Codec (Ph.D.)
10. Bhaskar Pal Formal and Semi-formal Verification Methods with Constrained Random Testbenches (Ph.D.)
14. Santosh Biswas Failure Diagnosis of Fair Discrete Event System Models and Its Application to On-line Testing of Sequential VLSI Circuits (Ph.D.)
15. Anindyasundar Nandi Formal Methods for Test Plan Coverage and Debugging (MS)
16. Sayak Ray Formal Verification and Synthesis of Power Mode Scheduling Strategies (MS)
17. Soham C. Chakraborty Static Analysis and Optimization of Object Oriented Systems (MS)
18. Alokes Bandyopadhyay (MS)

Fellow - Professional Bodies
1. Chakrabarti, Partha Pratim (0) Awarded - INSA
2. Chakrabarti, Partha Pratim (0) Awarded - INAE
3. Chakrabarti, Partha Pratim (0) Awarded - IASc
4. Chakrabarti, Partha Pratim (0) Awarded - WBS&T Academy
5. Kumar, Rajeev (2001) Fellow - The Institute of Electronics & Telecommunication Engineers (IETE)

Member - Editorial Board
1. Mukhopadhyay, Jayanta (2008) Member of Editorial Board
- International Journal of Biomedical Engineering and Consumer Health Informatics.
- International Journal of Biomedical Imaging (IJBI)
Awards & Honours
1. Sarkar, Dipankar (2009)  
   EDA Software Contest at VLSI 2009
   Indian Semiconductor Association TechnoInventor Award
   Second Best Design Contest Award, 22nd VLSI Design Conference, New Delhi
4. Mandal, Chittaranjan (2009)  
   VLSI Design 2009 EDA Contest award (first place)

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A Novel Regression Test Selection Technique</td>
<td>General Motors</td>
<td>Rs. 0.00 Lakhs</td>
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<tr>
<td>2</td>
<td>Advanced VLSI Consortium</td>
<td>Multiple (Consortium),</td>
<td>Rs. 100.00 Lakhs</td>
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<tr>
<td>3</td>
<td>Approximate Search and Coverage Based Analysis</td>
<td>IBM Faculty Award</td>
<td>Rs. 3.00 Lakhs</td>
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<td>4</td>
<td>Authentication schemes for VANETs</td>
<td>General Motors India</td>
<td>Rs. 0.00 Lakhs</td>
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<td>5</td>
<td>Bengali Treebank</td>
<td>Central Institute of</td>
<td>Rs. 26.00 Lakhs</td>
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<tr>
<td></td>
<td></td>
<td>Indian Languages,</td>
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<tr>
<td>6</td>
<td>Building Delay Tolerant Peer-to-peer network</td>
<td>DIT</td>
<td>Rs. 55.00 Lakhs</td>
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<tr>
<td>7</td>
<td>Combinatorial and Geometric Approaches to Digital Imaging Applications</td>
<td>SRIC, IIT Kharagpur</td>
<td>Rs. 1.35 Lakhs</td>
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<tr>
<td>8</td>
<td>Cross Language Information Access</td>
<td>MCIT</td>
<td>Rs. 65.00 Lakhs</td>
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<tr>
<td>9</td>
<td>Design and Analysis of an Efficient Cryptosystem for Safe Messaging over Vehicular Adhoc Network</td>
<td>General Motors, Bangalore,</td>
<td>Rs. 20.00 Lakhs</td>
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<tr>
<td>10</td>
<td>Design and implementation of a cryptosystem resistant to vulnerabilities and side channel attacks</td>
<td>DIT, GOI</td>
<td>Rs. 138.00 Lakhs</td>
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<td>11</td>
<td>Design of a processor having an asynchronous ALU to counter side channel attack</td>
<td>ISRO</td>
<td>Rs. 0.50 Lakhs</td>
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<tr>
<td>12</td>
<td>Design of an Indigenous Encryption Algorithm for SDH-16</td>
<td>Indian Telephone Industry, Bangalore</td>
<td>Rs. 40.00 Lakhs</td>
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<tr>
<td>13</td>
<td>Design of Indigenous Encryption Algorithms for SDH-16</td>
<td>Indian Telephone Industry,</td>
<td>Rs. 40.00 Lakhs</td>
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<tr>
<td>14</td>
<td>Designing robust and self-organised p2p system over peer-to-peer networks</td>
<td>Department of Science and Technology,</td>
<td>Rs. 20.00 Lakhs</td>
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<tr>
<td>15</td>
<td>Developing robust and efficient services for open source Internet telephony over peer to peer network</td>
<td>DST-BMBF</td>
<td>Rs. 3.92 Lakhs</td>
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<tr>
<td>16</td>
<td>Developing robust services for peer to peer networks</td>
<td>SRIC</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
<td>17</td>
<td>Development of Cross-Lingual Information Access (CLIA) system</td>
<td>Ministry of Communications &amp; Information Technology,</td>
<td>Rs. 61.51 Lakhs</td>
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<td>18</td>
<td>Development of Indian Language to Indian Language Machine Translation System (IL-IL MT)</td>
<td>Ministry of Communications &amp; Information Technology,</td>
<td>Rs. 46.00 Lakhs</td>
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<td>19</td>
<td>Development of infrastructure for centre of excellence on information assurance</td>
<td>Headquarters Integrated Defence Staff, Ministry of Defence,</td>
<td>Rs. 50.00 Lakhs</td>
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<td>20</td>
<td>Development of Multimedia Hardware-Software system for the Education of Students with Cerebral Palsy and Communication</td>
<td>Ministry of Social Justice and Empowerment Golf,</td>
<td>Rs. 17.00 Lakhs</td>
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<td>21</td>
<td>Development of Spatio-Temporal Access Control Models</td>
<td>DST, GOI</td>
<td>Rs. 16.18 Lakhs</td>
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<td>22</td>
<td>Distributed data synchronization algorithms (ASD)</td>
<td>Applied Research Works,</td>
<td>Rs. 2.16 Lakhs</td>
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<tr>
<td>23</td>
<td>Enabling Research with ICT</td>
<td>National Institute of Mentally Handicapped, Hyderabad,</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
<tr>
<td>No.</td>
<td>Project Description</td>
<td>Institute/Agency</td>
<td>Funding (Rs. in Lakhs)</td>
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<td>24.</td>
<td>Encompression - Encryption in Compressed Domain (Pre-project)</td>
<td>ISRO, Ahmedabad</td>
<td>2.00</td>
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<tr>
<td>25.</td>
<td>Extending the scope of equivalence checking in complex embedded system design verification</td>
<td>STC, IIT Kharagpur</td>
<td>20.00</td>
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<tr>
<td>26.</td>
<td>Fundamental research in information assurance</td>
<td>Headquarters Integrated Defence Staff, Ministry of Defense</td>
<td>48.10</td>
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<td>27.</td>
<td>GM Collaborative Research Laboratory on ECS for Education</td>
<td>General Motors</td>
<td>125.00</td>
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<tr>
<td>28.</td>
<td>High Level Synthesis and Verification of Digital Circuits</td>
<td>MHRD,</td>
<td>6.00</td>
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<td>29.</td>
<td>INAE Visveswarya Chair Professor Project</td>
<td>INAE,</td>
<td>16.74</td>
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<tr>
<td>30.</td>
<td>Indian Language Machine Translation</td>
<td>MCIT</td>
<td>45.00</td>
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<tr>
<td>31.</td>
<td>Information spreading in a system of mobile agents</td>
<td>STIC-Asie</td>
<td>0.00</td>
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<tr>
<td>32.</td>
<td>Investigation of Cryptanalytic Techniques</td>
<td>Headquarters, Integrated Defence Staff, Ministry of Defence, Government of India</td>
<td>44.30</td>
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<tr>
<td>33.</td>
<td>Low Power Circuits and Systems</td>
<td>Intel Corporation, USA</td>
<td>22.00</td>
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<td>34.</td>
<td>Machine Learning for Cross Language Information Retrieval</td>
<td>IIT Kharagpur ISIRD</td>
<td>3.00</td>
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<tr>
<td>35.</td>
<td>Multimedia Modeling of Dynamic Objects (MMD)</td>
<td>DST, GOI</td>
<td>18.00</td>
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<td>36.</td>
<td>Nokia Mobile Phone Interface Verification</td>
<td>Media Lab Asia</td>
<td>4.50</td>
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<tr>
<td>37.</td>
<td>Shrutti: A Vernacular Speech Recognition System</td>
<td>Ministry of Information Technology, Govt. of India</td>
<td>25.00</td>
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<td>38.</td>
<td>Special Manpower Development Programme for VLSI Design and Related Software (SMDP-II)</td>
<td>Society for Natural Language Technology Research,</td>
<td>90.00</td>
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<td>39.</td>
<td>Spellchecker</td>
<td></td>
<td>18.00</td>
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<td>40.</td>
<td>VLSI Design of Elliptic Curve Cryptosystem Tolerant against Power Attacks</td>
<td>IIT Kharagpur</td>
<td>4.40</td>
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<tr>
<td>41.</td>
<td>Web Enabled Medical Information Access Using Handheld Devices in a Wireless Environment for Telemedicine Applications</td>
<td>Ministry of Information and Communication Technology, GOI</td>
<td>62.10</td>
</tr>
</tbody>
</table>

**Consultancy Projects**

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Description</th>
<th>Institute/Agency</th>
<th>Funding (Rs. in Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Advisor for Communications and Networking Plan</td>
<td>National Insurance Company,</td>
<td>2.40</td>
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<td>2.</td>
<td>Behavioral Modeling and Verification of Mixed-signal Circuits</td>
<td>National Semiconductor Corp, USA,</td>
<td>27.00</td>
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<td>3.</td>
<td>Benchmarking of Text Mining</td>
<td>Hague Centre for Strategic Studies,</td>
<td>4.00</td>
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<td>4.</td>
<td>Broadband Architecture Validation</td>
<td>Reliance Commtn,</td>
<td>16.00</td>
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<td>5.</td>
<td>Call Centre &amp; Data Warehousing (CRMP)</td>
<td>WBSEB</td>
<td>17.00</td>
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<td>6.</td>
<td>Computerization of DVC (CDVC)</td>
<td>Damodar Valley Corporation,</td>
<td>19.00</td>
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<td>8.</td>
<td>Deployment of Telemedicine in Tripura</td>
<td>Ministry of Information Technology, Govt of India, and WECS, Ltd. Kolkata,</td>
<td>27.00</td>
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<tr>
<td>No.</td>
<td>Project Description</td>
<td>Implementing Body</td>
<td>Cost (Lakhs)</td>
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<td>9.</td>
<td>Development of Telemedicine in West Bengal Govt. Hospitals</td>
<td>Ministry of Information Technology, Govt. of India and WEBEL, Kolkata,</td>
<td>29.00</td>
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<tr>
<td>10.</td>
<td>External Network Consultant for West Bengal State Wide Area Network(WBSWAN) Expansion Project</td>
<td>Ministry of Information Technology, Gov't of India, and WEBEL Techn. Ltd. Kolkata,</td>
<td>30.00</td>
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<td>11.</td>
<td>Formal Design Intent Modeling and Verification of AMS Behaviors</td>
<td>Semiconductor Research Corporation (SRC),</td>
<td>45.00</td>
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<td>12.</td>
<td>Formal Methods for Component Based Design Validation</td>
<td>General Motors Collaborative Research Lab,</td>
<td>23.00</td>
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<td>13.</td>
<td>Formal Verification of Web Interfaces</td>
<td>Google Inc.</td>
<td>20.00</td>
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<td>14.</td>
<td>GM Collaborative Research Laboratory on Electronics, Controls and Software: Projects</td>
<td>General Motors Research Corporation</td>
<td>425.00</td>
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<td>15.</td>
<td>Hindi Named Entity Recognition</td>
<td>Microsoft Research</td>
<td>10.00</td>
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<td>16.</td>
<td>HP-UX lan driver development, as project</td>
<td>Pursuit Software Inc.</td>
<td>20.00</td>
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<td>17.</td>
<td>Interlinking of JIS campuses</td>
<td>JIS Group, Kolkata</td>
<td>1.00</td>
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<td>18.</td>
<td>IT Consultancy (CITM)</td>
<td>UCO Bank</td>
<td>5.00</td>
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<td>19.</td>
<td>IT Implementation and Computerization of DVC</td>
<td>Damodar Valley Corporation,</td>
<td>19.10</td>
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<td>20.</td>
<td>Multimodal Participatory Tutoring System for Rural Schools</td>
<td>Media Lab Asia,</td>
<td>24.00</td>
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<tr>
<td>21.</td>
<td>Named Entity Recognition</td>
<td>Microsoft Research Inc.,</td>
<td>10.00</td>
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<tr>
<td>22.</td>
<td>Personalized content and commerce recommendations</td>
<td>Minekey Inc.</td>
<td>62.00</td>
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<tr>
<td>23.</td>
<td>Sanyog: A Communication System for the Speech Impaired and Children with Cerebral Palsy Phase II</td>
<td>Media Lab Asia,</td>
<td>72.00</td>
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<tr>
<td>24.</td>
<td>Setting up of Telemedicine Facilities in Tripura</td>
<td>Ministry of Information Technology, Govt. of India and WEBEL, Kolkata,</td>
<td>27.00</td>
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<tr>
<td>25.</td>
<td>Shruti : Embedded Text to Speech Systems for Indian Languages Phase II</td>
<td>Media Lab Asia</td>
<td>21.00</td>
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<td>26.</td>
<td>Synthesis and Property Extraction from System Verilog Models</td>
<td>Synopsys India Pvt Ltd,</td>
<td>26.00</td>
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<td>27.</td>
<td>Technical Consultancy on IT Matters</td>
<td>UCO Bank</td>
<td>1.00</td>
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<td>28.</td>
<td>Telemedicine (DOTP)</td>
<td>WEBEL</td>
<td>29.00</td>
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<td>29.</td>
<td>Telemedicine (DTGH)</td>
<td>WEBEL</td>
<td>29.00</td>
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<td>30.</td>
<td>Telemedicine on Othalmology (TPLM)</td>
<td>WEBEL, Kolkata,</td>
<td>3.00</td>
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<td>31.</td>
<td>Telmedicne (SUTF)</td>
<td>WEBEL,</td>
<td>36.00</td>
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<td>32.</td>
<td>Training and Research Analysis</td>
<td>Infosys Ltd. Bangalore</td>
<td>1.60</td>
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<tr>
<td>33.</td>
<td>W.B. State Wide Area Network (WANE)</td>
<td>WTL</td>
<td>30.00</td>
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<tr>
<td>34.</td>
<td>Web Portal Development (WPDC)</td>
<td>WBSEDCL</td>
<td>3.00</td>
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<tr>
<td>35.</td>
<td>Web portal Development Consultancy</td>
<td>West Bengal State Electricity Distribution Company Limited,</td>
<td>3.00</td>
</tr>
<tr>
<td>36.</td>
<td>Zonal Data Warehouse and Online CRM Project of CRM</td>
<td>West Bengal State Electricity Board,</td>
<td>7.00</td>
</tr>
</tbody>
</table>

ANNUAL REPORT 2008-2009
Patents (filed / granted)

1. Low cost, portable, non-invasive, multi-parameter cardiac health assessment system for preventive cardiology, attachable to computer / PDA / Cell-phone

Visits Abroad by Faculty Members

1. Majumder, Arun Kumar Interaction with Oracle Research and Development Team on Future technologies the Indian context. (Oracle Headquarters, Redwood Shores, California, USA) November 3-5, 2008
2. Mukhopadhyay, Jayanta Research Work (University of California, Santa Barbara) October 6-17
3. Mukhopadhyay, Jayanta Research Work (National University of Singapore) 26th May - 6th June
4. Sarkar, Sudeshna To attend ACL 2008 and present paper (Columbus, OH) June 12-19, 2008
5. Chakrabarti, Partha Pratim Indo-Brazil Joint Workshop (Rio De Janeiro, Brazil) June 24-26, 2008
6. Sengupta, Indranil Attend Microsoft Faculty Summit (Seattle, USA) July 28-30
7. Sengupta, Indranil Attend ICECC 2008 Conference (Rajshahi, Bangladesh) June 26-30
8. Kumar, Rajeev Participation (Session Chair, Paper & Tutorial Pr) in ACM Genetic & Evolutionary Comp. Conf. (GECCO) (Atlanta, USA) 1 week

Invited Lectures by Faculty Members

1. Trajectory Analysis of Broadcast Soccer Videos by Mukhopadhyay, Jayanta (National University of Singapore)
2. In the quest for good digital distances by Mukhopadhyay, Jayanta (IIT Kharagpur)
3. Named Entity Recognition - A study of features and methods by Sarkar, Sudeshna (Microsoft Research India)
4. Opinion Analysis by Sarkar, Sudeshna (IIT Bombay)
6. Geometric data structures by Pal, Sudebkumar Prasant (BITS Pilani)
7. Link paths and reflection visibility problems by Pal, Sudebkumar Prasant (Fr. Conceicao Rodrigues College of Engineering, Bandra, Mumbai)
8. Coding, counting, cutset incomparability and coloring of labelled graphs and hypergraphs by Pal, Sudebkumar Prasant (IIT Kharagpur, Dept. of Mathematics, DST workshop on "Some research directions in Graph Theory")
9. Topics on VLSI System Design by Mandal, Chittaranjan (NIT Jamshedpur)
10. Evolutionary Multiobjective Combinatorial Optimization (EMCO) by Kumar, Rajeev (Int. Conference on Contemporary Computing, Jaypee Institute of Information Technology University (JIITU), Noida)
11. Object Oriented Software Engineering : Concepts and Practices by Kumar, Rajeev (Thapar University, Patiala)
12. Practical Aspects of Object Oriented Software Engineering by Kumar, Rajeev (National Institute of Technology (NIT), Rourkela)
13. Evolutionary Multiobjective Combinatorial Optimization by Kumar, Rajeev (A Specialized Tutorial in Genetic and Evolutionary Computing Conference (GECCO-08), 13 July 2008, Atlanta, Georgia)
14. Object Oriented Software Engineering for Trusted Computing by Kumar, Rajeev (NIT Durgapur in Nat. Conference of Software Engineering)
Books Published

1. Abhijit Das Programming, Data Structures and Algorithms published by Prentice Hall of India (0)
2. Abhijit Das Computational Number Theory published by Yet to decide (Document under preparation) (0)

Seminars, Conferences and Workshops Organised

1. 2nd India Software Engineering Conference (ISEC), 2009
2. 5th International Conference Distributed Computing & Internet Technology (ICDCIT)
3. AVLSI Consortium Annual Meet
4. AVLSI Consortium Half-Yearly Meet
5. Dynamics on and of complex networks
6. ICIIS 2008, CISE8 on Computational Electromagnetics, Computer Networks and Network T
7. ICISS 2009
8. Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP)
9. INDOCRYPT 2008
10. International Conference Contemporary Computing (ICCC)
11. International Conference Information Technology (ICIT)
12. Intel Researchers Day
13. International Summer School on NLP and Text Mining
14. Silver Jubilee Research Promotion Workshop on "Introduction to geometric algorithms"
15. Sixth Indian Conference of Computer Vision, Graphics and Image Processing (ICVGIP)
16. Technology Summit : Challenges in Development of Next Generation Semiconductor-based Systems

Short-Term Courses, Training Programmes and Workshops organized

1. Advanced Application Security (April 7-17, 2008)
2. Information Security (September 13-23, 2008)
FACULTY

Professors
Banerjee, Soumitro Ph.D. (IIT Delhi), Nonlinear Dynamics
Barua, Alok Ph.D. (IIT Kharagpur). Instrumentation Bioreactor Design and Control, VLSI
Basu, Tapan Kumar Ph.D. (IIT Delhi), Power Systems, DSP, Speech Processing
Bhattacharya, Tapas Kumar Ph.D. (IIT Kharagpur), Electrical Machines, Power Electronics, Linear Motors, Field Calculations
Das, Debapriya Ph.D. (IIT Delhi), Electric Power Distribution Systems and Power System Operation and Control
Das, Sarit Kumar Ph.D. (IIT Kharagpur), Control Systems
Dutta, Pranab Kumar Ph.D. (IIT Kharagpur), Signal Processing, Biomedical Image Processing
Kishore, N K Ph.D. (IISc. Bangalore), High Voltage and Insulation Engineering
Mohan, Bosukonda Murali Ph.D. (IIT Kharagpur), Fuzzy Logic Applications in Systems & Control, Applications of Orthogonal Functions in Systems & Control
Mukhopadhyay, Siddhartha Ph.D. (IIT Kharagpur), Dynamic Systems Estimation and Control, Industrial Automation, CAD of AMS Circuits
Pal, Jayanta Ph.D. (IIT Roorkee), Controller Design, Fractional Order Systems, Reduced Order Modelling, Electrical Power Systems, Genetic Algorithm Applications, Neural Networks
Patra, Amit Ph.D. (IIT Kharagpur), VLSI Design, DC-DC Power Converters, Fault Tolerant Control
Ray, Goshaidas Ph.D. (IIT Delhi), Robust Stabilization, Time Delay System, Decentralized Control, and Intelligent Control
Sen Gupta, Sabyasachi Ph.D. (IIT Kharagpur), Machine Drives and Power Electronics
Sen, Siddhartha Ph.D. (IIT Kharagpur), MEMS Capacitive Accelerometer, Fractional Order Systems, Robust Control, Control of Space Vehicles
Sinha, Avinash Kumar Ph.D. (Pilani), Power System

Associate Professors
Chakraborty, Chandan Ph.D. (IIT Kharagpur), Electric Machines, Drives and Power Converters
Kastha, Debaprasad Ph.D. (Tennessee), Wind Electrical Conversion Systems, Switched Mode Power Supplies, Electric Drives
Maka, Srinivasu Ph.D. (IIT Kharagpur), Control Systems, Instrumentation Engineering, Biomedical Engineering
Poddar, Gautam Ph.D. (IISc. Bangalore), Medium Voltage Converters and Control
Pradhan, Ashok Kumar Ph.D. (Sambalpur University), Power System Relaying, Power System Monitoring using WAMS, Power System Measurements, Digital Signal Processing for Power System
Prasad, Dinkar Ph.D. (IIT Kharagpur), Power Electronics, Machine Drives
Routray, Aurobinda Ph.D. (Sambalpur University), Real Time Signal Processing, Fatigue Analysis of Human Drivers, Emotion Analysis, Statistical Signal Processing
Assistant Professors


Biswas, Karabi Ph.D. (IIT Kharagpur), Sensor design, MEMS, Fractional Order Systems

Chatterjee, Dheeman Ph.D. (IIT Kanpur), Power System Dynamics and Stability, FACTS, Distributed Generation

Chattopadhyay, Souvik Ph.D. (IISc. Bangalore), Digital Control of Power Converters

Deb, Alok Kanti Ph.D. (IIT Delhi), Control Systems, Computational Intelligence

Mukherjee, Anirban Ph.D. (IIT Kharagpur), Computational Biology, Bioinformatics

Sahoo, Nirod Chandra Ph.D. (University of Singapore), Power System Operation and Control, Applied Soft Computing

Faculty Appointments

Dr. Alok Kanti Deb Assistant Professor
Dr. Dheeman Chatterjee Assistant Professor

Brief Description of on-going activities

From classical to modern, from milli watts to tens of kilo watts, from conventional to non-conventional, the electrical engineering department investigates these all. The range of investigation for this department is one of the broadest in this institute. The major on going activities are categorized as follows :

1. **Machine Drives and Power Electronics** : Magnetic Levitation; Superconducting magnetic energy storage; Variable frequency AC-Drives; Simulation of power electronic circuits; Resonant Converters; Design of integrated circuits for Power Management; Nonlinear phenomena in Power Electronics; Automotive Electronics; Diagnostic of drives; Drive fatigue analysis

2. **Control and Dynamic Systems** : Neuro-fuzzy controllers; Control of chaotic systems; Discrete event and hybrid systems; Fault-tolerant control of aero-space systems; Attitude control of satellites and launch vehicles; Robust stabilization using periodic controllers; Reduced order modeling; Control of Variable Air-Volume Air-Conditioning Systems; Bifurcation theory of hybrid dynamical systems; Delta domain digital control analysis and design; Neural networks applications in control; Genetic algorithm applications in control; Decentralized control of large scale systems; Nonlinear dynamics; Fractional order system and their applications

3. **Power and Energy Systems** : Wind turbines; Power system dynamics; Real-time digital simulation of power systems; Power system protection; Intelligent relaying; State estimation of power systems; Condition and Diagnostic Monitoring of Power Apparatus; Energy audit and management; Power system planning and optimization; Wavelet Application to Power system Transients; Neural Net Application to Partial Discharge Phenomenon; Electric Field Computations, Lightning Protection, Material Characterization; FACTs

4. **Instrumentation and Signal Processing** : Laser based profile measurement; Image based measurement systems; Motion estimation using MRI and colour Doppler imaging; Non-Linear and Statistical Signal Processing; Real Time Algorithms for Detection and Diagnostics; Condition monitoring of machines and power apparatus; Testing of analog and digital VLSI circuits; Fault detection and diagnosis of analog circuits; Control and instrumentation of bio-reactors; Fibre-optic components and sensors; Biomedical signal processing; Analysis of ECG signals; Sensors fusion; Multimedia Security; Convex Optimization and LMI applications to Signal Processing; Design and development of MEMS accelerometer; Seismic signal processing, active noise control; Fast algorithms for real time signal processing

**Thrust Areas**

This department has identified the following topics as the thrust areas of investigations :

1. MEMS
2. VLSI applications in power converters
3. Automotive electronics and electric vehicles
4. Non conventional energy
5. Control of aerospace systems
6. Bifurcation and chaos
7. Fault tolerant and embedded system
8. Distributed generation
9. FACTS

Lectures by Visiting Experts
1. Current Trends in Tactical Missile Guidance by Mr. S. Vathasal (Director, ERIP, DRDO, New Delhi)
2. Emerging issues in the power sector by Mr. Arvind Jadhav (Jt. Secretary, Ministry of Power, New Delhi)
3. Scaling of Advance C-MOS VLSI by Dr. Amitava Chatterjee
5. Instrumentation for the heart by Dr. Soumya Mukherjee (IIT Bombay)

Doctoral and MS Degrees Awarded
1. Leena G Design of Controllers for Multivariable Systems (Ph.D.)
2. Soumya Ranjan Mohanty Detection and Classification of Transmission Line Faults (Ph.D.)
3. Suvajit Mukherjee Medium Voltage Squirrel Cage Induction Motor Drives using Three-level Neutral Point Clamped Inverter Modules (Ph.D.)
5. Karabi Biswas Study on capacitive probes and MEMS accelerometers (Ph.D.)
6. Ardhendu Saha Broadband light generation through nonlinear effect (Ph.D.)
7. Suvarun Dalapati Power Converters based on Controlled Capacitor Charging Technique (Ph.D.)
8. H. N. Nagaraja Integrated Magnetics for efficiency improvement of VRMs (Ph.D.)
9. Prabir Saha Design of Low Phase Noise Low Power CMOS Quadrature Voltage Controlled Oscillator (MS)
10. Samrat Ray A Hierarchical Approach to Resistance Extraction of Power Arrays (MS)
11. Rajarshi Paul Design of a 20MHz Switching Voltage Regulator IC with a Precision Voltage Reference (MS)
12. Siddartha Swarnakar Development of A Fault Tolerant BLDC drive for aerospace actuators (MS)

Fellow - Professional Bodies
1. Mohan, Bosukonda Murali (2002) Awarded - The Institution of Engineers (India)

Member - Editorial Board
   - Prakriti (Bengali)
   - Breakthrough
   - IEEE Industrial Electronics Magazine
   - IET Power Electronics
   - Electric Machines & Power Systems
6. Chakraborty, Chandan (2008) *Guest Editor for a Special Issue in TIE*  
   - IEEE Transactions on Industrial Electronics
   - IEEE Transactions on Industrial Electronics
8. Mohan, Bosukonda Murali (2006) *Associate Editor*  
   - Int. J. Automation and Control
9. Mohan, Bosukonda Murali (2008) *Member of Editorial Board*  
   - Int. J. Mathematics and Engineering with Computers
10. Mukhopadhyay, Siddhartha (2007) *Member Editorial Board*  
    - Journal of Systems Science and Technology
11. Mukhopadhyay, Siddhartha (2007) *Honorary Editor, Controls*  
    - IETE Journal of research
    - International Journal of Electrical Engineering Education
13. Pradhani, Ashok Kumar (2008) *Member, Editorial Board*  
    - International Journal of Power and Energy Conversion (IJPEC)
    - Journal of Systems Science and Engineering
15. Sen, Siddhartha (2008) *Associated Editor*  
    - International Journal on Smart Sensing and Intelligent Systems
16. Sinha, Avinash Kumar (2007) *Member, Board of Advisors*  
    - The ICFAI Journal of Science and Technology

**Fellowships**

**Sponsored Research Projects**

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Advanced Control and failure prognosis and diagnosis of industrial processes using data Fusion</td>
<td>DIT, Govt. of India</td>
<td>Rs. 58.92 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Analytical &amp; Computational Evaluation of Various parameters involved in the design of SC Cables type to be used for Fusion Grade magnets</td>
<td>BRFS</td>
<td>Rs. 42.70 Lakhs</td>
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<tr>
<td>3</td>
<td>Application of Chaos in DC/DC Converters for Reduction of EMI</td>
<td>ISRO</td>
<td>Rs. 8.60 Lakhs</td>
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<tr>
<td>4</td>
<td>Artificial Heart Development Program</td>
<td>DST, New Delhi</td>
<td>Rs. 8.16 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>Attitude control of launch vehicles</td>
<td>ISRO, IIT Kharagpur Cell</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>6</td>
<td>AVLSSI Consortium</td>
<td>Multiple Organizations in India and Abroad</td>
<td>Rs. 150.00 Lakhs</td>
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<td>7</td>
<td>Cultural Dimension in Digital Multimedia Security Technology</td>
<td>EU-India Cross cultural program, New Delhi,</td>
<td>Rs. 35.00 Lakhs</td>
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<td>8</td>
<td>Design &amp; Development of Spark Plasma Sintering facility for Nanomaterial Compaction</td>
<td>Ministry of Human Resources Development,</td>
<td>Rs. 20.00 Lakhs</td>
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<tr>
<td>9</td>
<td>Design of an optimal control strategy for GSLV MK3</td>
<td>Indian Space Research Organization,</td>
<td>Rs. 2.00 Lakhs</td>
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<td>11</td>
<td>Development of a Low Cost On-Line Distribution Monitoring Device with Wireless Local Loop Capability</td>
<td>Central Power Research Institute, Bangalore,</td>
<td>Rs. 25.44 Lakhs</td>
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<tr>
<td>12</td>
<td>Development of an Autonomous Underwater Vehicle</td>
<td>DoD, Gol,</td>
<td>Rs. 267.00 Lakhs</td>
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<td>No.</td>
<td>Project Title</td>
<td>Research/Institution</td>
<td>Cost (Rs. Lakh)</td>
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<tr>
<td>13.</td>
<td>Development of an Economical Variable Speed Constant Frequency Generation System Suitable for Wind Power Generation</td>
<td>Central Power Research Institute, Bangalore</td>
<td>26.00</td>
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<td>14.</td>
<td>Development of constant phase element based sensor for detecting adulterated milk</td>
<td>Department of Science and Technology, West Bengal</td>
<td>5.71</td>
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<tr>
<td>16.</td>
<td>Development of Embedded Diagnostics Algorithms for HVAC systems in automobiles</td>
<td>General Motors (USA)</td>
<td>30.00</td>
</tr>
<tr>
<td>17.</td>
<td>Development of low cost on-line distribution monitoring device with wireless local loop capability</td>
<td>Central Power Research Institute, Bangalore</td>
<td>25.00</td>
</tr>
<tr>
<td>18.</td>
<td>Development of MEMS based Capacitive Accelrometer</td>
<td>Department of Information Technology</td>
<td>133.00</td>
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<td>19.</td>
<td>Development of Microscopic Imaging System for Dynamic Study of Fundamental Organisms (Fungus)</td>
<td>SRIC, IIT Kharagpur</td>
<td>3.00</td>
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<td>20.</td>
<td>Development of on-line Distribution monitoring device with WLL capability</td>
<td>CPRI, Bangalore</td>
<td>25.00</td>
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<td>22.</td>
<td>Development of Roof fall prediction system for underground mines using wireless network</td>
<td>Ministry of Human Resource Development, BRNS, DAE</td>
<td>7.00</td>
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<tr>
<td>24.</td>
<td>Development of the theory of nonsmooth bifurcations in hybrid dynamical systems</td>
<td>General Motors Corporation, Centre for Development of Advanced Computing, Trivandrum</td>
<td>5.47</td>
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<tr>
<td>25.</td>
<td>Educational Component of General Motors Collaborative Research Laboratory</td>
<td>Infineon Technologies AG, Austria, Vodafone Essar-IIT Kgp. Center of Excellence in Telecommunications (VEICET)</td>
<td>6.50</td>
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<tr>
<td>26.</td>
<td>Full Spectrum Real Time Digital Simulator (TDS)</td>
<td>Vodafone Essar-IIT Kgp. Center of Excellence in Telecommunications (VEICET)</td>
<td>113.00</td>
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<tr>
<td>27.</td>
<td>Integrating Solar PV Cell with Fuel Cell</td>
<td>Nampet, DIT,</td>
<td>15.00</td>
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<tr>
<td>29.</td>
<td>On-board Diagnostics of Automotive Engines</td>
<td>Vodafone Essar-IIT Kgp. Center of Excellence in Telecommunications (VEICET)</td>
<td>2132.70</td>
</tr>
<tr>
<td>30.</td>
<td>Renewable Hybrid Energy Power Plant for Telecom station in Isolated Sites</td>
<td>Vodafone Essar-IIT Kgp. Center of Excellence in Telecommunications (VEICET)</td>
<td>500.00</td>
</tr>
<tr>
<td>32.</td>
<td>Robust Control and Optimization of Power Output from Stand-Alone Wind Energy Conversion Systems for Isolated Telecom Base Stations</td>
<td>Vodafone Essar-IIT Kgp. Center of Excellence in Telecommunications (VEICET)</td>
<td>15.00</td>
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<tr>
<td>33.</td>
<td>Setting up a research and development center for Damodar Valley Corporation at Kolkata (Phase-I)</td>
<td>Damodar Valley Corporation, BARC, Mumbai</td>
<td>2132.70</td>
</tr>
<tr>
<td>34.</td>
<td>Setting up an Advanced facility for Research in Reliability Engineering</td>
<td>BARC, Mumbai</td>
<td>150.00</td>
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<tr>
<td>No.</td>
<td>Project Description</td>
<td>Implementing Agency</td>
<td>Cost (Lakhs)</td>
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</tr>
<tr>
<td>35.</td>
<td>STATCOM with four arm configuration (TCO)</td>
<td>Centre for Development of Advanced Computing, Trivandrum, Govt. of India,</td>
<td>4.00</td>
</tr>
<tr>
<td>36.</td>
<td>Universal auxiliary converter for railways rolling stock</td>
<td>C-DAC, Trivandrum and Indian Railways,</td>
<td>5.00</td>
</tr>
<tr>
<td>37.</td>
<td>Virtual HV Laboratory</td>
<td>MHRD</td>
<td>50.00</td>
</tr>
</tbody>
</table>

**Consultancy Projects**

1. Advanced Control and failure prognosis and diagnosis of industrial processes using data Fusion KE Tex Prembazar Rs. 0.20 Lakhs
2. Assessment of Dielectric Properties Kharagpur, Rs. 50.00 Lakhs
3. Behavioral Modeling and Top-Down Design of Switching Converter ICs National Semiconductor Corporation, USA, Rs. 50.00 Lakhs
4. Behavioral modeling and Verification of Analog and Mixed Signal Designs National Semiconductor Rs. 50.00 Lakhs
5. Bus Paralleling Controller with CAN Interface Centre for Development Rs. 1.50 Lakhs
6. Design and Development of a Twenty MegaHertz Switcher National Semiconductor Corporation, Rs. 17.00 Lakhs
7. Development of a Substation Automation System Phase I (Monitoring) DVC, Rs. 25.70 Lakhs
8. Development of Online Surface Inspection System for Hot Rolled flat Products. RDCIS, SAIL, Rs. 10.00 Lakhs
9. Development of performance monitoring system for critical stand motors of Rail & Structural Mill, Bhilai Steel Plant RDCIS, Ranchi, Rs. 10.00 Lakhs
10. Electronic paralleling of UPS System (PUPS) Centre for Development of Advanced Computing, Trivandrum, Rs. 01.00 Lakhs
11. Front end converter (FECR) Signotron India Ltd., Rs. 1.00 Lakhs
12. General Motors Collaborative Research Laboratory General Motors India Science Laboratory, Rs. 375.00 Lakhs
13. GM-CRL on ECS General Motors, USA, Rs. 500.00 Lakhs
14. Impulse Test on 2500 kVA 415/11 kV Transformer Synergy Power Equipment Pvt. Ltd, Jamshedpur, Rs. 0.35 Lakhs
15. Impulse Test on 6.3 MVA, 33/11 KV Transformer Marson's Limited, Rs. 0.80 Lakhs
16. Impulse Test on 630 kVA, 11/433 KV Transformer A. P. Electricals Pvt. Ltd, Kolkata, Rs. 0.35 Lakhs
17. Process Monitoring of Rolling Process at RSM, BSP, SAIL SAIL R&D, Ranchi, Rs. 5.00 Lakhs
18. Remedial Measures to Mitigate Voltage Dip Problem at CTPS Bus Damodar Valley Corporation, Rs. 3.15 Lakhs
19. Resonant Frequency Converters Megatherm Electronics Pvt. Limited, Rs. 4.00 Lakhs
20. Sensorless Vector Controlled AC Drives Veeral Control Pvt. Ltd., India, Bhabha Atomic Research Centre (BARC), India, Rs. 0.50 Lakhs
21. Series compensator for six step inverter(SCSS) Veeral Control Pvt. Ltd., India, Bhabha Atomic Research Centre (BARC), India, Rs. 1.00 Lakhs
Patents (filed / granted)
2. A Fast Response Energy Efficient Current Control Scheme for a DC-DC Converter with a Free-wheeling Switch
3. Visible Wavelength Laser Diode Based Diameter Gauge

Visits Abroad by Faculty Members
1. Pradhan, Ashok Kumar To attend conference (IEEE Conference Pittsburgh, USA) one week
2. Barua, Alok Invited lectures and collaborative research (Ulsan, South Korea) June 3-6
3. Barua, Alok Collaborative research (Department of Electrical Engineering, Korea University) May 26 to July 18, 2008
4. Mohan, Bosukonda Murali Attending IFAC World Congress (Seoul, Korea) six days
5. Chakraborty, Chandan to attend IEEE IECON 2008 conference and to deliver lectures at two US universities (USA) November 3-15, 2008
6. Chakraborty, Chandan to attend IEEE ICIT 2009 (Australia) February 8-14, 2009
7. Banerjee, Soumitro Attending conferences and delivering invited talks (Seattle, Wisconsin, Urbana-Champaign, Boston, College Park (USA) and Newcastle, Aberdeen (UK), St. Petersburg (Russia)) May 15 to July 5

Invited Lectures by Faculty Members
1. Nonlinear phenomena in power electronics by Banerjee, Soumitro (University of Wisconsin, Madison, USA)
2. Nonlinear phenomena in power electronics by Banerjee, Soumitro (University of Illinois at Urbana-Champaign, USA)
3. On the Stability of periodic orbits in hybrid dynamical systems by Banerjee, Soumitro (North Eastern University, Boston, USA)
4. On the Stability of periodic orbits in hybrid dynamical systems by Banerjee, Soumitro (University of Maryland, College Park, USA)
5. Nonlinear Dynamics of Switched Dynamical Systems by Banerjee, Soumitro (University of Stuttgart, Germany)
6. Nonlinear Dynamics of Switched Dynamical Systems by Banerjee, Soumitro (University of Newcastle upon Tyne, UK)
8. Development of a MEMS Sensor by Sen, Siddhartha (Visakhapatnam at National Symposium on Instrumentation (NSI-33))
9. Dynamic Control Allocation for Over-actuated Systems by Sen, Siddhartha (Thiruvananthapuram at COMPCON-08)
10. "Medium Voltage Converter" by Poddar, Gautam (NIT, Rourkela)
11. An introduction to control systems by Das, Sarit Kumar (DIAT, Pune)
12. Kalman Filtering & Robust Control at AICTE-MHRD Short Term Course, Oct 29 - Nov 11, 2008 by Deb, Alok Kanti (Dept of Electrical Engineering, NIT Rourkela)
13. MATLAB - The Language of Technical Computing by Deb, Alok Kanti (Vyas Engineering College for Girls, Jodhpur)
15. Numerical Protection by Pradhan, Ashok Kumar (NIT Rourkela)
16. Power System Protection through Intelligent Electronic Devices by Pradhan, Ashok Kumar (Sillicon Institute, Bhubaneswar)
17. Fuzzy Clustering by Pradhan, Ashok Kumar (NIT Rourkela)
18. Kalman Filtering at AICTE-MHRD Short Term Course, Jun 9 - Jun 13, 2008 by Deb, Alok Kanti (Dept of Electrical Engineering, NIT Rourkela)
19. Orthogonal Functions in Systems and Control by Mohan, Bosukonda Murali (Aditya Institute of Technology & Management, Tekkali)
20. Fuzzy Control Fundamentals by Mohan, Bosukonda Murali (Aditya Institute of Technology & Management, Tekkali)
22. Power System Restructuring An Overview by Sinha, Avinash Kumar (National Institute of Technology, Durgapur.)
23. Speed sensorless control of induction motor drives: A model ref. adaptive controller based approach by Chakraborty, Chandan (Massachusetts Institute of Technology (MIT), USA)
24. Issues of Induction Motor Drives by Chakraborty, Chandan (North Carolina State University, USA)

Books Published

Seminars, Conferences and Workshops Organised
1. Fractional order systems
2. IEEE 2009 International Conference on Industrial Technology(ICIT-2009)
3. IEEE R-10 Colloquium & Third ICIIS
4. Sixth Annual Alumni Meet

Short-Term Courses, Training Programmes and Workshops organized
1. Distribution System Technology (One week)
2. Training on STATCOM and FPGA (2 days)
DEPARTMENT OF ELECTRONICS & ELECTRICAL COMMUNICATION ENGINEERING

HEAD : Professor Ajay Chakraborty

FACULTY

Professors

Bandyopadhyay, Kalyan Kumar Ph.D. (Jadavpur University), Satellite Communication
Banerjee, Swapna Ph.D. (IIT Kharagpur), VLSI Design for Signal Processing and Biomedical Instrumentation
Biswas, Dhrubes Ph.D. (Illinois, USA), RF/Ultra-high speed GaAs/InP on Si for High Performance (PAE, Linearity, Frequency) Electronics, Optimization of wide bandgap compound semiconductor heterostructure based RF front end devices
Biswas, Prabir Kumar Ph.D. (IIT Kharagpur), Image Processing, Computer Vision, Automated Visual Inspection, Multimedia Network
Chakraborty, Ajoy Ph.D. (IIT Kharagpur), Electromagnetics, Microwave Circuits, Antennas and Mathematical Techniques used in Electromagnet
Chakraborty, Mrityunjoy Ph.D. (IIT Delhi), Digital and Adaptive Signal Processing, VLSI DSP and Signal Processing for Wireless Communication
Dutta, Debasis Ph.D. (IIT Kharagpur), Telecommunications
Gangopadhyay, Ranjan Ph.D. (IIT Kharagpur), Wireless and Fibre Communication
Garg, Ramesh Ph.D. (IIT Kanpur), Printed Antennas and Circuits
Maiti, Chinmay Kumar Ph.D. (IIT Kharagpur), Microelectronics, Silicon Heterostructures, Technology CAD, Internet Laboratory, Development
Pathak, Sant Sharan Ph.D. (IIT Delhi), Digital Communication
Rajakumar, Ratnam Varada Ph.D. (IIT Kharagpur), Digital Signal Processing, Communication Systems, Detection and Estimation
Ray, Ajoy Kumar Ph.D. (IIT Kharagpur), Image Processing and Computer Vision, Pattern Recognition in Medicine, Soft Computing
Sanyal, Subrata Ph.D. (IIT Kharagpur), RF and Microwave and Wireless Engineering, EM Scattering, RF and Microwave Components
Sen Gupta, Somnath Ph.D. (IIT Bombay), Video Processing and Multimedia Coding, Image Processing and Computer Vision

Associate Professors

Bhattacharyya, Tarun Kanti Ph.D. (Jadavpur University), MEMS, RFIC, Analog VLSI, Thinfilms
Chakrabarti, Indrajit Ph.D. (IIT Kharagpur), VLSI Design
Chattopadhyay, Santanu Ph.D. (IIT Kharagpur), Logic Synthesis, Circuit Testing, Low Power Design and Test, System-on-Chip (SoC) Testing, Network-on-Chip (NoC) Design and Test
Dhar, Anindya Sundar Ph.D. (IIT Kharagpur), VLSI Architecture Design
Mahapatra, Sudipta Ph.D. (IIT Kharagpur), Parallel and Distributed Systems, Lossless Data Compression Hardware, Photonic Devices and Networks
Saha, Goutam Ph.D. (IIT Kharagpur), Signal Processing, Pattern Recognition, Biometric Authentication from Speech, Biomedical Signal Processing related to Brain Heart and Lung
Assistant Professors

Bhattacharya, Amitabha Ph.D. (IIT Kharagpur), RF & Microwave
Chakraborty, Paritosh Kumar Ph.D. (IIT Kharagpur), Solid-State Semiconductor Physics
Datta, Raja Ph.D. (IIT Kharagpur), Optical WDM Networks, Wireless Ad-hoc Networks, Computer Networking, Distributed Systems
Ghosh, Bratin Ph.D. (University of Manitoba), Applied Electromagnetics
Halder, Achintya Ph.D. (Georgia Tech., Atlanta), VLSI, RF Circuit Design, Application and Test, Analog VLSI Design and Test
Mandal, Pradip Ph.D. (IISc. Bangalore), CAD for CMOS Analog VLSI, Analog Circuit Design
Mukhopadhyay, Sudipta Ph.D. (IIT Kanpur), Medical Imaging, Biomedical Signal Processing, Image Processing, Image Compression, Multimedia
Roy, Rajarshi Ph.D. (Brooklyn University), Telecommunication Systems / Networking, Queueing Theory / Optimization / Stochastics
Roy, Rajat Ph.D. (University of Mumbai), Microwave Filter Analysis by Mode Matching, Slotted Waveguide Antenna Analysis by Numerical Methods
Varshney, Shailendra Kumar Ph.D. (University of Delhi), Fiber Optics & Optical Communication, Photonic Crystal Fibers / Photonic Bandgap Fibers / Microstructured Optical Fibers, Nano-photronics, Fiber Sensors, Fiber Components and Devices

Scientific Officer

Sahoo, Ghanashyam Ph.D. (Jadavpur University), EMI Effects on Electro Medical Devices, Exposer to Mobile Base Station Radiation, Microwave Antenna

Faculty Appointments

Dr. Achintya Haldar Assistant Professor
Dr. Subhra Sekhar Das Assistant Professor
Dr. Shailendra Kumar Varshney Assistant Professor
Dr. Kalyan Kumar Bandyopadhyay Professor (Contact)

Faculty Promotions

Dr. Goutam Saha Associate Professor
Dr. Tarun Kanti Bhattacharya Associate Professor
Dr. Sudipta Mahapatra Associate Professor

Faculty Retirement

Dr. T. S. Lamba Professor
Dr. S. K. Lahiri Professor

Faculty Resignation

Dr. Jayadeva C. Goswami Professor

Brief Description of on-going activities

The following research activities are currently carried out in the department

1. Biomedical Instrumentation: Main thrust is towards the design and development of an embedded system-on-chip solution for an adaptive intelligent biomedical system. Already a low cost Doppler Ultrasonography system has been designed and presently attempt is being made towards design of an Ultrasound Imaging system. For this the architecture for the real time
signal processing is being implemented in Xilinx FPGA. Also a non-invasive blood glucose
monitor based on laser induced photo acoustic spectroscopy is under development. Another
research interest is for early detection of oral cancer via image processing.

2. Analog / Mixed Signal Design : Currently the research group is engaged in designing an 8 bit
160 MSPS pipelined 0.25??CMOS ADC and work is also going on the design of an ADC 0.18??
BiCMOS technology with enhanced performance.

3. Communication Systems : Research is being carried out to design a QPSK demodulator and a
9–channel Transmultiplexer for Space application.

4. Fibre Optics and Networking : The current research involves dispersion compensation of 40
Gb/s optical transmission system with optical phase conjugation and distributed Raman amplifier
as well as with chirped fibre Bragg grating. In the optical networking area, innovative schemes
have been developed for guaranteeing WDM network survivability and IP over WDM integrated
routing. Work is in progress for development of efficient contention resolution schemes for
packet switched optical networks and their analytical modelling.

5. Development of a RISC DSP for Modems.


7. Data Compression : Work is being carried out for the design of parallel algorithms for lossless
data compression and their implementation in high–speed programmable hardware.

8. Joint Dispersion and nonlinearity compensation for WDM Transmission systems using Optical
Phase conjugation and Distributed Raman Amplifier.

9. EMI / EMC : Studies have been performed on different wire antennas (e.g dipole, inverted
L, T, I, C–antennas) as Electromagnetic Interference (EMI) sensors. The Method of Moments
based numerical technique has been used to evaluate the antenna factor of different wire
antennas in different EMI test environments including Gigahertz Transverse Electromagnetic
(GTEM) cell.

10. Filters : Design, simulation and fabrication of lowpass Microstrip filters with cut–off frequency of
5.0GHz. Bandpass waveguide filters over X and Ku–band of frequencies. X–band filter has
passband of 9.50GHz to 10.50GHz and Ku–band filter has passband of 13.90GHz to
14.60GHz.

11. MCMT : Multiple Cavity Modeling Technique (MCMT) have been applied to study different
waveguide based passive microwave circuits like waveguide diaphragms, filters, power
dividers. The technique have also been applied successfully for the radiator problems like
widow radiators, Slot radiators both in transmitting and receiving mode.

12. Development of block floating point based schemes for implementing adaptive filters in digital
hardware

13. Architectural optimization of algorithms for signal processing and wireless communication.

14. Formulation of efficient algorithms for designing CMOS operational amplifiers.

15. Automated Visual Inspection of Industrial Objects, VLSI Architecture for low bit rate Video
Coding, Medical Image Processing, Gesture Recognition from Video Sequences, Face
recognition, Content based Retrieval of Texture Images, Fuzzy Neural Network.

16. Algorithm development for fault diagnosis in a distributed system.

Thrust Areas

1. MEMS & Semiconductor Technology
2. Broadband Communication Networks
3. VLSI Circuits and Systems

Doctoral and MS Degrees Awarded

1. Prasant K. Sahu
   Studies on Fiber Bragg Grating and Distributed Fiber-Optic sensors (Ph.D.)
2. Soumitra Deb Nath
   Modelling, Analysis, and Performance Evaluation of Broadband Photonic Networks (Ph.D.)
3. Saubhar Chaudhury  
   Low power Logic Optimization and Synthesis (Ph.D.)
4. Sumanta Gupta  
   Transmission Characteristics and Advanced Signal processing in an  
   All Optical Link Using Differential Phase-Shift Keying Signalling  
   (Ph.D.)
5. Siddarama R. Patil  
   Design of Improved Performance Structured Irregular Low Density  
   Parity Check Codes and Reduced Complexity Believe Propagation  
   Decoders (Ph.D.)
6. Sameer S. M.  
   Efficient Estimation Methods for Carrier Frequency Offset in OFDM,  
   MIMO-OFDM and OFDMA Systems (Ph.D.)
7. Chandan Giri  
   Test Infrastructure design for Power Aware System-On-Chip Testing  
   (Ph.D.)
8. Santanu Dwari  
   Design and Characterization of Compact, High Performance, Planar  
   Couplers and Filters for RF and Wireless Applications (Ph.D.)
9. Sandipan Chakraborty  
   Some Studies on Acoustic Feature Extraction, Feature Selection and  
   Multi-level Fusion Strategies for Robust Text-Independent Speaker  
   Identification (Ph.D.)
10. Debashis Dutta  
    Low-power Analog Bipolar and CMOS-CCII based Circuits Design  
    techniques and its application to Translinear filters (Ph.D.)
11. Mrinal Kanti Mandal  
    Design and Characterization of High Performance, Planar, Passive,  
    RF and Microwave Components (Ph.D.)
12. Rajarshi Mahapatra  
    Studies on Link-Adaptive Wireless Communications (Ph.D.)
13. Priyanka Mondal  
    Design and Analysis of Microwave Antennas and Passive  
    Components for Wireless Communication (Ph.D.)
14. Nandedkar Abhijeet Vijay  
    AReflex Fuzzy Min Max Neural Network (Ph.D.)
15. Shaik Rafi Ahamed  
    Efficient Finite Precision Realization of the Adaptive Decision  
    Feedback Equalizer using Block Flatting Point Arithmetic (Ph.D.)
16. V. S. Reddy  
    Algorithm and Architecture for Motion Estimation in Video Coding  
    (Ph.D.)
17. Benudhar Sahu  
    Synchronization in OFDM Based WLAN Systems and Cross Layer  
    Interaction in Mobile AD HOC Networks (Ph.D.)
18. C. B. Ashesh  
    Analysis and Design of Symmetric Coplanar Lines with Thick  
    Conductors (Ph.D.)
19. Aruna Tripathy  
    Error Performance and Complexity Analysis of Low Complexity Turbo  
    Equalization (Ph.D.)
20. Ravi Shankar Prasad  
    Design of High Speed Digital to Analog Converter (MS)
21. Anirban Das  
    Lifting Based Architectures for Realizing 2 and 3 Dimensional Discrete  
    Wavelet Transform (MS)
22. Arindrajit Ghosh  
    Design of a Low Power 8-Bit 200-MSPS A/D Converter (MS)
23. Sanjoy Kumar Dey  
    Design of an 8-bit 2.5 GSPS A/D Converter using 0.25μm Si/SiGe  
    BICMOS Technology (MS)
24. Bodhisatwa Mazumdar  
    Design of Image Restoration and Embedded Block Coding Units for a  
    PC Based Ultrasound Imaging System (MS)
25. Atanu Roy  
    Electromagnetic Modeling of High Frequency Electronic System to  
    Estimate EMI/EMC (MS)

Member - Editorial Board
   Member, Editorial Board  
   - International Journal on Medical Engineering and Informatics

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Analysis of Cavity Backed Microstrip Patch Antenna for Space Borne Phased Array Antenna</td>
<td>ISRO, IIT Kharagpur for Space Borne Phased Array Antenna</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Implementor/Partner</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Analysis of Multilayered Planar Array Antenna using Aperture Coupled Patch Elements</td>
<td>ISRO, IIT Kharagpur cell,</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>3.</td>
<td>CMOS op-amp design automation in sub-micron technology</td>
<td>ISRO-IIT Cell</td>
<td>Rs. 4.00 Lakhs</td>
</tr>
<tr>
<td>4.</td>
<td>Complex Biomedical Signal Analysis</td>
<td>ISIRD, SRIC, IIT Kharagpur, DST, India,</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>5.</td>
<td>Content based Image Retrieval for medical Images</td>
<td>ISIRD, ISRO-IIT, Kharagpur Cell,</td>
<td>Rs. 6.50 Lakhs</td>
</tr>
<tr>
<td>6.</td>
<td>Contoured beam synthesis for array antenna to obtain efficient footprint pattern with gain optimization</td>
<td>ISRO-IIT Kharagpur Cell,</td>
<td>Rs. 2.50 Lakhs</td>
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<tr>
<td>7.</td>
<td>Convergent Switching</td>
<td>Santech Corp.,</td>
<td>Rs. 100.00 Lakhs</td>
</tr>
<tr>
<td>8.</td>
<td>Coplanar waveguide feed to dielectric resonator antenna</td>
<td>ISRO-IIT Kharagpur Cell,</td>
<td>Rs. 8.06 Lakhs</td>
</tr>
<tr>
<td>9.</td>
<td>Design &amp; Fabrication of high sensitivity micro machined Silicon tunneling accelerometer with micro-g resolution</td>
<td>ISRO-IIT Kharagpur Cell,</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>10.</td>
<td>Design and analysis of metamaterials with application in miniaturization and improvement of antenna performance</td>
<td>ISRO, IIT Kharagpur Cell,</td>
<td>Rs. 8.53 Lakhs</td>
</tr>
<tr>
<td>11.</td>
<td>Design and Development of CMOS Based 8-bit, 250 to 500 MSPS Analog to Digital and Digital to Analog Converter</td>
<td>SAC, ISRO, Bangalore</td>
<td>Rs. 11.85 Lakhs</td>
</tr>
<tr>
<td>12.</td>
<td>Design and Development of Convergent Telecom Switch</td>
<td>Santech Communication Pvt. Ltd.,</td>
<td>Rs. 200.00 Lakhs</td>
</tr>
<tr>
<td>13.</td>
<td>Design and Development of non-invasive blood glucose measuring system</td>
<td>Department of Information Technology, New Delhi,</td>
<td>Rs. 27.00 Lakhs</td>
</tr>
<tr>
<td>14.</td>
<td>Design and Development of secure routing protocols for Mobile Adhoc Networks (MANET)</td>
<td>SRIC, IIT Kharagpur,</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
<td>15.</td>
<td>Design and Development of Telecommunication Convergence Switch</td>
<td>SANTECH Private Limited,</td>
<td>Rs. 100.00 Lakhs</td>
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<tr>
<td>16.</td>
<td>Design of high speed and/or low power adaptive decision feedback equalizers - an architectural optimization approach</td>
<td>DIT, New Delhi,</td>
<td>Rs. 30.40 Lakhs</td>
</tr>
<tr>
<td>17.</td>
<td>Development of a Lossless Compression System for Video Broadcasting</td>
<td>ISRO</td>
<td>Rs. 6.00 Lakhs</td>
</tr>
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<td>18.</td>
<td>Development of a Lung Sound Analyzer</td>
<td>Institute of Pulmocare and Research, VECC Kolkata, DAE, Govt. of India, ISRO-IIT, Kharagpur Cell, Dept. of Ocean Development, NPM MASS, ADA, Bangalore, Indo-Italy (ITPAR) DST,</td>
<td>Rs. 7.00 Lakhs</td>
</tr>
<tr>
<td>19.</td>
<td>Development of a Medical Expert System for Screening and Diagnosis of Coronary Artery Diseases</td>
<td>ISRO-IIT Kharagpur Cell,</td>
<td>Rs. 43.20 Lakhs</td>
</tr>
<tr>
<td>20.</td>
<td>Development of Algorithm for Adaptive Antenna Array for Satellite Communication</td>
<td>ISRO-IIT Kharagpur Cell,</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
<td>21.</td>
<td>Development of an AUV</td>
<td>ISRO-IIT Kharagpur Cell,</td>
<td>Rs. 600.00 Lakhs</td>
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<tr>
<td>22.</td>
<td>Development of MEMS based Accelerometers for Aerospace Application (NPM MASS)</td>
<td>ISRO-IIT Kharagpur Cell,</td>
<td>Rs. 470.00 Lakhs</td>
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<tr>
<td>23.</td>
<td>Development of Micromachined Inertial and Flow Sensors for Environmental and Biomedical Application</td>
<td>ISRO - IIT Kharagpur Cell,</td>
<td>Rs. 8.00 Lakhs</td>
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<tr>
<td>24.</td>
<td>Development of RF MEMS capacitive shunt switch in Application as phase shifters for satellite communication systems</td>
<td>DST, India</td>
<td>Rs. 6.42 Lakhs</td>
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<td>No.</td>
<td>Description</td>
<td>Implementer</td>
<td>Cost (Lakhs)</td>
</tr>
<tr>
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<tr>
<td>27.</td>
<td>Development of Roof fall prediction system in underground Mines using wireless Network (SUM)</td>
<td>CMPDIL, Ranchi</td>
<td>216.98</td>
</tr>
<tr>
<td>28.</td>
<td>Development of secure environment for sensitive information transaction in Mobile Ad-hoc Networks (MANET)</td>
<td>DIT, Govt. of India</td>
<td>54.48</td>
</tr>
<tr>
<td>29.</td>
<td>Development of Silicon Micromachined Accelerometer for Aircraft Motion Sensing</td>
<td>NPSM</td>
<td>212.00</td>
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<tr>
<td>30.</td>
<td>Development of Silicon Microsensors for Flow Measurement</td>
<td>MHRD</td>
<td>7.00</td>
</tr>
<tr>
<td>31.</td>
<td>Development of software packages for waveguide-based microwave circuits</td>
<td>ISRO-IIT, Kharagpur Cell, ISRO, India</td>
<td>8.00</td>
</tr>
<tr>
<td>32.</td>
<td>Development of Speaker Recognition Software for Telephone Speech</td>
<td>ISRO, India</td>
<td>7.00</td>
</tr>
<tr>
<td>33.</td>
<td>Development of speaker verification software for single to three registered user(s)</td>
<td>RCI, Hyderabad, ISIRD, IIT Kharagpur</td>
<td>10.90</td>
</tr>
<tr>
<td>34.</td>
<td>Development of Specific Software Modules for Realising Monopulse Slotted Array Antenna Using Non-Standard Wave guide at Ku-Band Along Sensitivity Analysi</td>
<td>ISRO, IIT, New Delhi</td>
<td>22.90</td>
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<tr>
<td>35.</td>
<td>Development of speech database for speaker recognition application</td>
<td>ISIRD, IIT Kharagpur</td>
<td>0.50</td>
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<tr>
<td>36.</td>
<td>Development of Traditional Tongue Based Diagnostic Software Through Grabbing and Processing of Tongue Images for Storage, Retrieval and Rule Generation</td>
<td>DST, Govt. of India, DST, New Delhi</td>
<td>6.02</td>
</tr>
<tr>
<td>37.</td>
<td>Development of Video Segmentation and Coding Algorithms and Architectures for Very Low Bitrate Applications</td>
<td>ISRO, DST, New Delhi</td>
<td>10.50</td>
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<tr>
<td>38.</td>
<td>DSP &amp; FPGA solution for SRI and Scan Conversion of USG system in DaVinci Platform</td>
<td>GE Medical Systems, DST, New Delhi</td>
<td>32.52</td>
</tr>
<tr>
<td>39.</td>
<td>Efficient testing for system-on-chip design - a new VLSI manufacturing paradigm</td>
<td>Department of Science &amp; Technology, Govt. of India</td>
<td>9.40</td>
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<tr>
<td>40.</td>
<td>Electromagnetic modeling of High Frequency Electronic Systems to estimate Electromagnetic Compatibility</td>
<td>DST, New Delhi</td>
<td>15.96</td>
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<td>41.</td>
<td>Embedded Software Solutions for Digital Base-band Transceivers (STC/EDT)</td>
<td>ISRO, Bangalore</td>
<td>25.00</td>
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<tr>
<td>42.</td>
<td>Enabling Technologies for the design and implementation of next generation optical internet prototype based optical packet switching</td>
<td>DST</td>
<td>3.14</td>
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<tr>
<td>43.</td>
<td>Engineering enabling technologies for the design and implementation of a photonic network based on optical packet switching</td>
<td>MHRD</td>
<td>13.00</td>
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<tr>
<td>44.</td>
<td>Establishment of Nation-wide Quality of Service Network Test-Bed.</td>
<td>Department of Information Technology, New Delhi</td>
<td>136.00</td>
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<tr>
<td>45.</td>
<td>Feasibility Study of Anti-Jam GPS Receiver for GPS Guided Weapons</td>
<td>ARMREB, New Delhi</td>
<td>9.70</td>
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<tr>
<td>46.</td>
<td>Feasibility study of microwave imaging for material resource exploitation in planetary mission</td>
<td>ISRO, IIT Kharagpur cell, DST, Aeronautics R&amp;D Board, New Delhi</td>
<td>1.44 143.00</td>
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<tr>
<td>47.</td>
<td>FIST Programme on Computer Networking</td>
<td>DST</td>
<td>14.07</td>
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<tr>
<td>48.</td>
<td>Flexible EMI shielding material from conductive rubber based composite</td>
<td>Advanced VLSI Consortium, ISRO-IIT Kharagpur cell, DST</td>
<td>5.00</td>
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<tr>
<td>ID</td>
<td>Project Description</td>
<td>Institution/Location</td>
<td>Cost (Lakhs)</td>
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<tr>
<td>50</td>
<td>FPGA based H.264 Codec</td>
<td>ISRO at SAC Ahmedabad,</td>
<td>8.50 Lakhs</td>
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<td>51</td>
<td>FPGA-based design and development of H-264 codec (PGA)</td>
<td>ISRO, IIT Kharagpur Cell,</td>
<td>4.80 Lakhs</td>
</tr>
<tr>
<td>52</td>
<td>Gigahertz Transverse Electromagnetic Cell</td>
<td>Army Centre of Electromagnetics, Mhow,</td>
<td>50.00 Lakhs</td>
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<tr>
<td>53</td>
<td>Gigahertz Transverse Electromagnetic Cell</td>
<td>Army Centre of Electromagnetics, Mhow,</td>
<td>50.00 Lakhs</td>
</tr>
<tr>
<td>54</td>
<td>High efficiency Solar cell using GaN/InGaN Multiple Junction Heterostructures for Space Applications</td>
<td>Indian Space Research Organization (ISRO),</td>
<td>48.45 Lakhs</td>
</tr>
<tr>
<td>55</td>
<td>Indo-US Joint Centre on Advanced and Futuristic Manufacturing</td>
<td>Indo-US Science &amp; Technology Forum,</td>
<td>5.60 Lakhs</td>
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<tr>
<td>56</td>
<td>Investigation of the microstrip feed to the Dielectric Resonator Antenna</td>
<td>DST, New Delhi</td>
<td>15.77 Lakhs</td>
</tr>
<tr>
<td>57</td>
<td>Investigation of the Microstrip feed to the dielectric resonator antenna</td>
<td>DST, New Delhi</td>
<td>15.77 Lakhs</td>
</tr>
<tr>
<td>58</td>
<td>Investigations of CMOS Device Technologies for Strain-Engineered MOSFETs Using TCAD</td>
<td>MCIT New Delhi</td>
<td>33.35 Lakhs</td>
</tr>
<tr>
<td>59</td>
<td>Investigations of CMOS device technologies for strain-engineered MOSFETs using TCAD Technology, New Delhi</td>
<td>Dept. of Information</td>
<td></td>
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<tr>
<td>60</td>
<td>Lossless Image Compression of Satellite Images</td>
<td>ISRO, IIT KGP cell,</td>
<td>0.50 Lakhs</td>
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<tr>
<td>61</td>
<td>Medical image analysis and MEMS based flow sensor development (MIA)</td>
<td>Texas Instruments (India) Pvt Ltd,</td>
<td>92.00 Lakhs</td>
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<tr>
<td>62</td>
<td>MEMS based micropropulsion devices for micro satellite program</td>
<td>ISRO</td>
<td>123.00 Lakhs</td>
</tr>
<tr>
<td>63</td>
<td>MEMS Based Micropropulsion Devices for Microsatellite Program</td>
<td>ISRO</td>
<td>122.96 Lakhs</td>
</tr>
<tr>
<td>64</td>
<td>MEMS Technology for Micromachined Silicon Microsensors</td>
<td>DRDO</td>
<td>51.00 Lakhs</td>
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<tr>
<td>65</td>
<td>Metamorphic High Electron Mobility Transistor for Power Amplifier for C and X Band Transponder Applications</td>
<td>ISRO</td>
<td>48.55 Lakhs</td>
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<tr>
<td>66</td>
<td>Modeling and simulation of memory devices with high-k dielectrics</td>
<td>DST, Govt. of W.B.</td>
<td>8.70 Lakhs</td>
</tr>
<tr>
<td>67</td>
<td>Modeling and Simulation of Memory Devices With High-K Dielectrics</td>
<td>DST, Govt. of West Bengal,</td>
<td>9.82 Lakhs</td>
</tr>
<tr>
<td>68</td>
<td>Modeling of Software Simulation Tool for Designing of WDM Trans. System</td>
<td>DST, New Delhi</td>
<td>10.53 Lakhs</td>
</tr>
<tr>
<td>69</td>
<td>Modernisation of Fibre Optic System Laboratory for Undergraduate and Postgraduate Students</td>
<td>MHRD, New Delhi</td>
<td>8.00 Lakhs</td>
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<tr>
<td>70</td>
<td>Modernisation of Integrated Circuit and System Laboratory</td>
<td>MHRD, New Delhi)</td>
<td>8.00 Lakhs</td>
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<td>71</td>
<td>MOSFET Modeling and Parameter Extraction</td>
<td>DRDO</td>
<td>58.36 Lakhs</td>
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<td>72</td>
<td>MOSFET modeling and parameter extraction</td>
<td>DRDO, New Delhi</td>
<td>56.60 Lakhs</td>
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<td>73</td>
<td>Nationally Coordinated Project on Telematics</td>
<td>Ministry of Human Resource Development</td>
<td>137.00 Lakhs</td>
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<tr>
<td>74</td>
<td>Network-on-Chip testing</td>
<td>ISIRD, IIT Kharagpur</td>
<td>3.00 Lakhs</td>
</tr>
<tr>
<td>75</td>
<td>Non-invasive blood glucose measuring system</td>
<td>Life Sciences Research Board, New Delhi, LSRB, New Delhi</td>
<td>9.00 Lakhs</td>
</tr>
<tr>
<td>76</td>
<td>Non-invasive blood-glucose measuring system</td>
<td>Life Sciences Research Board, New Delhi, LSRB, New Delhi</td>
<td>9.00 Lakhs</td>
</tr>
</tbody>
</table>
77. Optimal solutions for the next generation wireless Internet access
Vodafone-Essar - Approved in Principle, Rs. 48.72 Lakhs
78. Segmentation and Interpretation of Mammogram images for early detection of breast cancer
BRNS, Dept of Atomic Energy, Rs. 0.00 Lakhs
79. Setting up of Dielectric Measurement Facility (Hardware & software)
Armament Research & Development Establishment, Pune, Rs. 9.80 Lakhs
78. Segmentation and Interpretation of Mammogram images for early detection of breast cancer
Atomic Energy
79. Setting up of Dielectric Measurement Facility (Hardware & software)
Armament Research & Development Establishment, Pune, Rs. 9.80 Lakhs
80. Simulation on Electromagnetic Battlespace in a corps zone
Army Center of Electromagnetics, Mhow, Rs. 50.00 Lakhs
81. Simulation on Electromagnetic Battlespace in a corps zone
Army Centre of Electromagnetics, Mhow, Rs. 50.00 Lakhs
82. Special manpower development programme for VLSI design and related software (SMDP-II)
MCIT, Govt. of India, Rs. 0.00 Lakhs
83. Strategies for power reduction during VLSI circuit testing
Dept. of Information Technology, Govt. of India, Rs. 54.05 Lakhs
84. Studies on Com. Sys. Arch. For Software Radio
BEL, Bangalore, Rs. 30.00 Lakhs
85. Technology CAD of nano-mosfets in hybrid orientation technology
DST, New Delhi, Rs. 18.53 Lakhs
86. Technology CAD of nano-MOSFETs In Hybrid Orientation Technology
DST, New Delhi, Rs. 19.00 Lakhs
87. Turbo and other important FEC Coding Schemes
ISRO Bangalore, Rs. 20.00 Lakhs
88. Upgrading Facilities for MEMS design activities at National resource centre
NPM ASS, ADA, Bangalore, Rs. 34.00 Lakhs

Consultancy Projects
DEAL, Dehradun (DRDO), Rs. 3.50 Lakhs
2. Design & Processing of MEMS Microstructure for Mechanical Property Evaluation
DRDO, Hyderabad, Rs. 10.00 Lakhs
3. Design & processing of MEMS microstructure For mechanical property evaluation (PMMP)
DMRL, Hyderabad 500058, Rs. 10.00 Lakhs
4. Design of capacitive based accelerometer
DRDO, Rs. 10.00 Lakhs
5. Design of RFIC modules
National Semiconductor Corporation, USA, Rs. 60.00 Lakhs
6. Development of ADC and Receiver for wireless applications
Si2 Microsystems, Rs. 80.00 Lakhs
7. Development of Educational Complex (DOEC)
Tirupati Assets Pvt. Ltd, Rs. 50.00 Lakhs
8. Development of Fast Bipolar ASIC Chips
BARC, Rs. 12.00 Lakhs
BARC, Rs. 14.00 Lakhs
10. Equalizer for LiteLink
National Semiconductor Corp. Ltd., Rs. 10.00 Lakhs
11. Estimation for calibration of microwave attenuator
Asansol Engineering College, Rs. 0.30 Lakhs
12. Mast Clamp Current Probe (MCCP) Antenna
Naval EMC Centre, Mumbai, Rs. 19.90 Lakhs
13. Mast Clamp Current Probe Antenna (PCCM)
Naval EMC Centre, Mumbai, Rs. 19.90 Lakhs
14. Preparation of Vision/theme and feasibility report (VTFR)
Tirupati Assets Pvt. Ltd, Kolkata, Rs. 15.00 Lakhs
### Patents (filed / granted)
1. Dilute alloy assisted GaN epitaxial on silicon
2. Heterogeneous integration of III-V front end devices on Silicon
3. Systems and methods for testing integrated circuits

### Visits Abroad by Faculty Members
1. **Bandyopadhyay, Kalyan Kumar**  
   To discuss propagation study experiment in India with CNES, France and ONERA France (Toulouse, France) 3 days
2. **Biswa, Prabir Kumar**  
   IEEE Sections Congress 2008 (Quebec, Canada) September 18-22, 2008
3. **Saha, Goutam**  
   Visit to Canadian Universities for delivering Talk and Networking (Canada) August 3-11
4. **Banerjee, Swapna**  
   To present a paper in the ISCAS 2008 conference (Seattle, Washington, USA) May 18-21, 2008
5. **Chakraborty, Mrityunjoy**  
   Visiting Research Consultant (Nanyang Technological University, Singapore) one month
6. **Chakraborty, Mrityunjoy**  
   To present paper and attend editorial board meeting at the IEEE ISCAS - 2008 (Seattle, USA) May 18-21
7. **Biswa, Dhruves**  
   Conference (EBRF 2008 Conference, Helsinki, Finland) One week
8. **Biswa, Dhruves**  
   Conference (8th IEEE Conference on Nanotechnology, Arlington, Texas USA) One week

### Invited Lectures by Faculty Members
1. **EMI/EMC by Chakraborty, Ajoy** (Ambedkar Institute of Technology, Delhi)
2. **EMI/EMC by Chakraborty, Ajoy** (Andhra University College of Engineering, Visakhapatnam, A.P.)
3. **EMI/EMC by Chakraborty, Ajoy** (NSEC, Kolkata)
4. **EMI/EMC by Chakraborty, Ajoy** (National Institute of Technology, Warangal)
5. **EMI/EMC by Chakraborty, Ajoy** (DEAL, Dehradun)
6. **EMI/EMC by Chakraborty, Ajoy** (MNIT, Jaipur)
7. **Basic Radar Principles by Bhattacharya, Amitabha** (Interim Test Range, Balasore)
8. **Wireless Channel Characterisation by Bhattacharya, Amitabha** (KITS University, Bhubaneswar)
9. **Emerging Technologies and their spectrum requirements by Bhattacharya, Amitabha** (Army Centre for Electromagnetics, Mhow)
10. **Recent Advances in EMI / EMC by Bhattacharya, Amitabha** (NIT, Rourkela)
11. **Confluence of Hardware & Software in present day technologies by Bhattacharya, Amitabha** (CEM, Kolaghat)
12. **Network-on-Chip - the next generation System-on-Chip by Chattopadhyay, Santanu** (Bengal Engineering and Science University)
13. **Recent advances in VLSI design by Chattopadhyay, Santanu** (National Institute of Technology, Silchar)
14. Low power design and test (Tutorial) by Chattopadhyay, Santanu (VLSI Conference, New Delhi)
15. Optical fiber technologies : conventional to microstructure by Varshney, Shailendra Kumar (IIT Kharagpur, Kolkata Extension Centre)
16. Advances in Video Processing by Sen Gupta, Somnath (Yeshwantrao Chavan College of Engineering, Nagpur)
17. Special topics in Neural Networks by Sen Gupta, Somnath (Srinidhi Institute of Science and Technology, Hyderabad, Andhra Pradesh)
18. Embedded Systems and VLSI Design by Banerjee, Swapna (Oriental Institute of Science and Technology, Bhopal)
19. Recent Trends in VLSI Design & Microelectronics by Banerjee, Swapna (Bengal Engineering & Science University, Howrah)
20. GSAT-4, a step towards Indian Advance Communications Satellite by Bandyopadhyay, Kalyan Kumar (Toulouse, France)
22. Maxwell's Equations and Waveguide Transmission by Bhattacharya, Amitabha (PIET, Rourkela)
23. Overview of WIMAX by Bhattacharya, Amitabha (PIET, Rourkela)
24. Microwave devices analysis with S-parameters by Roy, Rajat (IIT Kgp bhubaneswar extension)
25. Evolution of Pattern Recognition by Biswas, Prabir Kumar (Aurangabad)
26. Fuzzy Min Max Neural Network for Pattern Recognition by Biswas, Prabir Kumar (Nagpur)
27. Bio-Nano activity at IIT Kharagpur by Saha, Goutam (University of Waterloo, Canada)
28. Bio-Nano activity at IIT Kharagpur by Saha, Goutam (Nanquebec, Montreal, Canada)
29. Bio-Nano activity at IIT Kharagpur by Saha, Goutam (University of Alberta, Canada)
30. Embedded Systems and VLSI Design by Banerjee, Swapna (NIT, Durgapur)
31. Optimization of VLSI Architecture by Dhar, Anindya Sundar (Bengal Engineering and Science University, Sibpur)
32. Digital VLSI Design by Dhar, Anindya Sundar (Bengal Engineering and Science University, Sibpur)
33. A Block Floating Point Realization of the Adaptive Decision Feedback Equalizers by Chakraborty, Mrityunjoy (Nanyang Technological University, Singapore)
34. Multiplierless Adaptive Equalizers - a CORDIC Based Approach by Chakraborty, Mrityunjoy (Nanyang Technological University, Singapore)
35. Role of Education-Enterprise Model for developing growth ventures in differing economic contexts by Biswas, Dhrubes (Helsinki, Finland)

Books Published

Seminars, Conferences and Workshops Organised
1. 9th International Conference on Cryptology in India (INDOCRYPT 2008)
2. EBRF International Conference
3. Faculty Development Program (FDP)
4. IEEE International Conference on Industrial and Automation Systems (ICIIS)
5. INDAC 2009
6. Indian Conference on Computer Vision, Graphics and Image Processing
7. International Conference on Industrial Information System
8. Short Course on C++ and JAVA
9. SIDBI skill Upgradation Programme for Grassroot entrepreneurs
10. Technology CAD for VLSI Design
11. Technology CAD for VLSI Design
12. Technology CAD for VLSI Design
13. Technology Entrepreneur Development Program (TEDP)
14. Technopreneur Promotion Program (TePP)
15. The IEEE Colloquium and the third IEEE International Conference on Industrial and Information System

**Short-Term Courses, Training Programmes and Workshops organized**

1. AICTE sponsored short course on Entrepreneurship (14 days)
2. AICTE sponsored short course on III-V compound semiconductor heterostructure (8 days)
3. AICTE Summer School on Image and Video Processing: Theory and Applications (30/05/08-11/06/08)
4. An Introduction to RF Techniques for Modern Communication System (July 1-6, 2008)
5. Embedded System Design (February 2-6, 2009)
6. Optical Communication Networks (June 22 to July 03)
7. Recent Advances in RF Techniques for Wireless Communication (July 7-12, 2008)
8. Recent Advances in RF Techniques for Wireless Communication (July 1-12, 2008)
10. RF and Microwave Measurement Fundamentals for Modern Electronic Systems (June 09-22)
11. RF and Wireless ()
13. VLSI Signal Processing (December 22-26, 2008)
DEPARTMENT OF GEOLOGY & GEOPHYSICS

HEAD : Professor Anil Kumar Gupta

FACULTY

Professors
Bhattacharya, Abhijit Ph.D. (IIT Kharagpur), Metamorphic Petrology, Igneous Petrology
Das, Subhasish Ph.D. (IIT Kharagpur), Sedimentology, Basin Tectonics
Gupta, Anil Kumar Ph.D. (BHU, Varanasi), Paleoeclimatology, Paleoceanography, Marine Micropaleontology, Marine Geology, Gas Hydrates
Mishra, Biswajit Ph.D. (IIT Kharagpur), Ore Geology and Metamorphic Petrology
Nath, Sankar Kumar Ph.D. (IIT Kharagpur), Earthquake and Engineering Seismology, Seismic Hazard Assessment and Microzonation, Seismic Prospecting and Signal Processing, Geophysical Tomography, Computational Geophysics
Panigrahi, Mruganka Kumar Ph.D. (IIT Kharagpur), Ore Geology, Crustal Fluids, Computer Applications
Sarkar, Anindya Ph.D. (Gujrat University), Stable Isotope Geochemistry, Sedimentology, Hydrocarbon Exploration, Isotope Hydrology
Sen Gupta, Debashish Ph.D. (PRL, Ahmadabad), Nuclear Geophysics and Environmental Radioactivity
Tripathy, Subhasish Ph.D. (IIT Bombay), Environmental Geochemistry, Waste Characterization and Utilization

Associate Professors
Bhattacharya, Amit Kumar Ph.D. (IIT Kharagpur)
Bhowmik, Santanu Kumar Ph.D. (Jadavpur University), Metamorphic Petrology, Geochemistry, Igneous Petrology
Gupta, Saibal Ph.D. (Cantab), Metamorphic Petrology, Structural Geology, Tectonics
Mamtani, Manish A Ph.D. (MSU, Baroda), Structural Geology, Microtectonics
Pant, Naresh Chandra Ph.D. (MLS University, Udaipur), Mineralogy, Petrology
Sharma, Shashi Prakash Ph.D. (BHU, Varanasi), Electrical and EM Geophysics, Groundwater Investigation, Inverse Theory

Assistant Professors
Basu, Arindam Ph.D. (The University of Hong Kong), Engineering Geology, Rock Mechanics
Dalai, Tarun K Ph.D. (PRL, Ahmedabad), Low Temperature Geochemistry, Radiogenic Isotope Geochemistry, Paleoeclimatology, Weathering of Organic Rich Sediments, Carbon Cycle and Trace Metal Budgets of Rivers
Mitra, Supriyo Ph.D. (Cambridge University), Earthquake Seismology, Continental Tectonics
Mohanty, William Kumar Ph.D. (Delhi University), Seismology, Gravity and Magnetic Methods of Prospecting
Raghavan Nair, Rajesh Ph.D. (NGRI / Osmania University), Near Surface Geophysics and Elastic Thickness
Ray, Sanghamitra Ph.D. (Calcutta University), Vertebrate Paleobiology and Gondwana sedimentation
Sanyal, Prasanta Stable Isotope Geochemistry, Palaeoclimatology and Palaeoecology
Lecturer
Datta, Indira Ph.D. (IIT Kharagpur), Remote Sensing, Analysis of Geological and Geophysical Data
Senior Scientific Officer
Sengupta, Probal Ph.D. (IIT Kharagpur), Seismology, Microzonation, Seismic Prospecting
Faculty Promotions
Dr. Mruganka Kumar Panigrahi Professor
Dr. William Kumar Mohanty Associate Professor
Brief Description of on-going activities
1. Studies on Indian monsoon (both modern and ancient) and paleoclimate studies of the Indian subcontinent and paleoceanography of the Indian Ocean;
2. Tectonic evolution of craton mobile belt ensembles in parts of the Indian shield;
3. Emplacement mechanism, tectonic evolution and metallogenesis in Precambrian Granitoids in India;
4. Gold mineralization and gold potentials of the schist belts in Dharwar Craton, India;
5. Studies on Indian microvertebrates, Lithospheric structure across Himalaya, Deformation at Collisional boundaries, Isotopes in Himalayan foreland sediments;
6. Paleogene climate of Kutch, Rajasthan, Environment in ancient sedimentary basins in India;
7. Seismic Hazard assessment and microzonation in the NE India and metropolitan cities, Mechanical characterization of rock materials, Groundwater potential assessment and pollution by natural and anthropogenic causes;
8. Waste utilization and wasteland development;
Thrust Areas
1. Paleoclimatology (Paleontology, Geochemistry)
2. Crustal Evolution and Metallogeny
3. Seismology
4. Environmental Hazards and Mitigation
New Acquisitions
1. Electron Probe Micro-Analyzer (EPMA)
2. Point Load Tester along with Brazilian Test Frame (includes continuous data acquisition facility for load and deformation)
3. Slake Durability Test Apparatus
4. System for Determining Rock Physical Properties (e.g. Effective and Total Porosities)
Lectures by Visiting Experts
1. by Padma Shri Dr. Ravi Bastia (Reliance Industries)
2. Heating of the Crust by Prof. R. N. Singh (NGRI, Hyderabad)
3. History of Oxygen Loss in Louisiana Coastal Waters - Clues from Tiny Shells by Prof. Barun K. Sen Gupta (Louisiana State University, USA)

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4. Deformation Localization and Melt Generation in Geological Materials by Dr. Santanu Misra (ETH Zentrum, Switzerland)
5. The evolution of the Eastern Ghats Belt, India by Prof. Michael M. Raith (Bonn, Germany)
6. The Earths Changing Climate Through the Aeons: Insights for the Present by Prof. Vinod K. Gaur (Indian Institute of Astrophysics)

Doctoral and MS Degrees Awarded

1. Rajesh Kumar Naik The Late Archean/Early Proterozoic Granitoid Complex and Associated Cu-Mo Mineralization at Malanjkhand, Central India: Towards a Working Model of Ore Genesis (Ph.D.)
2. Shantanu Kumar Dutta Assessment of Geoenvironmental Degradation in Makum Coalfield, Assam, India (Ph.D.)
3. Jagatbikas Nanda Deformation, Metamorphism and Post-emplacement Tectonic Evolution of the Alkaline Complex at Koraput and Associated Granulites, Eastern Ghats Belt, India (Ph.D.)
4. Pritam Nasipuri Mechanism and Conditions of Emplacement of the Bolangir Anorthosite Pluton, Eastern Ghats Belt, India (Ph.D.)
5. Sukhen Majumder Fabric Development in the Malanjkhand Granite (Central India) and Its Relationship with Regional Tectonics (Ph.D.)
6. Dinesh Pandit A Comparative Study of the Paleo-proterozoic Malanjkhand and Dongargarh Granitoids, Central India: Implications to Crustal Evolution and Metallogeny (Ph.D.)
7. Saikat Sengupta Stable Isotope and Geochemical Studies of Groundwater in parts of North 24 Parganas, West Bengal, India: Implications to Genesis and Mobilisation of Arsenic (Ph.D.)
8. Raj Kumar Singh Paleoceanographic Evolution of the Southeastern Indian Ocean during the Neogene: Proxy Records from ODP Hole 752A and 757B (Ph.D.)
10. Swapnendu Goon Mesoproterozoic Polyphase Metamorphism in the Chotanagpur Gneissic Complex, Eastern India: Evidence from the Bero-Saltora and Ranchi-Kolomda Areas (Ph.D.)
11. Lopamudra Saha High Pressure Re-metamorphism of Enclave-Type Granulites from the Aravalli-Delhi Mobile Belt, NW India and Its Regional Implications (Ph.D.)
12. M. Yanger Walling Seismic Hazard Assessment with Special Emphasis to the Microzonation of Talchir, Haldia and Kolkata (Ph.D.)
13. Soma De High Resolution Record of Monsoon Variability from Biogenic Sediments of the Maldives Ridge (ODP) (Ph.D.)

Fellow - Professional Bodies
2. Gupta, Anil Kumar (2008) Fellow - Indian Academy of Sciences, Bangalore
3. Gupta, Anil Kumar (2008) Life Fellow - Indian Geophysical Union

Member - Editorial Board
   - Prakriti Vikash
   - GEO-FACE
5. Panigrahi, Mruganka Kumar (2009) Member, Advisory Editorial Board
   - Resource Geology
6. Pant, Naresh Chandra (2008) Associate Editor
   - Indian Geoscience Journal (Previously known as Indian Minerals)
   - Geospectrum

Awards & Honours
1. Dalai, Tarun K (2009) JSPS Invitation Fellowship

Fellowships
1. Mitra, Supriyo (2008) UK-India Education and Research Initiative (UKIERI) post doctoral Fellowship
2. Sanyal, Prasanta (2008) BOYSCAST fellowship

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>3-Dimensional imaging of the lithosphere and active deformation across Sikkim-Darjeeling Himalaya and a comparison with NW-Himalaya</td>
<td>Deep Continental Studies (DCS) - Department of Science and Technology (DST)</td>
<td>Rs. 55.50 Lakhs</td>
</tr>
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<td>2.</td>
<td>Application of Fractals and Chaotic Dynamics to Study Geodynamics of the Himalayan Earthquakes of North West India</td>
<td>ISIRD, SRIC IIT Kharagpur</td>
<td>Rs. 1.00 Lakhs</td>
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<td>3.</td>
<td>Broadband Seismological Observatory at IIT Kharagpur for Seismotectonic Study of Bengal Basin (BBS)</td>
<td>Department of Science and Technology</td>
<td>Rs. 64.65 Lakhs</td>
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<tr>
<td>4.</td>
<td>Broadband seismometry in the north-east region with special emphasis to Guwahati for seismic hazard assessment</td>
<td>Department of Science and Technology, Government of India</td>
<td>Rs. 10.28 Lakhs</td>
</tr>
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<td>5.</td>
<td>Carbon isotope studies of graphite and coexisting carbonate in Eastern Ghat, Orissa: implication to the source of graphite and temperature of metamorphism</td>
<td>SRIC/ISIRD</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>6.</td>
<td>Chemical weathering of black shales: Implications for release of CO2 to atmosphere and trace metals to rivers</td>
<td>DST</td>
<td>Rs. 19.84 Lakhs</td>
</tr>
<tr>
<td>7.</td>
<td>Coastal sedimentary archives of Tsunami affected Eastern Indian Coast using high resolution Geophysical records</td>
<td>INCOIS, Hyderabad</td>
<td>Rs. 40.00 Lakhs</td>
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<tr>
<td>8.</td>
<td>Contrasting Styles Of Exhumation Of Monocyclic And Polycyclic Granulites From The Sausar Mobile Belt In Central India: Constraints From Metamorphic P-</td>
<td>DST,</td>
<td>Rs. 14.03 Lakhs</td>
</tr>
<tr>
<td>9.</td>
<td>Create Infrastructure Facilities and Additional Provisions needed for sustaining a 24-Month M.Tech. Programme in Computational Seismology</td>
<td>Department of Science and Technology (earlier)</td>
<td>Rs. 175.36 Lakhs</td>
</tr>
<tr>
<td>10.</td>
<td>Establishment of Electron Probe Micro-Analyzer (EPMA)-National Facility at IIT Kharagpur</td>
<td>Department of Science &amp; Technology, New Delhi,</td>
<td>Rs. 555.00 Lakhs</td>
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<td>11.</td>
<td>Evaluation of Seismic Potential of Talcher area, Orissa.</td>
<td>SRIC, IIT, Kharagpur</td>
<td>Rs. 2.40 Lakhs</td>
</tr>
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<td>12.</td>
<td>Evolution of the Indian summer monsoon during the Neogene: Suborbital to orbital changes</td>
<td>Department of Science &amp; Technology, New Delhi,</td>
<td>Rs. 19.00 Lakhs</td>
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<td>13.</td>
<td>FIST-II</td>
<td>DST Govt of India</td>
<td>Rs. 260.00 Lakhs</td>
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<td>14.</td>
<td>Genetic modeling of orogenic gold deposits in the Dharwar Craton: constraints from metamorphism, ore mineralogy and fluid evolution</td>
<td>DST, New Delhi,</td>
<td>Rs. 32.02 Lakhs</td>
</tr>
<tr>
<td>15.</td>
<td>Geochemical and fluid inclusion studies on the Malanjkhand granitoid complex: Implications for ore genesis and crustal evolution</td>
<td>DST</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>16.</td>
<td>Geophysical survey using gravity and magnetic methods in south Purulia shear zone</td>
<td>Department of Atomic Energy, Government of India,</td>
<td>Rs. 9.20 Lakhs</td>
</tr>
<tr>
<td>17.</td>
<td>Geophysical Survey using gravity and magnetic methods in south Purulia Shear Zone</td>
<td>Atomic Mineral Directorate, BRNS, Govt of India,</td>
<td>Rs. 19.50 Lakhs</td>
</tr>
<tr>
<td>18.</td>
<td>Global Seismic Monitoring by Broadband Seismological Observatory at IIT Kharagpur</td>
<td>Ministry of Earth Sciences,</td>
<td>Rs. 18.20 Lakhs</td>
</tr>
<tr>
<td>19.</td>
<td>Investigation of alteration of cosmic dust particles: Implications for interpretation of 187Os/188Os records in marine sediments and estimates for acc</td>
<td>Department of Space funded PLANEX Program, Physical Research Laboratory</td>
<td>Rs. 20.00 Lakhs</td>
</tr>
<tr>
<td>20.</td>
<td>Investigation of the basement structure of the Bengal Basin using Gravity and Seismic data</td>
<td>ISIRD, IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>21.</td>
<td>Investigation of the Deep Seismic Structure in the Foreland of the Himalayan Collision Zone in Eastern India.</td>
<td>ISIRD, SRIC</td>
<td>Rs. 2.80 Lakhs</td>
</tr>
<tr>
<td>22.</td>
<td>Isostatic compensation mechanisms of continental regimes based on application of wavelet</td>
<td>ISIRD, IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>23.</td>
<td>Measurement and Modeling of Radon Transport and distribution around tailing pond area and dwellings</td>
<td>BRNS, Department of Atomic Energy, Mumbai,</td>
<td>Rs. 30.00 Lakhs</td>
</tr>
<tr>
<td>24.</td>
<td>Mesozoic Gondwana vertebrates from Madhya Pradesh, India: an integrated study on paleobiology</td>
<td>Department of Science and Technology, New Delhi</td>
<td>Rs. 21.22 Lakhs</td>
</tr>
<tr>
<td>25.</td>
<td>Microzonation of Sikkim Region</td>
<td>Department of Science and Technology (earlier) Now Ministry of Earth Sciences,</td>
<td>Rs. 51.40 Lakhs</td>
</tr>
<tr>
<td>26.</td>
<td>National Capacity Building in Earthquake Engineering</td>
<td>Ministry of Home Affairs</td>
<td>Rs. 34.00 Lakhs</td>
</tr>
<tr>
<td>27.</td>
<td>National Facility on Stable Isotope Geochemistry, Indian Institute of Technology, Kharagpur</td>
<td>DST</td>
<td>Rs. 256.00 Lakhs</td>
</tr>
<tr>
<td>28.</td>
<td>National Programme on Earthquake Engineering Education in India</td>
<td>Ministry of Human Resource Development (MHRD)</td>
<td>Rs. 83.60 Lakhs</td>
</tr>
<tr>
<td>29.</td>
<td>National Programme on Isotope Fingerprinting of Waters of India</td>
<td>DST</td>
<td>Rs. 10.20 Lakhs</td>
</tr>
<tr>
<td>30.</td>
<td>Natural radioactivity and radiation dosimetry in the high background radiation area along the southern coast of Orissa, India</td>
<td>BRNS, Department of Atomic Energy, Mumbai,</td>
<td>Rs. 12.20 Lakhs</td>
</tr>
<tr>
<td>31.</td>
<td>Orthonormalized tapers in the estimation of flexural rigidity of plates</td>
<td>DST</td>
<td>Rs. 14.00 Lakhs</td>
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<tr>
<td>No.</td>
<td>Title</td>
<td>Institution</td>
<td>Amount (Lakhs)</td>
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</tr>
<tr>
<td>32.</td>
<td>Predicting crack initiation stress by porosity and evaluating microstructural control on crack initiation: a study on granite</td>
<td>DST, New Delhi</td>
<td>18.77</td>
</tr>
<tr>
<td>33.</td>
<td>Quantitative assessment of weathering grades of rock materials</td>
<td>ISIRD, IIT Kharagpur</td>
<td>3.65</td>
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<tr>
<td>34.</td>
<td>Re-Os isotope systematics of organic-rich sediments of the Upper Vindhyan Supergroup: Chronology, interbasinal correlation and seawater records</td>
<td>SRIC (ISIRD), IIT,</td>
<td>1.00</td>
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<tr>
<td>35.</td>
<td>Reconstruction of monsoonal rainfall from the late Quaternary Himalayan foreland sediments by Stable Isotope tracers: implications to climate forcing</td>
<td>DST, New Delhi</td>
<td>11.00</td>
</tr>
<tr>
<td>36.</td>
<td>Rhenium-Osmium isotope systematics of organic-rich sediments of the Upper Vindhyan Supergroup: Chronology, interbasinal correlation and records of Osm</td>
<td>ISIRD, IIT Kharagpur</td>
<td>0.00</td>
</tr>
<tr>
<td>37.</td>
<td>Seismic Hazard Assessment of Haldia, Bengal Basin Area</td>
<td>DST, New Delhi,</td>
<td>3.12</td>
</tr>
<tr>
<td>38.</td>
<td>Spatial relationship between metallogenesis and geodynamic evolution of granite-greenstone ensembles of Eastern Dharwar craton from the perspectives o</td>
<td>Department of Science and Technology,</td>
<td>11.00</td>
</tr>
<tr>
<td>39.</td>
<td>Spatio spectral localization of isostatic coherence anisotropy of 90 degree East ridge</td>
<td>Ministry of Earth Science,</td>
<td>20.00</td>
</tr>
<tr>
<td>40.</td>
<td>Tectono-metamorphic evolution of the Higher Himalayan rocks of Western (Kemeng Corridor) and eastern Arunachal Pradesh: A comparative Study</td>
<td>DST</td>
<td>7.42</td>
</tr>
<tr>
<td>41.</td>
<td>Tectonothermal evolution of polycyclic granulite enclaves in amphibolites from the Sandmata complex, Rajasthan : constraints from P-T evolution, petrolog</td>
<td>DST</td>
<td>13.01</td>
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<tr>
<td>42.</td>
<td>The exhumation factor in the genesis of inverted metamorphic sequences - an evaluation from structure, metamorphism, fluid inclusion and earthquakes i</td>
<td>DST</td>
<td>14.00</td>
</tr>
<tr>
<td>43.</td>
<td>The relationship between anisotropy of magnetic susceptibility, strength anisotropy and microstructure in rocks devoid of mesoscopic foliations</td>
<td>DST, New Delhi</td>
<td>19.55</td>
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<tr>
<td>44.</td>
<td>Utilization of Hyperspectral Data in Geological Investigations / Mapping for Mineral Exploration</td>
<td>Department of Space (SAC, Ahmedabad)</td>
<td>11.44</td>
</tr>
</tbody>
</table>

**Consultancy Projects**

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Description</th>
<th>Institution</th>
<th>Amount (Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Electrical resistivity survey for delineation of Limestone formation around Chaibasa - Jharkhand</td>
<td>Madras Cement</td>
<td>2.50</td>
</tr>
<tr>
<td>2.</td>
<td>Ground Vibration study on Balagunda Iron and Manganese Mines in District Keonjhar, Orissa</td>
<td>Envomin Consultant (Pvt) Ltd,</td>
<td>2.12</td>
</tr>
<tr>
<td>3.</td>
<td>In house training program on GPS applications to power system diagnostics</td>
<td>Tata Steel Ltd.,</td>
<td>66120.00</td>
</tr>
<tr>
<td>4.</td>
<td>Laser Raman Microspectrometry Analysis</td>
<td>Industry, Academic and Governmental Organizations,</td>
<td>2.50</td>
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<tr>
<td>5.</td>
<td>Magnetic Laboratory Maintenance Project (MLMP)</td>
<td>Various Government and Private agencies</td>
<td>0.78</td>
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<tr>
<td>6.</td>
<td>Resistivity Survey for installation for deep tube-well at Kharkikamathani</td>
<td>PHED, Govt of West Bengal.</td>
<td>0.40</td>
</tr>
<tr>
<td>7.</td>
<td>Study of Ground Vibration for Putulipani Iron-ore Mines, District- Keonjhar, Orissa</td>
<td>M/s Gandhamardhan Sponge Industries (P) Ltd.,</td>
<td>2.60</td>
</tr>
</tbody>
</table>
ANNUAL REPORT
2008-2009

8. Study on Assessment Technologies for Storage of CO2 for Carbon Sequestration

Visits Abroad by Faculty Members
1. Mitra, Adinpunya
   Research stay (Technical University of Braunschweig, Germany)
   May 19 to July 16
2. Mitra, Supriyo
   UKIERI Fellowship (Cambridge University) One year
3. Gupta, Saibal
   Representing Dept. of Geology & Geophysics, IIT Kharagpur.
   (Paris, France) March 1-5, 2009
4. Raghavan Nair, Rajesh
   IGC Conference (Norway) 5 days
5. Raghavan Nair, Rajesh
   Conference (Singapore) 5 days
6. Sanyal, Prasanta
   attending American Geophysical Union conference (Sanfrancisco, USA) 7 days
7. Mohanty, William Kumar
   Collaborative Research (Department of Earth Sciences, University of Western Ontario, Canada) 21st June to 8th July 2008
8. Sarkar, Anindya
   To attend the joint Indo-US Organising committee meeting for Indo-US frontiers of Science Symposium (National Academy of Science, USA, Washington DC) 3 days
9. Sarkar, Anindya
   To deliver an invited talk (Dept. of Earth & Env. Sc., Tsukuba University, Japan) 7 days

Invited Lectures by Faculty Members
1. Earthquake Hazard in the Northeast India  A Computer intensive Seismic Microzonation Approach.....
   by Nath, Sankar Kumar (Indian Statistical Institute, Kolkata (INAIE Kolkata Chapter))
2. Seismic Microzonation of Guwahati Region by Nath, Sankar Kumar (First National Steering Committee Meeting-cum-workshop under the aegis of The Ministry of Earth Science, New Delhi at Salt lake City Extension Center, IIT Kharagpur)
3. Natural Hazards and Mitigation by Mohanty, William Kumar (National Institute of Technology, Rourkela)
4. Isotope hydrology of arsenic contaminated aquifers from India: can the mass poisoning be abated?
   by Sarkar, Anindya (Tsukuba University, Japan)

Seminars, Conferences and Workshops Organised
1. Indian Frontiers of Science symposium
2. Indo-US frontier of Science symposium
3. Second meeting of Asian Current Research on Fluid Inclusions (ACROFI-2)

Short-Term Courses, Training Programmes and Workshops organized
1. Capacity Building Programme on Geographical Indication and Design Registration for Department of Tex
   (23-27 March 2009)
2. DST-TIFAC Women Scientist Scheme in IPR
   (2008-09)
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

HEAD: Professor Damodar Suar

FACULTY

Professors

Basu, Partha
Ph.D. (Calcutta University), Applied Econometrics
Foreign Investment Effectiveness of Marketing Expenditure

Chaterjee, Suhita Chopra
Ph.D. (Bombay), Sociology of Health and Illness / Medical Ethics

Chatterjee, Bani
Ph.D. (BHU, Varanasi), Economics

Giri, Vijai Nath
Ph.D. (IIT Kharagpur), Interpersonal / Organizational Communication

Roy, Anjali
Ph.D. (Bombay), Post-colonial Literatures and Theory, Culture and Media Studies, Postmodern Theory, Folklore and Orature

Srivastava, Kailash Bihari Lal
Ph.D. (IIT Kanpur), Organizational Behaviour and Human Resource Development and Management, Innovation and Knowledge Management

Suar, Damodar
Ph.D. (IIT Kharagpur), Social and Organisational Psychology, Neuropsychology

Tewari, Hare Ram
Ph.D. (IIT Kharagpur), Sociology

Associate Professors

Chakraborti, Chhanda
Ph.D. (University of Utah), Applied Ethics: Bioethics, Business Ethics, Philosophy of Logic, Philosophy of Mind: Cognition, Reasoning

Nayak, Narayan Chandra
Ph.D. (Utkal University), Social Sector Development, International Finance, Agricultural Economics

Patnaik, Priyadarshi
Ph.D. (Utkal University), Visual Culture and Communication, Translation of Medieval Oriya Texts, Indian Aesthetics, Media and Multimedia Studies, Nonverbal Communication

Assistant Professors

Behera, Bhagirath
Ph.D. (University of Bonn, Germany), Environmental and Natural Resource Economics

Chakraborty, Jayshree
Ph.D. (IIT Kanpur), Semantic and Pragmatic Studies in the Indian Languages, Language and Communication, Indian English Writings

Das, Saswat Samay
Ph.D. (Utkal University), Postmodern and Postcolonial Studies, Critical Thinking

Goswami, Kishor
Ph.D. (IIT Kharagpur), Food Security, Agricultural Economics, Poverty, Gender Studies

Komalesha, H. S.
Ph.D. (IIT Kharagpur), Indian English Literature, Translation

Mahakud, Jitendra
Ph.D. (IIT, Bombay), Corporate Finance, Financial Markets, and Banking, Investment Management, Financial Engineering

Mishra, Pulak
Ph.D. (Vidyasagar University), Industrial Economics, Public Economics, Economics of Rural Development

Murugan, Seema
Ph.D. (BHU), Communication Studies, American Literature, Dalit Literature

Pradhan, Rabindra Kumar
Ph.D. (Utkal University), Social and Organisational Psychology
Faculty Promotions
Dr. Vijai Nath Giri Professor

Faculty Resignation
Dr. Manas Kumar Mandal Professor
Dr. Trupti Mishra Assistant Professor

Brief Description of on-going activities
Research and Development on: Quantitative economics, Financial economics, Economics of growth, Industrial economics, Development economics, Environmental and resource economics, Developing world bioethics, Gender and trade, Financial institutions and markets, Sociology of health and medicine, Human resource development, Brain and behaviour, Interpersonal, intercultural and organizational communication, Visual aesthetics, Business ethics, corporate social responsibility.
Training on: Interpersonal communication, Recent trends in human resource development, Strategic management, Emotional intelligence, Logic and applications of logic.
Course development on: Economics, Human resource management, Philosophy

Thrust Areas
1. Development studies
2. Human resource management and ethics
3. Cultural studies and communication

Lectures by Visiting Experts
1. Science, technology and social inequality in India: A socio-historical perspective by Binay K Pattnaik (IIT Kanpur)
2. Violence of our lives by Sunrit Mullick (United States Educational Foundation in India, Kolkata)
3. Executive skills: Management and educational implications by J. P. Das (Department of Psychology, University of Toronto)
4. Edupreneurship by Sasi B Misra (EDII, Gandhinagar)
5. Does self help group participation lead to asset creation? by Ranjula Bali Swain (Uppsala University, Sweden)
6. Exchange rate pass-through and prices of tradables in India by Saikat Sinha Roy (Department of Economics, Jadavpur University)
7. Understanding applied ethics: Business, healthcare and law by Leslie P Francis (Department of Philosophy, University of Utah)
8. Applied philosophy by K Ramakrishna Rao (Indian Council of Philosophical Research, New Delhi)
9. Many-valued similarity and its logic applications by Esko Turunen (Tampere University, Finland)

Doctoral and MS Degrees Awarded
1. Maiti Maitreyi Development Approach of a Metropolitan Fringe in Transition: Kolkata Metropolis (Ph.D.)
2. Indiwar Misra Assessment of functional laterality among left-, right-, and mixed-handers (Ph.D.)
3. Anathbandhu Patra Gender relations in single- and dual-career families (Ph.D.)
4. Ujjwal Jana Application of Rasa theory to Indian fiction in English: A study of three novels (Ph.D.)
5. Kakulavarapu Manasa Exploring the dynamic process of knowledge management in knowledge intensive industry (Ph.D.)
6. Arti Sengupta Impact of emotional intelligence and alexithymia on conflict resolution and managerial styles (Ph.D.)
6. Mahua Verma (Mitra) Union effectiveness in Indian railways (Ph.D.)
7. Smriti Kumari Identification of potential ecotourism sites, sustainability assessment and management in geospatial environment (Ph.D.)
8. Tirumala Santra Leadership style, structure, and organizational effectiveness: The mediating role of computer-mediated and face-to-face communication (Ph.D.)
9. Shalini Dixit Variations in food security in West Bengal and Jharkhand: An empirical analysis (Ph.D.)

Fellow - Professional Bodies

Member - Editorial Board
3. Goswami, Kishor (2007) Associate Editor (Volume II) - International Journal of Interdisciplinary Social Sciences
4. Murugan, Seema (6) Member, Board of Editors - TITIKSHA
8. Suar, Damodar (2002) Associate Editor - Psychological Studies

Awards & Honours
1. Suar, Damodar (2008) Bharat Jyoti Award
3. Chakraborti, Chhanda (2009) Director Etudes Associe, Foundation Maison des Sciences deHomme, France

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agro-Management Practices Adopted by Rubber Growers in Assam A Case Study</td>
<td>Rubber Research Institute of India</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Animated Texts: Communicating in a Multimedia Environment</td>
<td>Indian Council of Social Sciences Research (ICSSR), Ministry of Rural Development, Government of India, New Delhi</td>
<td>Rs. 7.00 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>Appraisal of Process and Procedures of NREGA in Orissa</td>
<td>Ministry of Rural Development, Government of India, New Delhi</td>
<td>Rs. 7.00 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Bollywood's Transnational Flows</td>
<td>Indo-Canadian Shastri Institute</td>
<td>Rs. 6.00 Lakhs</td>
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<tr>
<td>5</td>
<td>Cognition in context</td>
<td>Swedish Research Council, Sweden</td>
<td>Rs. 0.00 Lakhs</td>
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<tr>
<td>No.</td>
<td>Project Title</td>
<td>Funding Agency</td>
<td>Amount (Rs.)</td>
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<tr>
<td>6.</td>
<td>Concept paper on disaster management</td>
<td>Defence Institute of Psychological Research</td>
<td>4.86 Lakhs</td>
</tr>
<tr>
<td>7.</td>
<td>Demeanour Analysis</td>
<td>DIPR</td>
<td>9.80 Lakhs</td>
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<tr>
<td>8.</td>
<td>Developing Corporate Governance Norm for SMEs</td>
<td>National Foundation for Corporate Governance, C/O - Confederation of Indian Industry</td>
<td>6.50 Lakhs</td>
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<tr>
<td>10.</td>
<td>Gender and Trade in Silk Industry: A Study on Silk Workers in Sualkuchi in Assam</td>
<td>United Nations Development Programme (UNDP)</td>
<td>2.64 Lakhs</td>
</tr>
<tr>
<td>11.</td>
<td>Impact of Globalization and Adoption of New Technology on Silk Industry in Assam: An Assessment from Gender Perspective</td>
<td>Department of Scientific and Industrial Research, New Delhi</td>
<td>6.83 Lakhs</td>
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<tr>
<td>12.</td>
<td>Intellectual Property Law and Competition Policy and Law in India</td>
<td>Competition Commission of India and The World Bank, Ministry of Corporate Affairs</td>
<td>6.30 Lakhs</td>
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<tr>
<td>13.</td>
<td>Techno-Economic Feasibility of Integrated Acquaculture Options within Irrigation Systems (TFI)</td>
<td>Indian Council of Agricultural Research (ICAR), New Delhi</td>
<td>31.03 Lakhs</td>
</tr>
<tr>
<td>14.</td>
<td>Technology Adoption in Tea Industry with Special Reference to North East India</td>
<td>Department of Scientific and Industrial Research, New Delhi, India</td>
<td>6.50 Lakhs</td>
</tr>
</tbody>
</table>

**Consultancy Projects**

1. Comprehensive Socio-Economic Survey for Pakri Barwadih Coal Mining Project
   - National Thermal Power Corporation Ltd. (NTPC), Rs. 17.25 Lakhs
2. Design of Course Content for Group Discussion and Personal Interview (GDPI)
   - Centre for Advanced Communication, STEP-IIT Kharagpur, Rs. 0.90 Lakhs
3. Setting up of the Indian Institute of Corporate Affairs
   - Ministry of Corporate Affairs, Rs. 200.00 Lakhs

**Visits Abroad by Faculty Members**

1. Chakraborti, Chhanda
   - Invited Discussion (UNESCO Bioethics Division, Paris, France) June 13
2. Chakraborti, Chhanda
   - Collaborative Research (Dept. of Philosophy Paris IV Sorbonne, Paris, France) June
3. Chakraborti, Chhanda
   - Research data (Pasteur Institute, Paris, France) June 1221
4. Chakraborti, Chhanda
   - Invited Project Discussion (Centre de Recherche "Droit, Sciences, Techniques" Université de Paris 1 Panthéon-Sorbonne) June 24
5. Chakraborti, Chhanda
   - Seminar (College de France, Paris, France) June 10
6. Goswami, Kishor
   - For presenting a paper (Turin, Italy) June 19-21
7. Goswami, Kishor
   - For academic collaboration (Zlin, Czech Republic) June 22-27
8. Srivastava, Kailash Bihari Lal
   - To present a paper in XXIX International Congress of Psychology (Berlin, Germany) July 20-25
9. Suar, Damodar
   - Invited symposium of International Association of Psychology (Berlin, Germany) July 20-25
Invited Lectures by Faculty Members

1. Three Cheers and Three Curses - English in India by Komalesha, H. S. (Mandsaur Institute of Technology, Mandsaur)
2. Environmental CSR by Chakraborti, Chhanda (BITS Pilani)
3. Logic by Chakraborti, Chhanda (Dept of Mathematical Information Technology, University of Jyvaskyla, Finland)
4. Human Reasoning by Chakraborti, Chhanda (Dept of Mathematical Information Technology, University of Jyvaskyla, Finland)
5. Ethics in Practice by Chakraborti, Chhanda (Dept of Mathematical Information Technology, University of Jyvaskyla, Finland)
6. The Need for Communication Studies in the English Classroom by Murugan, Seema (Seva Bharati Mahavidyalaya, P.O. Kapgari, Dt.: West Midnapore)
7. Technical Education in India and its Future by Chaterjee, Suhita Chopra (College of Engineering and Management, Kolaghat)
8. Sustainable Development: Issues and Dilemmas by Nayak, Narayan Chandra (Fakir Mohan University, Balasore, Orissa)
10. Social initiative and CSR by Srivastava, Kailash Bihari Lal (BITS Pilani)
11. Disaster and its Impact: Development Issues and Dilemmas by Nayak, Narayan Chandra (UN College, Soro, Orissa)
12. Communication Skills for Teachers by Komalesha, H. S. (BIT Sindri)
13. Effective Presentation Skills by Komalesha, H. S. (IIT Kharagpur)

Books Published


Seminars, Conferences and Workshops Organised

1. Industrial Relations in India
2. Recent trends in Organizational behaviour
3. National Seminar on Trans-historian Configurations: Colonial Past & post Modern Futures in USA and Ind
5. One Day Workshop on Industrial Relations in India, 22 March 2009
Short-Term Courses, Training Programmes and Workshops organized

1. Emotional Intelligence: Optimising Human Performance at the Workplace (April 25-27, 2008)
2. Interpersonal Communication (February 17-22, 2009)
3. Linguistics and its Applications (December 27-29, 2008)
4. Literary theory: Theories of reading and writing (August 1-4)
5. Managing Stress at work (November 16-18, 2008)
6. Recent Trends in Human Resource management and development (July 7-18, 2008)
7. Soft Skills, Group Discussion and Personal Interview (June 5-8, 2008)
8. Winter School on Logic and Applications of Logic (LAAL 2009) Part I and Part II (Jan 5-16, 2009)
DEPARTMENT OF INDUSTRIAL ENGINEERING & MANAGEMENT

HEAD : Professor Pradip Kumar Ray

FACULTY

Professors

Acharya, Damodar Ph.D. (IIT Kharagpur)
Banerjee, Rabindra Nath PGDM (Edinburgh UK)
Mahanty, Biswajit Ph.D. (IIT Kharagpur), System Analysis, Optimization, Information Systems, Project Management
Mohapatra, Pratap Kumar Jagadev Ph.D. (IIT Kharagpur), Industrial Engineering and Management
Sahu, Sadananda Ph.D. (IIT Kharagpur), Industrial Engineering and Management, Supply Chain Management

Associate Professors

Maiti, Jhareswar Ph.D. (IIT Kharagpur), Risk Assessment and Safety Management, Ergonomics and Work System Design, Statistical Quality Control
Tiwari, Manoj Kumar Manufacturing Systems, Supply Chain Management, AI Applications

Assistant Professors

Jenamani, Mamata Ph.D. (IIT Kharagpur), E-Business, E-Auction, Recommender and Personalization systems
Sarmah, Sarada Prasad Ph.D. (IIT Kharagpur), Supply Chain Management Inventory Logistics

Senior Lecturer

Nandy, Ayan Ph.D. (IIM, Calcutta)

Faculty Appointments

Dr. Jyoti Mukherjee Professor
Dr. Ranjan Ghosh Professor
Dr. T. P. Bagchi Professor

Brief Description of on-going activities

Since its inception the department has been known across the nation for its excellent research potential and capability in the field of industrial engineering and related areas. As a matter of fact, pioneering research in the following areas of industrial engineering and management are being carried out:

1. Operations Management : Production Planning and Inventory Control, Facility Design and Layout, Logistics and Supply Chain Management, E-Business, Quality Engineering and Control,
4. Operations Management Work System Design,
5. Ergonomics and Safety Engineering Quality Engineering Simulation and Soft Computing

**Doctoral and MS Degrees Awarded**

1. Preethi Upamaka  
   Technology Diffusion Studies in Indian Research Organizations (Ph.D.)
2. N S Arunraj  
   Modeling risk and risk-based maintenance in chemical process industry (Ph.D.)
3. Pradip Kumar Talapatra  
   Studies on Total Quality Management in Indian Manufacturing Firms (Ph.D.)
4. Santanu Sinha  
   Modelling Supply Chain Coordination under Diverse Settings (Ph.D.)

**Fellow - Professional Bodies**

   Nominated - World Academy of Productivity Sciences

**Member - Editorial Board**

1. Mahanty, Biswajit (2007) Member of Editorial Board  
   - International Journal of System Dynamics and Policy Planning
   - The Institution of Engineers (India)
   - Journal of Hazardous Materials
   - Ergonomics
5. Mohapatra, Pratap Kumar Jagadev (2005) Member of the Editorial Board  
   - Journal of Advances in Management Research
   - System Dynamics Review
7. Mohapatra, Pratap Kumar Jagadev (2005) Member of the Editorial Board  
   - International Journal of System Dynamics and Policy Planning
   - International Journal of Production Research
9. Tiwari, Manoj Kumar (2009) Editorial Board Member  
   - International Journal of Production Research (IJPR)
10. Tiwari, Manoj Kumar (2009) Editorial Board Member  
    - Journal of Mathematics of Operational Research (IJMOR)
11. Tiwari, Manoj Kumar (2009) Editorial Board Member  
    - Robotics and Computer Integrated Manufacturing (RCIM)
12. Tiwari, Manoj Kumar (2009) Editorial Board Member  
    - Journal of Advances in Management Research (JAMR)
13. Tiwari, Manoj Kumar (2009) Associate Editor  
    - Journal of Intelligent Manufacturing (JIM)
14. Tiwari, Manoj Kumar (2009) Editorial Board Member  
    - International Journal of Advanced Manufacturing Technology (IJAMT)
15. Tiwari, Manoj Kumar (2009) Editorial Board Member  
    - International Journal of Computer Aided Engineering and Technology (IJCAET)
16. Tiwari, Manoj Kumar (2009) Associate Editor  
    - International Journal of System Science (IJSS)
17. Tiwari, Manoj Kumar (2009) Editorial Board Member  
    - International Journal of Decision Making in Manufacturing and Services
20. Tiwari, Manoj Kumar (2009) Editorial Board Member - Applied Mathematical Sciences (AMS)

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Agent-Mediated Electronic Auctions and Negotiations</td>
<td>MHRD, ISIRD, SRIC,</td>
<td>Rs. 18.00 Lakhs</td>
</tr>
<tr>
<td>2.</td>
<td>Automated negotiation and trust management in electronic market places</td>
<td>IIT Kharagpur,</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>3.</td>
<td>Development and Test of a Socio-technical Model for Assessing Occupational Risk of Injuries and Illnesses to Mine Workers</td>
<td>CSIR, New Delhi</td>
<td>Rs. 8.00 Lakhs</td>
</tr>
<tr>
<td>4.</td>
<td>Development and test of a sociotechnical model for assessing occupational risk of injuries to mine workers</td>
<td>CSIR</td>
<td>Rs. 7.64 Lakhs</td>
</tr>
<tr>
<td>5.</td>
<td>Development of decision support model for supply chain coordination</td>
<td>ISIRD, IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
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<td>6.</td>
<td>DST-sponsored FIST project for Development of Ergonomics Laboratory</td>
<td>DST</td>
<td>Rs. 45.00 Lakhs</td>
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<tr>
<td>7.</td>
<td>ERP System for the Institute (IER)</td>
<td>IIT Kharagpur</td>
<td>Rs. 51.00 Lakhs</td>
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<tr>
<td>8.</td>
<td>Exploring Trust, Fraud and Privacy issues in E-Business</td>
<td>Department of Science and Technology</td>
<td>Rs. 8.00 Lakhs</td>
</tr>
<tr>
<td>9.</td>
<td>FIST Program - 2005 on &quot;Ergonomics and e-Business&quot;</td>
<td>DST New Delhi</td>
<td>Rs. 60.00 Lakhs</td>
</tr>
<tr>
<td>10.</td>
<td>Hazard evaluation, risk assessment, and accident causation in mines - An application of multivariate statistical models and neural networks</td>
<td>DST, New Delhi</td>
<td>Rs. 6.00 Lakhs</td>
</tr>
<tr>
<td>11.</td>
<td>Productivity Management in Rice Production Activities - A Data Envelopment Analysis</td>
<td>ICAR</td>
<td>Rs. 13.64 Lakhs</td>
</tr>
<tr>
<td>12.</td>
<td>Technology adoption in Tea industry with special reference to NE India</td>
<td>DSIR, New Delhi</td>
<td>Rs. 6.50 Lakhs</td>
</tr>
</tbody>
</table>

Consultancy Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Preparing the blue print of Institute to be known as IICA</td>
<td>Ministry of Corporate Affairs New Delhi,</td>
<td>Rs. 160.00 Lakhs</td>
</tr>
<tr>
<td>2.</td>
<td>Cyclone Shelter</td>
<td>Office of the Prime Minister, Tata Consultancy Services Ltd.,</td>
<td>Rs. 9.00 Lakhs</td>
</tr>
<tr>
<td>3.</td>
<td>Developing a Maturity Model to Transform 'Potential' Organizational Resources to Assets (based on AXELL) for Tata Consultancy Services Ltd.</td>
<td>Tata Consultancy Services Ltd.,</td>
<td>Rs. 50.00 Lakhs</td>
</tr>
<tr>
<td>4.</td>
<td>Development of Educational Complex</td>
<td>Indian Air Force, IMFA Limited, Bhubaneswar,</td>
<td>Rs. 56.00 Lakhs</td>
</tr>
<tr>
<td>5.</td>
<td>Implementation of Lean Engineering Concepts</td>
<td>IMFA Ltd, Bhubaneswar,</td>
<td>Rs. 7.86 Lakhs</td>
</tr>
<tr>
<td>6.</td>
<td>Manpower Study at Mines Division of IMFA LTD</td>
<td>IMFA Ltd, Bhubaneswar,</td>
<td>Rs. 8.00 Lakhs</td>
</tr>
</tbody>
</table>
8. Pilot Project on Implementation of Lean Engineering Practices at 11BRD, AF
   - Indian Air Force, New Delhi
   - Rs. 56.00 Lakhs

9. Project on IICA
   - Ministry of Corporate Affairs
   - Rs. 25.00 Lakhs

10. Strategic Options Study for Rural Roads
    - Rural Works Department, Govt. of Orissa
    - Rs. 8.00 Lakhs

11. Studies on the norms in transit / handling and bed loss of ore during material handling in OMC operated mines
    - The Orissa Mining Corporation Limited, Bhubaneswar
    - Rs. 7.50 Lakhs

12. Study on Ore Losses during Transit and Material Handling for OMC-operated Mines
    - OMC Ltd, Bhubaneswar
    - Rs. 7.50 Lakhs

Visits Abroad by Faculty Members
1. Sahu, Sadananda
   - Visited School of Mechanical and Manufacturing Engineering, Visited Central Library (University of Loughborough) June-July 2008

2. Sahu, Sadananda
   - Visit NTU and National Library of Singapore (Singapore) December 2008

Invited Lectures by Faculty Members
1. Development of SME as Ancillary and Downstream of Steel Industry in Orissa by Mahanty, Biswajit (Seminar organized by IPICOL, Orissa at Bhubaneswar)
2. Soft Computing Applications in Supply Chain Management. by Tiwari, Manoj Kumar (NIT Rourkela)
3. PSO and ABC algorithm on multi-objective optimization related to Supply Chain problems by Tiwari, Manoj Kumar (IIIT Gwalior)
4. Industrial Safety Management by Ray, Pradip Kumar (DRDO, Proof and Experimental Establishment, Chandipur, Balasore, Orissa)
5. Process Safety and Risk Assessment by Maiti, Jhareswar (Kolkata, CII Symposium)

Seminars, Conferences and Workshops Organised
1. 12-week duration Training Programme on Industrial Safety Engineering for Tata Steel Officials
2. Project Management Fundamentals
3. Short-Term Course on Project Management for Management/Engineer Trainees
4. Training Programme on Fundamentals of Lean Engineering Concepts for IAF Officials

Short-Term Courses, Training Programmes and Workshops organized
1. A 13-week Course on Industrial Safety Engineering for Tata Steel Officials (13 weeks)
2. Introduction to Lean Engineering Practices for IAF (2 weeks)
3. PLM/PDM (2 weeks)
DEPARTMENT OF MATHEMATICS

HEAD : Professor Akhil Ranjan Roy

FACULTY

Professors

Alam, Syed Samsul Ph.D. (IIT Kharagpur), Statistics, Operations Research, Computer Applications

Bhattacharyya, Somnath Ph.D. (IISc. Bangalore), Computational Fluid Dynamics, Micro-/nanofluidics Modeling

Biswal, Mahendra Prasad Ph.D. (IIT Kharagpur), Multi-Objective Decision Making and Multi-Choice Programming

Goswami, Adrijit Ph.D. (Jadavpur University), Operations Research, Theoretical Computer Science

Gupta, Dharmendra Kumar Ph.D. (IIT Kharagpur), Numerical Analysis and Computer Science

Gupta, Umesh Chandra Ph.D. (IIT Delhi), Queueing Theory

Jain, Vinay Kumar Ph.D. (IIT Delhi), Complex Analysis (Extremal Problems and Zeros of Polynomials and Analytic Functions)

Kumar, Somesh Ph.D. (IIT Kanpur), Statistical Decision Theory, Estimation Theory, Quantum Information and Computation, Statistical Data Analysis

Misra, Jagadis Chandra Ph.D., D.Sc. (Calcutta), Mathematical Modelling, Biomechanics, Biomechanics, Mechanics of Fluids and Solids

Nanda, Sudarsan Ph.D., D.Sc.(Sambalpur), Functional Analysis, Optimization, Fuzzy Logic

Roy, Akhil Ranjan Ph.D. (IIT Kharagpur), Relativistic Cosmology, Fuzzy Optimization, Inventory Models, Bifurcation Theory

Sarkar, Anjan Ph.D. (IIT Kharagpur), Statistics, Remotely Sensed Image Analysis.

Srivastava, Parmeshwary Dayal Ph.D. (IIT Kanpur), Functional Analysis, Sequence Space, Cryptography

Associate Professors

Kumar, Pawan Ph.D. (IIT Kanpur), Graph Theory, Compiler Design

Murthy, P V S N Ph.D., Bio Fluid Mechanics, Non-Newtonian Fluid Transport in Porous Media

Pandey, Rajnikant Ph.D., Singular Boundary Value Problems, Multipoint Boundary Value Problems, Theoretical Numerical Analysis

Raja Sekhar, G P Ph.D. (Hyderabad University), Boundary Integral Methods for Viscous Flows, Mass Transfer in Porous Catalysts

Assistant Professors

Biswas, Debapiya Ph.D. (Leeds University), Clifford Analysis

Chakraborty, Debjani Ph.D. (IIT Kharagpur), Fuzzy Mathematics

Gayen, Rupanwita Ph.D. (University of Calcutta), Linear Water Waves, Integral Equations

Ghoshal, Koeli Ph.D. (Jadavpur University), Mathematical Modelling of Turbulence and Sediment Transport

Maity, Soumen Ph.D. (ISI, Kolkata), Combinatorics, Cryptography, Fault-Tolerance in VLSI Architectures

Nahak, Chandal Ph.D., Functional Analysis, Optimization, Fractional Calculus

Nanda, Asok Kumar Ph.D. (Chandigarh), Entropy, Reliability, Statistics

ANNUAL REPORT
2008-2009
New Academic Programmes
1. M.Sc. - Ph.D.
2. M.Tech. - Ph.D.

Brief Description of on-going activities
Besides extensive research in the Thurst areas viz. Functional Analysis and Fluid Mechanics, significant contribution has also been made by the members of the faculty in other fields of research in the area of Clifford Analysis, Fuzzy Mathematics, Soft Algebra, Bio Mechanics, Chaos and Bifurcation in Nonlinear systems, Graph Theory, Integral Equations, Cryptography, Queueing Theory, Statistical Decision Theory, Statistical Data Analysis, Compiler Design, Combinatorics, Fractional Calculus, Optimization and Theoretical Computer Science. The Department has obtained the reports from the external experts of the peer review committee concerning its different academic programmes and is now awaiting finalization of the report to be submitted to the institute.

Thrust Areas
1. Functional Analysis, Fluid Mechanics

New Acquisitions
1. Updation of the computer lab by 15 new PCs, one server for running simulation programmes, one 15 KV UPS for the lab, one plotter, replacement of faculty old deskjet printer by laserjet printers, one Copier cum printer

International Collaborations
1. The Department has finalized one MoU with the Center of Industrial Mathematics, Department of Mathematics, University of Bremen, Germany, to enhance the research activities via students exchange programme.

Lectures by Visiting Experts
1. Eigenvalue expansion method for oscillatory stokes flows 2) Oscillatory eddy structure in cylindrical container by Dr. Kidambi Rangachari (NAL Bangalore)
2. Computational Science and Engineering in Eindhoven by Mattheij, R.M.M. (Technische Universiteit Eindhoven Netherlands)
3. Image based navigation for autonomous vehicles by Dr Reiger Rupert (Project Co-ordinator of EADS (European Aeronautics and Defence Space company, N.V))
4. Front Propagation in a Noisy, Nonsmooth, Excitable Medium by Dr. Mohar Guha (University of Michigan, USA)
5. Estimation of a Population Size Through Capture-Mark-Recapture Method: A Comparision of Various Point and Internal Estimators by Dr. Nabendu Pal (University of Louisiana at Lafayette)

Doctoral and MS Degrees Awarded
1. Narmada Behera Optimality Conditions and Duality Results under Generalized Invexity in Banach Space (Ph.D.)
2. Jayanta Kumar Dash Deterministic Equivalent of Fuzzy Chance Constrained Programming Problems (Ph.D.)
3. Debasis Giri Cryptanalysis and improvement of protocols for digital signature (Ph.D.)
4. Ameeya Kumar Nayak Electroosmotic Flow in a charged micro- and nano channel and double diffusive convection in a cavity (Ph.D.)
5. Amit Kumar Verma Analytical Results for a class of Non-Linear Singular Boundary Value Problems (Ph.D.)
6. Santa Kumari Sunanda Generalized Hardy type Inequalities and Opial type Inequalities for Fractional Derivatives (Ph.D.)
7. Pradip Kumar Parida Study of some third order methods for Non-Linear Equations in Banach Spaces (Ph.D.)
8. S. Dhinakaran Unsteady flow and heat / mass transfer from solid / porous bodies - A numerical treatment (Ph.D.)

Member - Editorial Board
1. Alam, Syed Samsul (0) Member, Editorial Board
   - Canadian Journal of Pure and applied Sciences
2. Biswal, Mahendra Prasad (2009) Reviewer
   - Mathematical Reviews
   - International Journal of Mathematics in Operational Research (IJMOR)
   - Naval Research Logistics
5. Kumar, Somesh (2005) Editor
   - International Journal of Applied Mathematics and Statistics
6. Kumar, Somesh (2008) Editor
   - Bulletin of Statistics and Economics
7. Kumar, Somesh (2008) Executive Editor
   - International Journal of Mathematics and Computation
8. Kumar, Somesh (2008) Reviewer
   - Journal of Combinatorics, Information & System Sciences
   - Communications in Statistics - Theory and Methods
10. Kumar, Somesh (2007) Reviewer
    - Journal of Statistical Computation and Simulation
11. Kumar, Somesh (2006) Associate Editor
    - Journal of Indian Society for Probability and Statistics
    - Journal of Multivariate Analysis
    - Journal of Statistical Planning and Inference
    - Journal of Applied Mathematics and Computing
    - The Open Transport Phenomenon Journal : http://www.bentham.org/open/totpj/
    - International Journal of Mathematical Modeling Simulation and Application
17. Panigrahi, Pratima (2005) A member of the Editorial Board
    - The Aligarh Bulletin of Mathematics

Awards & Honours
1. Chakraborty, Debjani (1997) ISCA Young Scientist Award in Mathematics

Fellowships
### Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A Class of Non-Smooth Optimization Problems under Non-Fuzzy and Fuzzy Environments</td>
<td>CSIR, New Delhi</td>
<td>Rs .3.00 Lakhs</td>
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<tr>
<td>2.</td>
<td>Boundary Integral Work Bench for Viscous Flows through Porous Media</td>
<td>DST, Govt. of India</td>
<td>Rs. 9.00 Lakhs</td>
</tr>
<tr>
<td>3.</td>
<td>Classification of Hyperspectral remote sensing data to discriminate between crop condition variety and stage.</td>
<td>ISRO,</td>
<td>Rs .7.48 Lakhs</td>
</tr>
<tr>
<td>4.</td>
<td>Continuous and periodic review inventory model in Fuzzy and/or Stochastic Environment</td>
<td>DST</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>5.</td>
<td>Development and implementation of extended finite element method (X - FEM) for modelling cohesive discontinuities in rock mass</td>
<td>DST, New Delhi</td>
<td>Rs. 16.34 Lakhs</td>
</tr>
<tr>
<td>6.</td>
<td>Effects of Non-linearity and viscoelasticity of blood and wall tissues and magnetohydrodynamic.</td>
<td>CSIR, New Delhi</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>7.</td>
<td>Electro-osmotic Flow and Mixing in a charged Micro and Nano-Channels: A Computational and Analytical Study</td>
<td>DST</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>8.</td>
<td>FIST Program Department of Mathematics</td>
<td>DST</td>
<td>Rs. 21.00 Lakhs</td>
</tr>
<tr>
<td>9.</td>
<td>FIST program Department of Mathematics (FMA)</td>
<td>DST New Delhi</td>
<td>Rs. 22.00 Lakhs</td>
</tr>
<tr>
<td>10.</td>
<td>Flow perturbation and sediment suspension over sandy bedforms: Theoretical and experimental studies</td>
<td>DST</td>
<td>Rs. 1.26 Lakhs</td>
</tr>
<tr>
<td>11.</td>
<td>Inversion of Prospect + SAIL model for estimation of Biophysical parameters Using Hyperspectral Reflectance</td>
<td>SAC, ISRO,</td>
<td>Rs. 2.80 Lakhs</td>
</tr>
<tr>
<td>12.</td>
<td>Nonlinear Singular Boundary Value Problems Arising in Physiology</td>
<td>CSIR, New Delhi</td>
<td>Rs. 5.66 Lakhs</td>
</tr>
<tr>
<td>13.</td>
<td>Numerical Investigation of Convective Transport from Wavy Surfaces</td>
<td>DST, New Delhi</td>
<td>Rs. 2.14 Lakhs</td>
</tr>
<tr>
<td>14.</td>
<td>Numerical Investigation of Convective Transport in a non-Darcy Porous Meida with focus on Second Order Effects</td>
<td>CSIR, New Delhi</td>
<td>Rs. 7.50 Lakhs</td>
</tr>
<tr>
<td>15.</td>
<td>On Stochastic Order Relations with Applications in Reliability</td>
<td>DST, New Delhi</td>
<td>Rs. 7.45 Lakhs</td>
</tr>
<tr>
<td>16.</td>
<td>Singularity Methods for Stokes Flows in Presence of Rigid / Porous Planar Interface</td>
<td>CSIR, Govt. of India</td>
<td>Rs. 7.00 Lakhs</td>
</tr>
<tr>
<td>17.</td>
<td>Studies on the Analysis of Global Approximate Newton Method</td>
<td>ISIRD, SRIC, IIT Kharagpur</td>
<td>Rs. 1.25 Lakhs</td>
</tr>
<tr>
<td>18.</td>
<td>Studies on the equilibrium problems under generalized convexity and generalized monotonicity in Banach space</td>
<td>CSIR</td>
<td>Rs. 7.00 Lakhs</td>
</tr>
<tr>
<td>19.</td>
<td>Unsteady flow separation using particle simulation approach</td>
<td>DST</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>20.</td>
<td>Wall proximity on bluff body wake:3-D aspects</td>
<td>C.S.I.R.,</td>
<td>Rs. 8.00 Lakhs</td>
</tr>
</tbody>
</table>

### Consultancy Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Project Description</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Computerization of pension scheme</td>
<td>Coal Mines Pension Fund Organisation,</td>
<td>Rs. 40.00 Lakhs</td>
</tr>
<tr>
<td>2.</td>
<td>Data integration for Developing Management Information Systems</td>
<td>Bayer (India) Limited, Mumbai,</td>
<td>Rs. 2.00 Lakhs</td>
</tr>
<tr>
<td>3.</td>
<td>Development of software for Demand Forecasting</td>
<td>Bayer (India) Ltd., Mumbai,</td>
<td>Rs. 0.75 Lakhs</td>
</tr>
</tbody>
</table>
Visits Abroad by Faculty Members
1. Raja Sekhar, G P Alexander von Humboldt Fellowship for Experienced Researchers (Institute for Applied Analysis and NUMerical Simulation, University of Stuttgart, Germany) One year
2. Bhattacharyya, Somnath invited talk and attending conference (TU- Darmstadt) July

Invited Lectures by Faculty Members
1. A survey on radio k-coloring of graphs by Panigrahi, Pratima (Kalasalingam University, Krisnankoil, Madurai, Tamilnadu)
2. Some variations of coloring of graphs by Panigrahi, Pratima (University of Calcutta)
3. On some combinatorial problems by Panigrahi, Pratima (Institute of Mathematics and Applications, Bhubaneswar)
4. Optimization in Constraint Networks by Gupta, Dharmendra Kumar (Manipur University)
5. Hydrodynamics and Solute Transfer due to a Sinking Marine Aggregates by Bhattacharyya, Somnath (National Institute of Oceanography, Goa)
6. Statistical Inference and Decision Theory by Kumar, Somesh (NIT, Jamshedpur)
7. Unconstrained Reformulation of Constrained Optimization Problems by Nahak, Chandal (BHU, Varanasi)
8. Fractional Calculus and Address as Chief Guest by Nanda, Sudarsan (Gauhati University, Guwahati)

Books Published

Seminars, Conferences and Workshops Organised
1. National Workshop on Some Recent Research Directions in Graph Theory.
2. Ramunajan Birth Day Celebration
3. The Indian Society of Theoretical and Applied Mechanics (ISTAM) An International Meet
DEPARTMENT OF MECHANICAL ENGINEERING

HEAD : Professor Ajay Kumar Chattopadhyay

FACULTY

Professors

Bhattacharyya, Ranjan Ph.D. (Kentucky), Vibration, Dynamics of Rotors, Nonlinear Elasticity
Bhattacharyya, Sati Nath Ph.D. (IIT Kharagpur), Fluid Mechanics
Bhattacharyya, Souvik Ph.D. (Texas A&M), Thermal Sciences, Energy, Refrigeration, Heat Transfer
Brahma, Ranajit Kumar Ph.D. (IIT Kharagpur), Gas Turbine and Heat Transfer
Chakraborty, Suman Ph.D., Microfluidics, Micro-scale and Nano-scale Transport Processes including Biological Application, CFD
Chattopadhyay, Ajay Kumar Ph.D. (Jadavpur University), Machining, Grinding, Surface Coating, Metal-Ceramic Joining
Das Gupta, Anirvan Ph.D. (Kanpur), Dynamics, Vibration and Wave Propagation in Continuous Media, Fluid-structure Interaction
Dash, Sukanta Kumar Ph.D. (IIT Kharagpur), Computational Methods CFD and Heat Transfer
Datta, Gouranga Lal Ph.D. (IIT Kharagpur)
Karmakar, Ranjit Ph.D. (IIT Kharagpur), Vehicle Dynamics, Physical System Modelling
Maiti, Biswajit Ph.D. (IIT Delhi), Two-phase Flow, Finite Element Analysis of Fluid Flow
Maiti, Rathindranath Ph.D. (IIT Kharagpur), Fluid Drive and Mechanical Power Trans / Gearing
Mishra, Prasanta Kumar Ph.D. (Jadavpur University), Manufacturing Science and Engineering (Nonconventional Manufacturing), Innovative Machine Design
Mukherjee, Amalendu Ph.D. (IIT Kharagpur), System Dynamics and Controls
Nath, Ashish Kumar Ph.D. (Bombay University), High Power Lasers, Laser Material Interaction and Processing
Paul, Soumitra Ph.D. (IIT Kharagpur), Machining and Grinding, Cutting Tool Coating, Non-traditional Manufacturing
Pradhan, Brajabandhu Ph.D. (IIT Kharagpur), Design Engineering, Fracture Mechanics, Mechanics of Composite Materials, Smart Structures, Functionally Graded Materials, Theoretical and Experimental Stress Analysis
Pratihar, Dilip Kumar Ph.D. (IIT Kanpur), Robotics, Soft Computing, Manufacturing Science
Ray, Manas Chandra Ph.D. (IIT Kharagpur), Smart Structures, Carbon Nanotube Reinforced Composites, Smart Functionally Graded Structures, Piezoelectric Composites, Vibrations and Control
Roy Chowdhury, Samar Kumar Ph.D. (Birmingham), Tribology
Som, Sankar Kumar  Ph.D. (IIT Kharagpur), Thermal Science and Engineering, Thermal Science and Engineering

Associate Professors
Bhattacharyya, Kingshook  Ph.D. (IIT Kharagpur), Multibody Dynamics
Biswa, Kajal  Ph.D. (IIT Kharagpur), Manufacturing Science and Engineering
Chakraborty, Goutam  Ph.D. (IIT Kanpur), Nonlinear Dynamics, Mechanics of Advanced Materials, Vibration
Das, Manab Kumar  Ph.D. (IIT Kanpur), Fluid Mechanics and Heat Transfer
Kumar, Cheruvu Siva  Ph.D. (IIT Kharagpur), Robotics, Control Systems, Computer Networks
Pal, Surjya Kanta  Ph.D. (IIT Kharagpur), Manufacturing Process Modelling, Tool Condition Monitoring
Ramgopal, Maddali  Ph.D. (IIT Madras), Refrigeration and Airconditioning
Ray, Kumar  Ph.D. (IIT Kharagpur)
Roy Chowdhury, Asimava  Ph.D. (IIT Kharagpur), Laser Sintering, Computer Numerical Control (CNC), Fused Deposition Modeling (FDM), Direct Slicing and Curved Slicing for Rapid Prototyping, Rapid Prototyping (RP), Free Form Surface Machining by CNC, Non-conventional Manufacturing, Laser Coating, Laser Assisted Manufacturing
Samantaray, Arun Kumar  Ph.D. (IIT Kharagpur), Fuel-Cell Control, Non-linear Mechanics, Systems and Control

Assistant Professors
Bandyopadhyay, Partha Pratim  Ph.D. (IIT Kharagpur), Surface Technology
Gupta, Sanjay  Ph.D. (Delft), Biomechanics
Racherla, Vikranth  Ph.D. (University of Pennsylvania), Behavior of Non-Linear Composites, Design and Synthesis of Smart Polymers, Design and Analysis of Biomedical Implants
Ramanujam, S  Ph.D. (IIT Kharagpur)
Sarangi, Mihir  Ph.D. (IIT Kharagpur), Machine Design, Tribology, Rotor Dynamics

Faculty Appointments
Dr. Ashish Kumar Nath  Professor
Dr. Vikranth Racherla  Assistant Professor
Dr. Sankha Deb  Assistant Professor
Faculty Promotions
Dr. Manas Chandra Ray  Professor
Dr. Subhransu Roy  Professor
Dr. Suman Chakraborty  Professor
Dr. Anirvan Das Gupta  Professor
Dr. Dilip Kumar Pratihar  Professor
Dr. Surjya Kanta Pal  Associate Professor
Dr. Partha Saha  Associate Professor
Dr. Arun Kumar Samantaray  Associate Professor
Dr. Kingshook Bhattacharyya  Associate Professor
Dr. Goutam Chakraborty  Associate Professor

Faculty Retirement
Dr. Gouranga Lal Dutta  Professor

Brief Description of on-going activities
1. Design and development of expert systems in robotics, manufacturing science, medical diagnosis and others using soft computing
3. Laser materials Processing
4. CFD/Lattice Bolzmann Method in Complex Flows
5. Study of the Mulling Effect in rubber-like, hyper-elastic materials
6. Lateral dynamics of a rail-vehicle system
7. Dynamics of lubricated ball bearings
8. Numerical simulation on two phase flow pertaining to bottom injected gas stirred ladles
9. High Efficiency Deep Grinding: Modelling & Experimentation
10. High Pressure Cooling in Machining of Super Alloys
11. TiN hard coating by unbalanced magnetron using Physical Vapour Deposition Technique
12. Multi Layer TiN-MoS2 coating on cutting tools by unbalanced magnetron technique
13. Machinability study of Inconel 718
14. Development of control strategies for autonomous underwater vehicles
15. Modelling and simulation of through-process hot steel rolling using bond graph
16. Model based fault detection and isolation
17. Development of liquid spring technology
18. Softcomputing techniques used in conventional and nonconventional machining
19. Simulation of liquid sloshing in a tank using numerical grid generation techniques
20. Prediction of fluid flow and heat transfer from wavy surfaces
21. Design and development of carbon di-oxide based heat pump systems

Thrust Areas
1. High Speed Machining, Grinding and Development of Cutting Tools / Grinding Wheel
2. Micro Manufacturing and Microscale Transport Processes
3. Bio-micro-fluidics and microscale transport processes

New Acquisitions
1. Three Universal Milling Machines
2. Electromechanical Testing Actuator (ZWICK UTM)
3. Mettler Electronic Analytical Balance
4. Gas Turbine
5. Steam Turbine
6. B&K Measuring Amplifier Vibration Meter
7. 4-Component Dynamometer for Cutting Force Measurement
8. Machine Fault Simulator Kit
9. Pinnacle Plus 5kW DC Pulsing Power Supply
10. High Precession Hydraulic Surface Grinding Machine

International Collaborations
1. Student exchange program with University of South California (USA)
2. Student exchange program with University of Erlangen (Germany)
4. Research collaboration with Univ. Lille for development of process supervision software
5. UK-India Education and Research Initiative (UKIERI) Project in collaboration with Univ. Southampton
6. Research collaboration with Växjö University, Sweden
7. Indo-US Project/ DST-NSF Project with UIUC and UCI
8. DST-JSPS Project with University of Tokyo and Tokai University

Lectures by Visiting Experts
1. New Least square technique for Finite element modeling by Prof. J. N. Reddy (Professor of Texas A&M University, USA)
2. Drill Wear Monitoring based on Measured Instantaneous Angular Speed by P.S. Heyns (Professor, Dept. Mechanical Engineering, Univ. Pretoria, SA)
3. Fault Diagnosis of Feed Pumps in Urea Production Plants by Om Prakash Srivastava (Professor, Växjö University, Sweden)
4. Manufacturing research activities at GeorgiaTech by Prof Shreyes Melkote (Georgia Tech.)
5. Real-Time Path Planning for Automating Optical Tweezers based Particle Transport Operations by Prof. Ashis Gopal Banerjee (University of Maryland, College Park)
6. Transport Phenomena in Polymer Electrolyte Fuel Cells by Dr. Partha P. Mukherjee (Los Alamos National Laboratory)
7. Effect of the ambient acoustic fluid on the structural dynamics by Abhijit Sarkar (IndianInstitute of Science, Bangalore)
8. Thermophysical exploration of the role of disaccharides in anhydrobiotic engineering of mammalian cells for long-term storage of tissue engineered consts. by Dr. Sankha Bhowmick (University of Massachusetts, Dartmouth)
9. Current Trends in Bioengineering Research by Dr. Andrew M.R. New (University of Southampton, UK)
10. Discussions on robotics and control by Prof. Mo Jamshidi (University of Texas)

Doctoral and MS Degrees Awarded
1. Santosh Kr. Sahu Rewetting of hot surfaces by top flooding (Ph.D.)
2. J. Shivakumar Geometrically Nonlinear Analysis of Smart Laminated Composite StructuresIntegrated with Distributed PiezoelectricFiber Reinforced Composite Actuators (Ph.D.)
4. Manas Mohan Mahapatra Thermomechanical Finite Element Analyses and Experimental Investigations on Angular Distortions and Weldment Characteristics of Arc Welded Joints (Ph.D.)
5. Ramjee Repaka  
   Laminar Forced Convection with Viscous Dissipation in Hydrodynamically & Thermally Developing Flow between Parallel Plates at Unequal Temperatures (Ph.D.)

6. Pradip Kr. Talapatra  
   Studies on Total Quality Management In Indian Manufacturing Firms (Ph.D.)

7. Kona Mrunalini  
   Some Studies on parametric Instability and Control of Composite Structures Using Smart Layers (Ph.D.)

8. Gajendra Kr. Agarwal  
   Heat Transfer, Emission Characteristics, and Thermodynamic Exergy Balance of Impinging Flames on Plane and Curved Surfaces (Ph.D.)

9. Sargade Vikas Gulabrao  
   Development of High Performance Titanium Nitride Coated Carbid Insert using Closed-Field Unbalanced Magnetron Sputtering (Ph.D.)

10. Sharifuddin Mondal  
    Unknown Input State Estimators for Component Fault Detection & Isolationof Lumped Parameter Systems (Ph.D.)

11. Alok Kumar Nandy  
    Improvement in the Machinability of Ti-6Al-4V-Titanium Alloy by High Pressure Cooling (Ph.D.)

12. Karali Patra  
    Study on Different Strategies for Soft Computing based Drill Wear Monitoring using Multiple Sensors (Ph.D.)

13. P. Ramesh Babu  
    Thermoelastic Analyses of Interlaminar Delamination Growth Behaviour Emanating from Free and Pin-Loaded Holes In Laminated FRP Composites (Ph.D.)

14. D. S. Nagesh  
    Studies on Modeling of Bead Geometric Parameters in Welding Processes Using Design of Experiments, Artificial Neural Network and Genetic Algorithm (Ph.D.)

15. Neeraj Agrawal  
    Transcritical Carbon Dioxide Heat Pumps : Studies on Multistaging and Capillary Tube System (Ph.D.)

16. Kate Ramesh Prabhakar  
    Investigations on External and Internal Hydraulic Jumps (Ph.D.)

17. Amitava Ghosh  
    On Development and Performance Evaluation of Advanced Single Layer Brazed cBN Wheel (Ph.D.)

18. Arun Kumar Pradhan  
    Performance of Vertically / Obliquely Reinforced 1-3 Piezoelectric Composites for Active Control of Smart Laminated Composite Structures (Ph.D.)

19. Somnath Sarangi  
    Effect of Stress-softening of Rubber Strings (Ph.D.)

20. Sukhomay Pal  
    Development & Validation of Various Soft Computing based Models for Pulsed Gas Metal Arc Welding Process (Ph.D.)

21. Brajesh Tripathi  
    On Some Aspects of Room Airflow Simulations (Ph.D.)

**Fellow - Professional Bodies**

1. Pratihar, Dilip Kumar (2008)  
   Awarded - Institution of Engineers (I)

   Awarded - INAE Fellow

3. Pradhan, Brajabandhu (1990)  
   Awarded - Institution of Engineers

   Fellow - Indian National Academy of Engineering (INAE)

**Member - Editorial Board**

   Member, Editorial Board - Energy Conversion & Management

   Member, Editorial Board - International Journal of Power & Energy Systems

   Member - International Journal of Engineering Research and Technology

   Member, Editorial Advisory Committee - Open Thermodynamics Journal

[143] ANNUAL REPORT 2008-2009
   - International Journal of Micro-Nano Scale Transport
   - International Journal of Micro and Nano Systems
7. Chattopadhyay, Ajay Kumar (2008) Member International Advisory Board
   - International Journal of Manufacturing Technology and Research
   - Journal of Modern Manufacturing Technology
   - Indian Journal of Biomechanics
     - Proceedings of SIAT 2009
    - Journal of the Acoustical Society of India
    - International Journal of Abrasive Technology (http://www.inderscience.com/ijat)
13. Pratihar, Dilip Kumar (2008) Member of Editorial Board
    - International Journal of Data Mining, Modelling and Management
14. Pratihar, Dilip Kumar (2008) Member of Editorial Board
    - International Journal of Advanced Intelligence Paradigms
15. Ramgopal, Maddali (2009) Member, Editorial Advisory Board
    - Buildings & Environment

Awards & Honours
2. Chakraborty, Suman (2008) Scopus Young Scientist Award in Engineering

Fellowships
1. Das, Prasanta Kumar (2009) FELLOW OF INAE

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2D Laser Doppler Velocimetry and Phase Doppler Particle Analyser</td>
<td>MHRD - FIST Project</td>
<td>Rs. 120.00 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>A Study Of Microscale Transport Processes Leading To The Development Of A Cooling Strategy For Electronic Components</td>
<td>DIT,</td>
<td>Rs. 89.75 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>Active structural acoustic control of smart structure using 1-3 piezoelectric composite materials.</td>
<td>Department of Science and Technology,</td>
<td>Rs. 16.33 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Advanced research in mechanical engineering system</td>
<td>DST FIST programme</td>
<td>Rs. 700.00 Lakhs</td>
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<tr>
<td>5</td>
<td>An investigation of thermally sprayed cermet coatings for hard chrome replacement (HCR)</td>
<td>IIT Kharagpur</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
<tr>
<td>6</td>
<td>Application of genetic algorithm for minimization of machining time and CL-data file size in CNC machining of free form surface</td>
<td>MHRD, NEW Delhi</td>
<td>Rs. 7.00 Lakhs</td>
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<tr>
<td>7</td>
<td>Biomechanical Analysis and Design of Orthopaedic Implant</td>
<td>Department of Biotechnology, Govt. of India, New Delhi,</td>
<td>Rs. 51.12 Lakhs</td>
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<tr>
<td>8</td>
<td>Carbon dioxide based heat pump systems for simultaneous cooling and heating applications</td>
<td>MHRD, Government of India,</td>
<td>Rs. 7.00 Lakhs</td>
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<tr>
<td>No.</td>
<td>Project Title</td>
<td>Funding Agency</td>
<td>Amount (Lakhs)</td>
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<tr>
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<tr>
<td>9.</td>
<td>Cell Culture inside Microfluidic Channels with Extended Air-water Interface</td>
<td>DBT</td>
<td>17.40</td>
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<tr>
<td>10.</td>
<td>Composite Applications Laboratory</td>
<td>TIFAC, DST</td>
<td>346.20</td>
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<tr>
<td>11.</td>
<td>Compression-Absorption systems for cooling and heating applications</td>
<td>ERD, CSIR</td>
<td>7.35</td>
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<tr>
<td>12.</td>
<td>Compressor driven metal hydride cooling and heating systems</td>
<td>Ministry of Non-Conventional Energy Sources, Govt. of India,</td>
<td>19.50</td>
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<tr>
<td>13.</td>
<td>Design and development of adaptive robot controller using soft computing</td>
<td>DST, New Delhi</td>
<td>8.35</td>
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<tr>
<td>14.</td>
<td>Design and development of automobile for SAE Formula 1 international competition for students</td>
<td>SRIC</td>
<td>10.00</td>
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<tr>
<td>15.</td>
<td>Development and Characterization of nanofluid for micro thermal heat transfer application in Advance satellites</td>
<td>ISRO</td>
<td>4.33</td>
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<tr>
<td>16.</td>
<td>Development of an R&amp;D centre at Kolkata</td>
<td>Damodar Valley Corporation</td>
<td>1.00</td>
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<tr>
<td>17.</td>
<td>Development of Autonomous Underwater Vehicle</td>
<td>Department of Ocean Development</td>
<td>697.00</td>
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<tr>
<td>18.</td>
<td>Development of Instrumentation for Liquid liquid and gas Liquid systems</td>
<td>MHRD</td>
<td>14.00</td>
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<td>19.</td>
<td>Development of sound proofing composite materials using jute products</td>
<td>JMDC</td>
<td>32.26</td>
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<tr>
<td>20.</td>
<td>E-learning application on Grid Network</td>
<td>CDAC</td>
<td>10.00</td>
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<td>21.</td>
<td>EHD enhancement of natural convection heat transfer</td>
<td>CSIR</td>
<td>10.00</td>
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<tr>
<td>22.</td>
<td>Establishment for an advanced research facility for EB welding and process development related to programs of interest to DAE</td>
<td>BRNS, DAE</td>
<td>42.53</td>
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<tr>
<td>23.</td>
<td>Establishment of Nationwide QoS Testbed network</td>
<td>Ministry of Information Technology</td>
<td>126.00</td>
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<td>24.</td>
<td>Estimation of damping and analysis of damage effects in composite rotors</td>
<td>ARDB, New Delhi</td>
<td>11.34</td>
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<td>25.</td>
<td>Experimental and Theoretical Studies on DNA Hybridization in Microchannels with Electrokinetically Driven flow</td>
<td>DST</td>
<td>4.38</td>
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<tr>
<td>27.</td>
<td>Flow and Heat Transfer Modelling in a Thrust Chamber of a Rocket Engine</td>
<td>ISRO, Bangalore</td>
<td>8.00</td>
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<tr>
<td>28.</td>
<td>High Power Laser Workstation With Fibre Laser (2kw) and CNC Work Station</td>
<td>MHRD - FIST Project</td>
<td>201.00</td>
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<tr>
<td>29.</td>
<td>Indo-South African Project on &quot;Machine Tool Vibration Monitoring&quot;</td>
<td>DST (India) &amp; NRF (South Africa), Indo-US Science and Technology Forum,</td>
<td>3.50</td>
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<td>30.</td>
<td>Indo-US Center on Fabrionics</td>
<td>Indo-US Science and Technology Forum,</td>
<td>0.00</td>
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<td>31.</td>
<td>Intelligent Data Mining for Forward and Reverse Modeling of Manufacturing Processes</td>
<td>SERC</td>
<td>15.00</td>
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<td>32.</td>
<td>Kinematics of flows in diverse context</td>
<td>DST</td>
<td>8.50</td>
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<tr>
<td>33.</td>
<td>Microfluidics and Microscale Transport Processes</td>
<td>SRIC</td>
<td>6.00</td>
</tr>
<tr>
<td>34.</td>
<td>Multi-sensor Based Tool Condition Monitoring in Drilling</td>
<td>CSIR</td>
<td>7.00</td>
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<tr>
<td>35.</td>
<td>National Grid Computing Project - GARUDA</td>
<td>IIT Kharagpur, CDAC and ERNET India,</td>
<td>0.00</td>
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<tr>
<td>No.</td>
<td>Title</td>
<td>Department/Institute</td>
<td>Amount (Lakhs)</td>
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<tr>
<td>36.</td>
<td>Numerical Simulation of Turbulent Plane Offset Jet Flow and Conjugate Heat Transfer</td>
<td>Department of Science and Technology</td>
<td>9.60</td>
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<tr>
<td>37.</td>
<td>On the Dynamics of Artificial Joints</td>
<td>IIT Kharagpur</td>
<td>4.90</td>
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<td>38.</td>
<td>Online component fault detection and isolation using diagnostic bond graphs</td>
<td>(Institute Scheme for Innovative Research and Development, IIT-Kharagpur,)</td>
<td>3.00</td>
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<tr>
<td>39.</td>
<td>Optofluidics on a CD</td>
<td>DST</td>
<td>0.00</td>
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<tr>
<td>40.</td>
<td>Preclinical analysis and development of improved acetabular prostheses</td>
<td>British Council</td>
<td>57.18</td>
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<td>41.</td>
<td>Removal of Obsolescence and Modernization of Refrigeration and Air Conditioning Laboratory</td>
<td>MHRD, Government of India,</td>
<td>20.00</td>
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<tr>
<td>42.</td>
<td>Rural industrialization in West Bengal</td>
<td>KVIC</td>
<td>60.00</td>
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<tr>
<td>43.</td>
<td>Soccer Robots: Small Sized League (SSR)</td>
<td>SRIC, IIT Kharagpur</td>
<td>4.80</td>
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<tr>
<td>44.</td>
<td>Standardization of process parameters in withering, maceration, rolling, fermentation and drying of tea</td>
<td>Tea board, GOI</td>
<td>366.96</td>
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<tr>
<td>45.</td>
<td>Steel Technology Centre</td>
<td>DST &amp; Ministry of Steel</td>
<td>200.00</td>
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<td>46.</td>
<td>Studies on Application of Phase Change Materials in Domestic Frost-free refrigerators</td>
<td>ISIRD, IIT, Kharagpur</td>
<td>0.50</td>
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<td>47.</td>
<td>Study of tea rolling process with the aim of quantification and optimization of the process and subsequent development of new machinery</td>
<td>Tea Board</td>
<td>40.00</td>
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<td>48.</td>
<td>Surface Integrity in High Efficiency Grinding by Super-abrasive Wheels</td>
<td>MHRD</td>
<td>25.00</td>
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<td>49.</td>
<td>Transient Boiling and Counter Current Flow Phenomena during Direct in Bundle Emergency Coolant Injection</td>
<td>BARC</td>
<td>42.00</td>
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<td>50.</td>
<td>Turbulent Flow Computation of Two-Dimensional Incompressible Viscous Flow through a Cascade</td>
<td>Aeronautical Research Development Board</td>
<td>12.61</td>
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<tr>
<td>51.</td>
<td>Visualization and optical diagnosis of two phase flow: bubbles and droplet distribution and dynamics pertaining to carry-over and carry-under phenomena</td>
<td>BARC</td>
<td>35.76</td>
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<tr>
<td>52.</td>
<td>Water lubricated transport of heavy oils - experimentation and theory</td>
<td>DST</td>
<td>19.00</td>
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</tbody>
</table>

**Consultancy Projects**

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Department/Institute</th>
<th>Amount (Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Design parameters for beam blank SEN of JSPL caster</td>
<td>IFGL Refractories</td>
<td>1.00</td>
</tr>
<tr>
<td>2.</td>
<td>Design parameters for the SEN of Hissar Steel</td>
<td>IFGL Refractoris</td>
<td>1.25</td>
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<tr>
<td>3.</td>
<td>Determination of vortex height in a tundish for a grade change operation</td>
<td>IFGL Refractoris</td>
<td>0.60</td>
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<tr>
<td>4.</td>
<td>Air conditioning system of Netaji Indoor Stadium, Kolkata</td>
<td>PWD, Government of West Bengal</td>
<td>0.80</td>
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<tr>
<td>5.</td>
<td>An Integrated Micro-Macro Solidification Algorithm for Direct Numerical Simulation of Large Scale Solidification Structures</td>
<td>General Motors (USA)</td>
<td>23.58</td>
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<tr>
<td>6.</td>
<td>Characterization of surface roughness for pressure driven and/or electro-osmotic liquid flow in a micro-channel</td>
<td>DELPHI</td>
<td>7.63</td>
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<tr>
<td>7.</td>
<td>Design of a tundish for lower wall stress of Bhilai Plant</td>
<td>IFGL Refractoris</td>
<td>0.60</td>
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<tr>
<td>8.</td>
<td>Development of a fundamental model for characterizing solidification transport in the mushy region</td>
<td>General Motors, USA</td>
<td>38.78</td>
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<tr>
<td>9.</td>
<td>Development of system for monitoring of slow speed running equipment.</td>
<td>RDCIS, SAIL RANCHI</td>
<td>8.50</td>
</tr>
<tr>
<td>10.</td>
<td>Development of web and video courses on Refrigeration &amp; Air Conditioning under NPTEL</td>
<td>MHRD, NPTEL</td>
<td>0.00</td>
</tr>
</tbody>
</table>
11. Experimental sample preparations by wire cut EDM (CEDM) 
   - Various clients, Rs. 0.87 Lakhs

12. Feasibility Studies on the existing central air conditioning system at IIT Guwahati 
   - IIT Guwahati, Rs. 2.50 Lakhs

   - Emami Paper Mills Limited, Rs. 13.00 Lakhs

14. Genetic Algorithms in hydrocyclones 
   - TATA Steel, Jamshedpur, Rs. 0.00 Lakhs

15. Manual For Cooling Tower water treatment 
   - M.M. Aqua technologies, Rs. 1.25 Lakhs

16. Material Processing by Nd-YAG laser (MPNL) 
   - Various clients, Rs. 0.86 Lakhs

17. Noise Reduction in Amorphous Metal Transformers 
   - Vijai Electricals, Hyderabad, Rs. 9.50 Lakhs

18. Operational Speed Enhancement of Paper Mills by FEM 
   - Emami Paper Mills Ltd., Rs. 15.00 Lakhs

19. Pressure drop characteristics of Y-type and Basket-type strainers 
   - Sarojini Enterprises, 11 Subol Chandra Lane, Kolkata 700 009, Rs. 0.51 Lakhs

20. RTD study for Tisco-LD2 tundish, Sponsor 
   - IFGL Refractories, Rs. 0.60 Lakhs

21. Setting up a research and development centre for Damodar Valley Corporation at Kolkata (Phase-1) 
   - Damodar Valley Corporation, Kolkata, Rs. 11000.00 Lakhs

22. Stress analysis of steel cord reinforced pipe conveyor belt(SCPC) 
   - Phoenix Yule limited, Kolkata, Rs. 2.24 Lakhs

23. Technical Evaluation of Screw Chilling Unit 
   - Blue Star, Kolkata, Rs. 1.20 Lakhs

24. Technology Development of Liquid-Spring based Shock-Isolation System 
   - Research and Development Establishment (Engineers), DRDO, Pune, Rs. 9.70 Lakhs

**Patents (filed / granted)**

1. A controlled Hip-Joint Simulator
2. A device for measuring the thermal conductivity of a fluid with dispersion of ultra-fine solid particles
3. A method for Curved-Layer fused deposition modeling and system to carry out such method
4. A method for measurement of velocity of two phase flow by capacitance sensors
5. A non-invasive instrumentation system for measurement of mass flow rate of bulk solid in a pneumatic conveying system
6. An improved conductivity probe system for measuring of a multi phase fluid flow particularly a two phase fluid flow
7. An improved probe design and circuitry for the measurement of bulk solid velocity by electrodynamic probe
8. Design and development of structured surface for the enhancement of boiling heat transfer
9. Optical probe for multiphase flow
10. Split Cam for an improved drive system such as two gear epicyclic drive similar to Harmonic Drive system.

**Visits Abroad by Faculty Members**

1. Samantaray, Arun Kumar 
   - Collaborative research (University of Lille, France) 2 months
2. Maiti, Rathindranath 
   - Invited Lecture and Technical Discussion (Institute for Fluid Power Drives and Controls (IFAS), RWTH Aachen University, Germany) September 28-29, 2008
3. Pal, Surjya Kanta 
   - Collaborative research (The University of Sheffield) 2 months (May-July)
4. Chakraborty, Suman 
   - Visiting Professor (Stanford University) May-July, 2008
5. Deb, Sankha
   Invited as Visiting Professor (Department of Maths. and Industrial Engineering, Ecole Polytechnique de Montreal, Canada) June 2008
6. Ray, Manas Chandra
   To conduct a collaborative research on carbon nanotube reinforced composite (Massachusetts Institute of Technology, Cambridge, Massachusetts, USA) June 15-22
7. Kumar, Cheruvu Siva
   Establishing relationships under the VEICET project and also with IIT for further work in manufacturi (Univ, Surrey, TU Dresden, TU Eindhoven and Warwick Manufacturing Group) 8 days
8. Gupta, Sanjay
   UKIERI research project (University of Southampton, UK) Six weeks
9. Gupta, Sanjay
   UKIERI research project (University of Southampton, UK) One week
10. Bandyopadhyay, Partha Pratim
    Research on Ti-Cr-Si-O coating (Swiss Federal Lab of Material Testing and Research) Mid May - Mid July, 2009
11. Maiti, Rathindranath

Invited Lectures by Faculty Members
1. Digital Signal Processing in NVH by Mohanty, Amiya Ranjan (NSTL Vishkapatnam)
3. Introduction to vibration analysis by Bhattacharyya, Ranjan (DVC-IIT R&D Centre, Kolkata.)
4. Ballooning Motion of a Rubber String by Bhattacharyya, Ranjan (NIT Durgapur)
5. Intelligent and Integrated Computer-Aided Process Planning by Deb, Sankha (Department of Maths. and Industrial Engineering, Ecole Polytechnique de Montreal, Canada)
6. Bond graph modelling of thermomeallurgical process on a runout table. by Karmakar, Ranjit (N.I.T Durgapur)
7. Green Refrigeration Technologies Challenges & Opportunities, by Ramgopal, Maddali (Institute of Engineers (KGP Chapter), IIT Kharagpur)
8. Natural refrigeration by Bhattacharyya, Souvik (Jadavpur University)
11. Microfluidics: Present Trends and Future Challenges by Chakraborty, Suman (IIT Madras)
12. Multiscale analysis of Smart Fuzzy Fiber Reinforced Composites by Ray, Manas Chandra (ISTAM -2008, Osmania University, Hyderabad)
13. Analysis of failure mechanisms and design considerations of resurfaced femur by Gupta, Sanjay (Indian Arthroplasty Association Annual Conference (IAACON 2008), New Delhi)
14. Advancement in Superabrasive Grinding Wheel through Surface Coating by Chattopadhyay, Ajay Kumar (Jadavpur University)
15. Micro Machining by Chattopadhyay, Ajay Kumar (NITTTR Kolkata)
16. Motor Current Signature Analysis by Mohanty, Amiya Ranjan (INS Shivaji, Lonavla)
17. Analysis of the active contacts of ORBIT motor to examine its tribological & starting torque aspects by Maiti, Rathindranath (Institute for Fluid Power Drives and Controls (IFAS), RWTH Aachen University, Germany)
18. Understanding Design and Performance of Epitrochoid Generated 'GEROTOR' Class of Hydrostatic Units by Maiti, Rathindranath (Wroclaw University of Technology (Fluid Power Research Group), Poland)
19. Fluid Power Research and Education in India. by Maiti, Rathindranath (ICTET-08 Conference, G.H.Raisoni College of Engg., Nagpur University, Nagpur, India.)
20. Use of functionally graded materials in structural elements for improved crack growth resistance by Pradhan, Brajrabandhu (National conference on CAMSCM, NERIST, Nirjuli, Arunachal pradesh)
21. Composites, smart materials and concepts of light weight smart structures design by Pradhan, Brajabandhu (Department of Applied Mathematics, Univ. of Calcutta)

22. Impact-induced stress and deformation fields in laminated FRP hybrid composites by Pradhan, Brajabandhu (B. N. M. Institute of Technology, Bangalore)

23. Concepts of light weight structures design by Pradhan, Brajabandhu (National Institute of Technology, Rourkela)

24. Use of FRP composites and Smart materials in design of Aircraft structures by Pradhan, Brajabandhu (Osmania University, Hyderabad)

Books Published

Seminars, Conferences and Workshops Organised
1. Indo-US Workshop on Microfluidics and Fabrionics
2. International Conference on Vibration Problems

Short-Term Courses, Training Programmes and Workshops organized
1. Course on PLM and PDM for DRDO (August 18-29, 2008)
2. Programme for HAL Engineer Trainee (Autumn Semester 2008-2009)
DEPARTMENT OF METALLURGICAL & MATERIALS ENGINEERING

HEAD : Professor Nirupam Chakrabarti

FACULTY

Professors
Chakraborti, Nirupam Ph.D. (University of Washington), Computational Materials Science, Genetic Algorithms, Process Metallurgy
Chakraborty, Madhusudan Ph.D. (IIT Kharagpur), Solidification Processing, Scanning Electron Microscopy, Metal Matrix Composites, T1 - based alloys
Chatterjee, Uday Kumar Ph.D. (IIT Kharagpur), Corrosion
Das, Karabi Ph.D. (Wisconsin, USA), Metal Matrix Composites, Nanocomposites, Physical Metallurgy, Powder Metallurgy, Wear of Materials
Dhindaw, Brij Kumar Ph.D. (IIT Kharagpur), Composite Solidification Processing Phase Transformations
Godkhindi, Mahadev Malhar Ph.D. (IIT Bombay), Powder Metallurgy, Ceramics
Panigrahi, Sarat Chandra Dr.Tech.Sc. (Krakow), Metal Casting Solidification Energy

Associate Professors
Acharya, Narendra Nath Ph.D. (IIT Kharagpur), Particulate Tech. (metals, non-metals), Modelling (ANN & GA), Multimedia
Dutta Majumdar, Jyotsna Ph.D. (IIT Kharagpur), Surface Engineering, Laser Materials Processing, Electron Beam Assisted Materials Processing, Biomaterials, Shape Memory Alloy, Environmental Degradation of Materials
Ghosh, Sudipto Ph.D. (IIT Kanpur), Solidification, Deformation, Modeling
Sant, Sudhindra B  Ph.D. (Queen's University, Canada), Semiconductor Thin Films, Spintronics - Thin Films - Interfaces, Photovoltaics Thin Films - Large Scale, Phase-change Chalcogenide Thin Films, Thermoelectric Thin Films, Piezoelectric Thin Films and Creation of MEMS Devices, Metallization of Wide Band-gap Semiconductors, Structure of Interfaces in Bulk, Nanocrystalline Alloys Subjected to High Strain Rate Deformation

Singh, Shiv Brat  Ph.D. (Cambridge University, UK), Physical Metallurgy of Steel

Assistant Professors

Aich, Shampa  Ph.D. (University of VNL, USA), Rapid Solidification, Magnetic Materials, Bio Materials, Surface Modifications, Shape Memory Alloy, Core-Shell Nanostructures

Bhaduri, Amit  M.Tech. (IIT Kharagpur), Structure-Property Relationship

Biswa, Koushik  Ph.D. (University of Germany), Bio-ceramic, Modelling (Ab-initio/MD), Solid Oxide Fuel Cell, Zirconia & Alumina Ceramics, Tribology, MoSi2-SiC-ZrO2-Composites, Lithium Ion Battery, Electro-ceramics

Chakrabarti, D  Ph.D. (University of Birmingham, UK)

Datta, Bidyut Kanti  Ph.D. (IIT Kharagpur)

Kundu, Tarun Kumar  Ph.D (Lulea University of Technology, Sweden), Extarctive Metallurgy, Mineral Processing, Atomistic Simulation, Synthesis of Nanomaterials by Wet Chemical Route

Laha, Tapas  Ph.D. (Florida International University, Miami), Nanocomposites - Processing and C;haracterization, Interfacial Phenomena, Surface Engineering and Coating Technology, Corrosion and Electrochemical Studies

Tata Chair Professor

Basu, Samar  Ph.D. (IIT Kanpur)

Chair Professor

Ghosh, R. N.  Ph.D., Physical Metallurgy

Sen, P. K.  Ph.D., Process Metallurgy

Faculty Appointments

Dr. Sudhindra B. Sant  Associate Professor
Dr. Debalay Chakrabarti  Assistant Professor
Dr. Ranjan Dutta  Assistant Professor
Dr. Tapas Laha  Assistant Professor

Faculty Promotions

Dr. Karabi Das  Professor
Dr. Gour Gopal Roy  Professor
Dr. Rahul Mitra  Professor
Dr. Sudipto Ghosh  Associate Professor

Faculty Retirement

Dr. Uday Kumar Chatterjee  Professor

Faculty Resignation

Dr. Ranjan Dutta  Assistant Professor

ANNUAL REPORT
2008-2009
Brief Description of on-going activities

The Research & Development Programme of the Department encompasses various areas like Corrosion Science and Technology, Extractive Metallurgy, Mechanical Metallurgy, Melting, Casting and Solidification Processing, Modeling, Simulation and Multimedia in Metallurgical Engineering, Physical Metallurgy, Powder Metallurgy and Surface Engineering. The research activities are carried out within the framework of either the institute academic curriculum (B. Tech, M. Tech, and PhD level projects) or as sponsored research, developmental assignments and collaborative studies with outside organizations like educational institutes, R & D laboratories and industries in India and abroad and also as industrial consultancy. The Department has produced 20 B. Techs, 5 Dual Degree M. Techs, 21 M. Techs, 7 PhDs, and initiated/continued 18 consultancy and 42 sponsored/ collaborative projects during the academic year 2008-2009. The group working in the field of Extractive Metallurgy has made significant contribution in the area of metal value extraction from sea nodules. Attempt is being made to develop eco-friendly economically viable process routes to extract the metal values from the sea nodules using cheap sodium chloride as the electrolyte. Besides, fundamental studies on solid-liquid separation are being carried out to examine the dewatering characteristics of different fine mineral particles like kaoline, calcite and quartz suspensions aided by flocculants and surfactants. Injection metallurgy is predominantly used in the Industry to decrease the impurity content of liquid steel/ ferro-alloys in a more economical way. Detailed study of design and operating parameters for such high temperature process is an important issue, which is being studied in the laboratory through physical modeling. Direct reduction of iron ore using mine generated ore and coal fines, is one of the major research areas where the work has been initiated with MHRD project. One of the present research interests also includes the mathematical modeling of fluid flow and heat transfer during welding. Optimization of various design and operating parameters during fusion welding, mathematical modeling of heat transfer during pulsed laser welding that results in low distortion and which has ability to weld heat sensitive components, are also present areas of research in the area of extractive metallurgy. In the domain of Mechanical Metallurgy, a pioneering achievement has been the design and development of fatigue testing using rotating bending machine to study short, long and non-propagating crack behaviour in several steels. Synergetic characterisation of ultrasonic and acoustic signals of in-situ deformation state of metallic materials and investigations related to structure-property relationship of various ceramic and metal-matrix composites, high temperature materials and advanced alloys are some continued thrust areas of activity. Development of metal toughened cutting tool, ceramic and intermetallic matrix composites with ceramic, inter-metallic and metallic reinforcements, newer grades of dual phase and micro alloyed steels through fracture based studies, correlation between fracture and wear characteristics of materials, development of thin sheet steel components are some important fronts in this direction. Several types of failure analysis remain an attendant part of these activities. In addition, research is in progress in the area of mechanical behaviour of small volume materials. The major areas in the field of Melting, Casting and Solidification Processing include i) development of cast microalloyed steels, ii) studies on the hot tearing of long freezing range Al alloys, iii) austempered ductile iron through non-conventional route, iv) grain refinement of Al alloys and v) development of cast metal matrix composites. The group involved in the grain refinement of Al alloys has been successful in improving the mechanical properties of some hypoeutectic and eutectic Al-Si alloys by combined grain refinement and modification treatment using indigenously developed Al-B and B rich Al-Ti-B master alloys and Sr, respectively. The department has transferred a technology of manufacturing Al-B, Al-Ti and Al-Ti-B master alloys to an industry for commercial production of the same. In the area of solidification processing, the main focus is on the understanding of the particle engulfment and pushing during solidification in continuous casting. Basically the issues of inclusions redistribution in the continuous cast ingots have been characterized. Heat transfers in the hot metal ladles have been modeled with a view to examine the feasibility of setting up of satellite foundries. The models have also been experimentally validated. The Modeling, Simulation and Multimedia have eventually emerged as current thrust areas of research activities of the department. In addition to mathematical modeling works in the areas like surface engineering, phase transformation, solidification processing, fracture & fatigue, some more new areas have surfaced and these are i) application of genetic algorithm for the optimization metallurgical systems, ii) mathematical simulation of high temperature metallurgical systems by application of computational fluid dynamics, heat and mass transfer, iii) molecular dynamic simulation of of nanostructured materials. The department has also developed a full-fledged multimedia laboratory, which is presently engaged in developing interactive compact discs (CDs) for teaching and learning in the field of Metallurgy. Investigations on the fundamentals of solid-state and liquid-solid phase transformation continue to receive the most prominent attention from the Physical Metallurgy group of the department. The major thrust in the area of physical metallurgy, and in particular, concerning phase transformation
activities lies in the area of synthesis and structural characterization of nanocrystalline materials prepared by planetary ball milling. Some notable achievements of this group include synthesis of nanocrystalline Ni-Si, Fe-Si, Nb-Al, Cu-Al, Ni-Al and several other ternary systems, identification of the sequence of phase formation during their synthesis by mechanical alloying and development of new kinetic models for mechanical alloying to evolve some relation of the alloying rate with the melting temperature of the corresponding system. Catalytic characteristics of nanostructured nickel aluminides have also been investigated Recently, it has been demonstrated that a number of early transition metals (Nb, Ti, Zr) undergo polymorphic changes following nanocrystallization. Thermodynamic analysis based on equation of state shows that the structural instability due to negative hydrostatic pressure consequent upon nanocrystallization (below a critical grain size) and/or high strain rate deformation is responsible for such change in crystal structure. Role of impurity has been assessed and precluded as a possible cause for this polymorphic change. Besides this fundamental study, development of Al-based nanocrystalline and/or amorphous alloys has been another actively pursued area by the phase transformation group in the recent past. Several Al-Cu-TM and Al-TM-Si (TM = transition metal) Al-Ni-Ti ternary alloys, and rare earth metal containing Al alloys have been synthesized and characterized to explore the possibility of developing bulk amorphous Al-alloy by mechanical alloying and identifying the criteria of selection of the amorphous forming compositions. Currently, the genesis of solid-state amorphization and polymorphic changes is being investigated using positron annihilation and nuclear magnetic resonance studies (in collaboration with SINP, Kolkata). In addition to the above, the mechanism of recrystallization and texture development in aluminium alloys for packaging purpose is being investigated, and considerable progress has been achieved. A low-Mn unalloyed austempered ductile alloy has been developed for structural components in excavator and earth moving equipments by appropriate experiment, characterization and modeling exercise to optimize the austenitization and austempering process window. It was demonstrated that laser surface hardening, unlike alloying/melting, of austempered ductile iron could significantly enhance hardness and wear resistance due to residual compressive stress on the surface developed by martensitic transformation instead of liquid-solid ledeburitie transformation. In addition, the detailed crystallography of Cr-rich M23C6 precipitates in quenched and aged austenitic stainless steels has been determined and the importance of localized residual stress developed due to quenching on the nucleation and growth of these precipitates has also been established. Recently, a plasma immersion ion implantation (PIII) facility has been installed (through a DST sponsored project) in this Department capable of implantation under negatively biased pulses with high frequency from a RF coupled plasma of gaseous species (nitrogen, oxygen, etc.) of metallic and semiconductor materials. This facility allows simultaneous implantation and diffusion at temperature up to 500oC. Currently, this facility is being utilized for enhancing hardness and wear-resistance of steel and selected non-ferrous alloys. The present activities of Powder Metallurgy group include synthesis of particulate reinforced mullites and their property evaluation, production of Al2O3 reinforced Ni3Al thorough sintering route, reaction sintering of silicon carbide, recovery of copper from printed circuit etchant sludge and production of silicon carbide from fly ash silica. Work has also been initiated towards production and sintering behavior of nanocrystalline titanium powder, nanocrystalline ferritic and stainless steel powder. In addition, a method of consolidating elemental tungsten to bulk components for high temperature applications by sintering nanostructured powder at relatively low temperature of 1700 C has been developed. Research on Composite Materials hold a very prominent position in the department, and involves processing by casting, conventional and advanced powder metallurgy routes, such as reactive milling and sintering. Fundamental research is in progress in the direction of understanding the microstructure-property relationships, characteristics of matrix-reinforcement interfaces and mechanical behaviour. Research involves the development of in-situ Al-Al2O3, Al-MgAl2O4, Al-TiC and Al-TiB2 composites by casting route and studies of mechanical properties. In addition, SiCp reinforced Al-Li/ Mg-Li alloy based metal matrix composites have been developed by infiltration technique, where the understanding of the particle engulfment and pushing during solidification processing has been applied. Significant progress has been made in studies on interface reaction kinetics and tailoring of interfaces to control formation of detrimental reaction products. Research on metal matrix composite materials also includes systems having age-hardenable Al-alloys and Zn-Al alloys as matrices, and reinforcements of varying sizes. Research has been initiated in areas of semi-solid processing for casting and forming operations on Al-alloy matrix composites. In addition, significant progress has been achieved in synthesis of Fe-TiC, Fe-ZrC and Fe-TiB2 composites from some cheap raw materials by aluminothermic reduction method. The Fe-TiC composite, processed from an waste product of an aluminium extraction plant, has the potential to be used as a cutting tool material. Besides, the mechanical behaviour of ceramic and intermetallic matrix composites is being studied, with emphasis on structure-property correlations and mechanisms of deformation and fracture. Dispersion of ductile phase in molybdenum and niobium silicides has resulted in
improved damage tolerance, keeping the high temperature strength and oxidation resistance satisfactory. Ceramic matrix composites have been evaluated with focus on applications in cutting tools, as well as aerospace components including nose-cone tiles for hypersonic vehicles. The Surface Engineering is one of the major thrust area of research in the department. Among several activities related to surface engineering, laser assisted surface modification, ion implantation and plasma spray deposition are the primary areas of active research interest. It has been demonstrated that laser surface alloying of the near shape region of engineering components (of stainless steel, copper and titatium based alloys) can significantly improve the resistance to wear, corrosion, oxidation and similar surface dependent degradation. Recently, a new effort is initiated to exploit plasma assisted ion implantation for non-line-of-sight surface engineering of Fe/Ti- based components. In addition, another effort has been directed towards development of a plasma sprayed coating from a few commercially available and inexpensive ceramic materials of Indian origin, i.e, alumina, plasma dissociated zircon and some composite ceramic powders. The research activities in the area of Environmental Degradation embraces fundamental studies relating to film/scale growth processes on different metal-oxygen and metal-halogen systems with emphasis on kinetics and growth mechanism, defect structures of compounds, transport properties of different species, adhesion and protective properties of the scales. Performance of different types of coatings as a protective device is also an area of investigation. Studies on high temperature oxidation behaviour of multi-phase refractory metal-silicides like Molybdenum and Niobium Silicides are in progress. In the area of aqueous corrosion, the current activities are concentrated on the studies of corrosion behaviour of amorphous and nanocrystalline Zr-based binary alloys, corrosion and stress corrosion performance of aluminium based composites and Al-Ni alloys and stress corrosion cracking of nickel alloys in hydrogen fluoride. Development of Lithium Ion Battery (LIB) Technology for applications in Electric Vehicles in India has taken a prominent research area in the Department, as a part of multi-institution project from the Government of India. An important focus of the project is on the development of new, more efficient and cheaper materials for creating the next generation of LIBs, which would enable India to create a stake in this emerging area of energy storage. LIB Technology is considered as the third generation energy storage technology after the Lead-Acid and the Nickel-Cadmium battery technologies. Its superiority over the two other previous generation technologies has been demonstrated by higher volumetric & gravimetric energy densities, higher shelf life, and temperature range of operation. It is expected that within the next 10 years almost 50% of all portable power sources will be based on the LIB Technology. The first phase of the project would focus on the LIB Technology development in India. The ability to fabricate cells with existing materials, both at the laboratory experimental scale and prototype industrial scale, would be demonstrated quickly in IIT. In the second phase, fundamental R&D, which will be conducted in five participating institutions would locate new, better, more efficient, and cheaper anode, cathode and electrolyte materials to create the next generation of products. Smaller cells/batteries would be scaled-up to larger cells/batteries as portable power source for electric vehicles, which will be demonstrated to the government at the end of the Project.

**Thrust Areas**

1. Biomaterials
2. Nanostructured Material
3. Nanocomposites
4. Virtual alloys
5. Laser Surface alloying
6. Plasma Ion Implantation
7. Thermally Sprayed Coating
8. Functionally Graded Materials
9. Intermetallics
10. In-Situ Composites
11. Solidification under microgravity
12. Synthesis of fine ceramics
13. Process Modeling
14. Special grade steels
15. Aluminium Packaging Alloys
16. Lithium Ion Battery
New Acquisitions
1. Differencial Scanning Calorimetry- Q20, TA Instruments
2. Micrometry 5103 Tester, Vickers with necessary accessories, M/s Buehler Ltd., USA
3. UHV E-beam Evaporator System KVE-T4065820 with accessories, M/s Korea Vacuum Tech. Ltd., Korea
4. Fully Automated Floor mounted XRD system, D8 Advance with necessary accessories, M/s Bruker AXS Analytical Instruments, Germany
5. Ecomet 3000 variable speed Grinder/Polisher with accessories, 2 sets, M/s Buehler Ltd., USA
7. SQTE pure substances database M/s Therfact Ltd., Canada
8. SQTE 2007 solution database, M/s Therfact Ltd., Canada
9. Wear and Friction Monitor TR-201-M4 Pin on Disc type machine with scratch testing attachment, M/s DUCOM Instruments Pvt. Ltd., Bangalore
10. Wear and Friction Monitor TR-208-M4 Pin on Disc type machine with scratch testing attachment, M/s DUCOM Instruments Pvt. Ltd., Bangalore
11. Thermal Properties Analyser KD2 Pro System, M/s Decagon Vevices, Pullman, USA
12. Attritor Mill with Grinding Tank and Necessary accessories, M/s Union Processor, USA
13. Multi Tribometer TE97, Phoenix Tribology Ltd., UK

Lectures by Visiting Experts
1. Scope and Challenges in the Processing of Titanium by Dr. T. K. Mukherjee (Ex-advisor to Chairman, BARC)
2. TRIZ (a Russian acronym for Theory of Inventive Problem Solving) by Professor H.S.Ray (Ex-Professor, IIT Kharagpur and Ex-Director, RRL, Bhubaneswar, Currently: Emeritus Scientist, CGCRI, Kolkata)
3. Changing Scenereo in Steelmaking Technology vis-à-vis Quality Requirements in Speciality Steel and Its Products by Dr Ashok Chakraborty (Former Adviser, DST, New Delhi)
4. Regenerative rare-earth nanostructures for Biomedical Applications by Professor S. Seal, FASM, FAAAS (Nanoscience and Technology Center, Advanced Materials Processing Analysis Center, Mechanical Materials, Office of VP Research - Nanoinitiative Coordinator, University of Central Florida, Orlando, USA)
5. Nanofluids : Fundamentals issues to practical applications by Dr. John Philip (SMARTS, NDED, Metallurgy and Materials Group, Indira Gandhi Centre for Atomic Research, Kalpakkam 603 102, Tamilnadu, India.)
6. Fundamentals of materials surface treatment by high current pulsed electron beam: Application to metallic and intermetallic alloys by Professor Thierry GROSDIDIER (Materials Science, Processing and Characterization, LETAM, UMR CNRS-7078, Ile du Saulcy, University Paul Verlaine - Metz, 57045, Metz-Cedex, France)
7. The Future of Extractive Metallurgy by Prof. Fathi Habashi (Department of Mining, Metallurgical, and Materials Engineering, Laval University, Quebec City, Canada G1K 7P4.)
8. Hot Dip Galvanizing-the Process and Current Trends by Dr. Monojit Dutta (R&D, TATA Steel)
9. Controlled Rolling of HSLA steel to attain Sub-zero toughness for Indian Naval Application by Dr. Abhijit Dutta (Retd. Scientist G (DMRL, Hyderabad) and AICTE-INAЕ Distinguished Visiting Professor)
10. Metallurgy in a computer assembly plant by Dr Prabjit Singh (IBM Poughkeepsie, New York)
11. Physical refinement of solidification microstructures in Mg and Al alloys by Dr Amitabha Das (Lecturer, School of Engineering, Swansea University, Swansea, UK)

Doctoral and MS Degrees Awarded
1. B.S.B. Reddy Synthesis & characterization of bulk metal matrix nanocomposites prepared by pulsed co-electrodeposition and mechanical-thermal synthesis (Ph.D.)
2. D. Roy Nano-intermetallick/ceramic dispersed Al based amorphous / nanocrystalline matrix composites (Ph.D.)
4. R.K. Rana Some studies on copper containing interstitial free steels (Ph.D.)
5. S. Mula Aluminum based nanocomposites developed by mechanical alloying and non-contact ultrasonic casting (Ph.D.)
6. A. Biswas Surface treatment of Ti-6al-4V for bio-implant application (Ph.D.)
7. S. S. Nayek Development of nanostructured intermetallics and composites by non equilibrium processing (Ph.D)

Fellow - Professional Bodies
1. Dhindaw, Brij Kumar (0) Fellow - Institution of Engineers India
2. Roy, Sanat Kumar (1990) Nominated - The Indian Institute of Metals
3. Roy, Sanat Kumar (1995) Nominated - The Institution of Engineers (India)

Member - Editorial Board
2. Chakraborti, Nirupam (0) Member, Editorial Board - Materials & Manufacturing Processes
3. Chakraborti, Nirupam (0) Member, Editorial Board - International Journal of Machining and Machinability of Materials

Awards & Honours

Sponsored Research Projects
<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Development &amp; characterization of biocompatible low modulus titanium alloys for total joint replacement</td>
<td>CSIR</td>
<td>Rs. 11.96 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Development and Characterization of Nano-fluid for Micro-thermal Heat Transfer Applications in Advanced Satellite (DCN)</td>
<td>ISRO and KCSTC</td>
<td>Rs. 5.00 Lakhs</td>
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<td>Project Number</td>
<td>Project Description</td>
<td>Funding Agency</td>
<td>Funding Amount</td>
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<tr>
<td>3</td>
<td>Development and Characterization of Novel Nanocrystalline Metallic/Ceramic Based Hydrogen Sensor Materials (NNM)</td>
<td>MHRD, New Delhi</td>
<td>Rs. 15.00 Lakhs</td>
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<tr>
<td>4</td>
<td>Development of Niobium Silicide Based Alloys and Composites for Elevated Temperature Applications</td>
<td>DRDO</td>
<td>Rs. 32.37 Lakhs</td>
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<td>5</td>
<td>Development of Coating on Marine Propeller for Improving Cavitation Erosion and Corrosion Resistance under Simulated Hydrodynamic Condition</td>
<td>Naval Research Board New Delhi</td>
<td>Rs. 38.48 Lakhs</td>
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<tr>
<td>6</td>
<td>Development of ductile cast iron for spent fuel sub-assembly cask for PFBR</td>
<td>IGCAR, Kalpakkam</td>
<td>Rs. 32.68 Lakhs</td>
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<tr>
<td>7</td>
<td>Development of High Energy Density Lithium</td>
<td>RCI, Hyderabad</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>8</td>
<td>Development of high temperature oxidation resistant tungsten based bulk refractory alloys through mechanical alloying route</td>
<td>DRDO,</td>
<td>Rs. 27.30 Lakhs</td>
</tr>
<tr>
<td>9</td>
<td>Development of Molybdenum and Niobium silicide based alloys and composites for elevated temperature applications</td>
<td>DRDO</td>
<td>Rs. 32.41 Lakhs</td>
</tr>
<tr>
<td>10</td>
<td>Development of multifunctional surface on Ti and its alloys for tailoring wear resistance and biocompatibility</td>
<td>CSIR</td>
<td>Rs. 10.00 Lakhs</td>
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<tr>
<td>11</td>
<td>Development of nanocrystalline coating by combined plasma assisted implantation and deposition</td>
<td>DST</td>
<td>Rs. 53.00 Lakhs</td>
</tr>
<tr>
<td>12</td>
<td>Development of New Metallic Coating for Low Carbon Steels</td>
<td>Tata Steel</td>
<td>Rs. 8.02 Lakhs</td>
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<tr>
<td>13</td>
<td>Development of New Metallic Coating for Low Carbon Steels: Phase 2</td>
<td>Tata Steel</td>
<td>Rs. 2.50 Lakhs</td>
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<tr>
<td>14</td>
<td>Development of niobium silicide based alloys &amp; composites for elevated temperature applications</td>
<td>DRDO,</td>
<td>Rs. 32.41 Lakhs</td>
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<tr>
<td>15</td>
<td>Development of Wear-resistant Cu-alloy with Nanocrystalline Ceramic Phase Dispersion by Mechanical Alloying for Electrical Contact and Component</td>
<td>International Copper Association, USA,</td>
<td>Rs. 12.00 Lakhs</td>
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<tr>
<td>16</td>
<td>Development of high temperature oxidation resistant tungsten based bulk refractory alloys through mechanical alloying</td>
<td>DRDO,</td>
<td>Rs. 27.20 Lakhs</td>
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<tr>
<td>17</td>
<td>Effect of cyclic oxidation and residual stresses on oxidation kinetics of molybdenum silicide based alloys and composites</td>
<td>DRDO, New Delhi</td>
<td>Rs. 22.95 Lakhs</td>
</tr>
<tr>
<td>18</td>
<td>Effect of Rare Earth Additions on Oxidation Behaviour of Molybdenum and Niobium Silicide Based Alloys</td>
<td>DRDO</td>
<td>Rs. 14.31 Lakhs</td>
</tr>
<tr>
<td>19</td>
<td>Establishment of an Advanced Research Facility for EB Welding and Process Development Related to Programs of Interest to DAE</td>
<td>Board of Research in Nuclear Sciences (BRNS) and Dept. of Atomic Energy, Gol, BRNS and DAE,</td>
<td>Rs.133.00 Lakhs</td>
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<td>20</td>
<td>Establishment of an Advanced Research Facility for EB Welding and Process Development Related to Programs of Interest to DAE</td>
<td>Ocean Development Board, Ministry of Earth Sciences, New Delhi</td>
<td>Rs.133.00 Lakhs</td>
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<tr>
<td>21</td>
<td>Evaluation of manganese Extraction from Ocean Nodules using a new approach</td>
<td>Ocean Development Board, Ministry of Earth Sciences, New Delhi</td>
<td>Rs.0.00 Lakhs</td>
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<td>22</td>
<td>Evaluation of manganese nodules extraction processes for optimal performances : A new approach</td>
<td>Maharashtra state Mining Corporation,</td>
<td>Rs.17.25 Lakhs</td>
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<td>23</td>
<td>Feasibility study for extraction of vanadium and titanium from titano-magnetite ore deposit of Maharashtra</td>
<td>Maharashtra state Mining Corporation,</td>
<td>Rs.7.29 Lakhs</td>
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<td>24</td>
<td>Feasibility study for extraction of vanadium and titanium from titanomagnetite ore deposit of Maharashtra - part-I: Pre-feasibility study for vanadium</td>
<td>Maharashtra State Mining Corporation, DST</td>
<td>Rs. 7.00 Lakhs</td>
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<td>25</td>
<td>Forming and Coating Behaviour of TRIP Aided Steels</td>
<td>DST</td>
<td>Rs. 8.44 Lakhs</td>
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<tr>
<td>26</td>
<td>Generation of semi-solid slurries through one step processing of liquid metal for rheoprocessing</td>
<td>National Materials Research Laboratory, DRDO, Ambernath</td>
<td>Rs. 9.92 Lakhs</td>
</tr>
<tr>
<td>27</td>
<td>Grain Boundary Segregation, Precipitates Morphology and Surface Modification in Case of Complete and Incomplete Grain Boundary Wetting by a Second Sol</td>
<td>Department of Science and Technology, N. Delhi</td>
<td>Rs. 12.00 Lakhs</td>
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<tr>
<td>28</td>
<td>High Speed Laser Synthesis of Amorphous Surface Structure (LSH)</td>
<td>DST - NSF (USA)</td>
<td>Rs. 17.00 Lakhs</td>
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<td>29</td>
<td>High Strength TRIP-aided Steel for Automobiles</td>
<td>Tata Steel</td>
<td>Rs. 11.68 Lakhs</td>
</tr>
<tr>
<td>30</td>
<td>Laser Assisted Fabrication of Compositionally Graded Component for Hip Joint and Femoral Replacement</td>
<td>Council of Scientific and Industrial Research</td>
<td>Rs. 18.00 Lakhs</td>
</tr>
<tr>
<td>31</td>
<td>Life estimation and microstructural damage of irradiated and unirradiated Cu-Cr-Zr alloy</td>
<td>NFP-BRFST Ahmedabad</td>
<td>Rs. 30.38 Lakhs</td>
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<td>32</td>
<td>Mathematical modeling of solidification behaviour of weld pool and oxidation characteristics of zones of weldment during laser welding of plain carbon</td>
<td>DST</td>
<td>Rs. 17.00 Lakhs</td>
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<td>33</td>
<td>Mechansynthesis and mechanical thermal synthesis of in-situ aluminium based nanocomposites and their characterization</td>
<td>DST</td>
<td>Rs. 43.15 Lakhs</td>
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<td>34</td>
<td>Physico-Chemical Analysis of Metal Based Ayurvedic Bhasma Drugs by Sophisticated Modern Instrumental Methods</td>
<td>DST</td>
<td>Rs. 20.35 Lakhs</td>
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<td>35</td>
<td>Production of porous TiNi shape memory alloys from mechanically alloyed powders for biomedical applications - A Fast Track Research Scheme (PTS)</td>
<td>DST, New Delhi</td>
<td>Rs. 10.00 Lakhs</td>
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<td>36</td>
<td>Project Name: Development and characterization of nanomaterials as filler in polymer composites</td>
<td>MHRD</td>
<td>Rs. 0.00 Lakhs</td>
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<td>37</td>
<td>Semisolid Processing of Al-Mg base alloys under low convection conditions</td>
<td>CSIR</td>
<td>Rs. 10.71 Lakhs</td>
</tr>
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<td>38</td>
<td>Silicon Carbide as high temperature MEMS and MOSFET devices.</td>
<td>ISRO- Kalpana Chawla Space Cell, IIT-KGP, ISIRD IIT KGP</td>
<td>Rs. 0.00 Lakhs</td>
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<td>39</td>
<td>Solvent extraction studies for high value metals by ionic liquids, in mixer-settler unit: Experimentation and molecular Modelling</td>
<td>DST</td>
<td>Rs. 4.60 Lakhs</td>
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<td>40</td>
<td>Steel Technology Centre</td>
<td>Ministry of Steel, DST</td>
<td>Rs. 20.25.86 Lakhs</td>
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<td>41</td>
<td>Structure of Interfaces and Interfacial Reactions in Electronic Materials</td>
<td>IIT Kharagpur</td>
<td>Rs. 5.00 Lakhs</td>
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<td>42</td>
<td>Structure-Property Relations In Ceramic Composites For High Temperature Applications In Nose Cone Tiles In Hypersonic Vehicles</td>
<td>DRDL</td>
<td>Rs. 72.96 Lakhs</td>
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<tr>
<td>43</td>
<td>Structure-property relations in ceramic composites for high temperature applications in nose cone tiles in hypersonic vehicles</td>
<td>DRDO</td>
<td>Rs. 72.96 Lakhs</td>
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<tr>
<td>44</td>
<td>Surface Engineering of Ballbearing Steel by Plasma Ion Implantation</td>
<td>Tata Iron and Steel Company, Jamshedpur</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>45</td>
<td>Synthesis and Characterization of Al-based Nanocrystalline Composites</td>
<td>DST-KBN (Indo-Poland),</td>
<td>Rs. 4.50 Lakhs</td>
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<tr>
<td>Project Number</td>
<td>Project Description</td>
<td>Funding Agency</td>
<td>Amount (Lakhs)</td>
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<tr>
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<tr>
<td>46</td>
<td>Synthesis and characterization of in-situ carbide reinforced austenitic manganese steel matrix composites</td>
<td>Naval Research Board</td>
<td>27.92</td>
</tr>
<tr>
<td>47</td>
<td>Synthesis and characterization of nanocrystalline ZrO2-based electrolyte for solid oxide fuel cells</td>
<td>CSIR</td>
<td>11.00</td>
</tr>
<tr>
<td>48</td>
<td>Synthesis and Characterization of Nanostructured Materials for Functional and Structural Applications</td>
<td>DST</td>
<td>279.51</td>
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<tr>
<td>49</td>
<td>Synthesis and properties of electrodeposited Nickel/Ceria nano composites</td>
<td>Indian Rare Earths Limited</td>
<td>27.81</td>
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<td>50</td>
<td>Synthesis and properties of electrodeposited nickel/zirconia nanocomposites</td>
<td>NRB</td>
<td>48.28</td>
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<tr>
<td>51</td>
<td>Synthesis and thermo mechanical characterization of MoSi2-SiC-ZrO2 nano composite</td>
<td>ISIRD</td>
<td>5.00</td>
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<tr>
<td>52</td>
<td>Synthesis, development and in-vitro characterization of bio-inert Yttria/Ceria coated/stabilized zirconia and zirconia toughened alumina composites fo</td>
<td>Department of Bio-technology, New Delhi</td>
<td>29.60</td>
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<tr>
<td>53</td>
<td>Thermal stress modeling and design of twin roll caster to obtain thin alloy sheet with extremely fine/amorphous structures</td>
<td>DST, Govt. of India</td>
<td>37.53</td>
</tr>
<tr>
<td>54</td>
<td>Thermo-mechanical MOdeling and Validation of Twi Roll Caster to obtain fully amorphous/nanostructure</td>
<td>Department of Science and Technology</td>
<td>37.53</td>
</tr>
<tr>
<td>55</td>
<td>Versatile Nano Zirconia Production Facility at Indian Rare Earths Limited, OSCOM</td>
<td>Indian rare Earths Limited</td>
<td>45.00</td>
</tr>
</tbody>
</table>

**Consultancy Projects**

1. Characterization of emulsion samples
   - Asian Paints Limited
   - Rs. 50.00

2. Corrosion of reinforcement in concrete
   - M/s Shyam Steel, Kolkata
   - Rs. 0.10

3. Development of air cooled microalloyed steel with improved toughness for forging applications
   - Ashok Leyland
   - Rs. 12.00

4. Failure analysis of a gear box assembly shaft
   - Technovation Engineers Pvt Ltd.
   - Rs. 0.29

5. Failure analysis of boiler tubes
   - Damodar Valley Corporation
   - Rs. 0.70

6. Failure Analysis of Sucker Rod, Seating Ring and Diffuser Support used in Petrochemical Industry
   - Lonestar Alpha Laboratories, Dubai
   - Rs. 0.60

7. Failure analysis of welded pipeline
   - Essar Steel Limited
   - Rs. 0.30

8. Fracture analysis of sucker rods
   - Lonestar Alpha Laboratories, Muscat, TATA STEEL
   - Rs. 1.50

9. Genetic Algorithms in Hydrocyclones
   - NSTL, Vishakhapatnam
   - Rs. 0.00

10. Grain Refinement of Al Alloys (LM25; BS1490) for higher strength (Chill Casting - TF Condition)
    - NIST, Vishakhapatnam
    - Rs. 3.50

11. Hydrogen rich gas production from blast furnace gas
    - The Tata Iron & Steel Limited
    - Rs. 3.86

12. Noise reduction in amorphous metal transformers
    - Vijai Electricals Ltd
    - Rs. 8.99

13. Optimizing Properties of galvanized Steels
    - Tata Steel
    - Rs. 4.40

14. Setting up a research and Development centre for Damodar Valley Corporation at Kolkata (Phase-I) (DCD)
    - Damodar Valley Corporation, Kolkata
    - Rs.2132.70

15. Setting up of a R&D centre at Kolkata
    - Damodar Valley Corporation
    - Rs.2100.00

16. Strength and fracture behaviour of spot-welds in automotive steel sheets
    - Usha Beltron Ltd
    - Rs. 4.00

17. Structure- property correlation in free-cutting steel
    - ANNUAL REPORT 2008-2009
18. Testing of stainless steel wires
Usha Martin Ltd.
Rs. 0.13 Lakhs

19. XRD analysis of materials
Tata Steel, Vidyasagar Univ, IACS, SNBCBS-Kolkata, ISM-Dhanbad,
BIT-Mesra, NML-Jamshedpur
and others,

Visits Abroad by Faculty Members
1. Chakraborti, Nirupam Collaborative research (Abo Akademi University, Finland) 6 weeks
2. Chakraborti, Nirupam Collaborative research (Iowa State University, USA) 1 month
3. Roy, Gour Gopal Collaborative Research as Visiting Professor (Pennsylvania state University, USA) 9th June to 15th July
4. Dhindaw, Brij Kumar Visiting Professor (McMaster University, Hamilton, Ontario Canada) 15th May 2008 till 22nd July 2008
5. Mitra, Rahul Visiting Professor (University of Southern California) January 01 - May 15
6. Das, Siddhartha Guest Professor/Scientist (University of Ulm, Germany) June-July
7. Singh, Shiv Brat Collaborative work (University of Cambridge, UK) July 7-21
8. Ray, Kalyan Kumar To attend an International conference (Cairo, Egypt) May 27-29

Invited Lectures by Faculty Members
1. On the Formation of Aluminum-based Bulk Nanocomposites by Mechanical Alloying followed by Sintering by Pabi, Shyamlal Kumar (BIT, Mesra)
2. Genetic Algorithms in Materials Science by Chakraborti, Nirupam (Oran, Algeria)
3. Sea Nodules Processing Status review by Sen, Prodip Kumar (Chennai, Indian representative for Ministry of Earth Sciences)
4. Mechanical properties of nanocrystalline materials by Mitra, Rahul (National Institute of Technology, Durgapur)
5. Application of transmission electron microscopy for characterization of nano-materials by Mitra, Rahul (S.N. Bose Institute for Basic Sciences)
6. Surface Nitriding of Ti-6Al-4V for Bio-implant Application by Dutta Majumdar, Jyotsna (National Aeronautical Laboratory Bangalore)
7. Laser Assisted Shaping of Materials by Dutta Majumdar, Jyotsna (Chandipur)
8. Development of TiN coating on AISI 316L Stainless Steel by Cathodic Arc Evaporation by Dutta Majumdar, Jyotsna (Puri)
11. Monotonic and Cyclic Damage In Metallic Sheets by Ray, Kalyan Kumar (5th International Conference on Creep, Fatigue and Creep-Fatigue Interaction, at IGCAR, Kalpakkam 24-26 September, 2008)
14. (1) Failure analysis of structural components; (2) Failure analysis: case studies by Ray, Kalyan Kumar (Invited lecture at short term course on “Failure Analysis” at GIET, Gunupur on 09 March, 2009)

Seminars, Conferences and Workshops Organised
1. COMPOSIT 2009
2. ICAMMP, International Conference on Advanced Materials and Processing
3. Materials Structures the Nabarro Legacy
DEPARTMENT OF MINING ENGINEERING

HEAD: Professor Jayanta Bhattacharya

FACULTY

Professors

Bhattacharya, Jayanta  Ph.D. (IIT Kharagpur), Environmental Engineering Reliability and Quality Engineering
Bhattacherjee, Ashis  Ph.D. (Penn-State), Health and Safety, Quality Control, Operations Research
Das, Samir Kumar  Ph.D. (ISM Dhanbad), Mines Safety, Strata Control and Rock Mechanics, Fly Ash Stowing, Mining Environment and Reclamation, Coal Mining, Mining Equipment, Surface Mining, Powered Roof Supports
Mukhopadhyay, Subir Kumar  Ph.D. (IIT Kharagpur), Open Pit Mining, Mine Planning and Design, Underground Metalliferous Mining, Mine and Mineral Economics Trade and Stockpiling, Mine Safety Legislation and Management, Small Scale Mining and Sustainable Development in Mining
Pathak, Khanindra  Ph.D. (London University), Surface Mining and Mine Closure Planning, Environmental Modelling and Management, RS-GIS Application, Mining Machinery, and Oil Well Drilling Technology
Rao, Karanam Uma Maheshwar  Ph.D. (IIT Kharagpur), Rock Mechanics, Underground Metal Mining Methods
Sastry, Bhamidipati Suryan  Ph.D. (Utah), Mine Ventilation; Surface and Subsurface Environment

Associate Professors

Pal, Samir Kumar  Ph.D. (IIT Kharagpur), Blind Backfilling of Abandoned Mine Voids, Abrasion and Wear of OTR Tyres, Strata Monitoring and Subsidence Technology

Assistant Professors

Chakravarty, Debashish  Ph.D. (IIT Kharagpur), Numerical Modelling in Geomechanics and Blasting, Geoinformatics, GPS, GIS, Remote Sensing, GeoSpatial Imaging, Digital Photogrammetry; Laser and Radar Imaging, Advanced Surveying, Geodesy, Mine Automation and Virtual Reality Applications
Prusty, Basanta Kumar  Ph.D. (Southern Illinois), Coalbed Methane, Carbon Sequestration, Clean Coal Technology
Samanta, Biswajit  Ph.D. (IIT Kharagpur), Orebody Modeling and Geostatistics, Mine planning

Faculty Appointments

Dr. Basanta Kumar Prusty  Assistant Professor
Brief Description of on-going activities

Environment and Safety  Application of LCA, GIS and remote sensing for soil and water analysis as a part of mine closure planning; Experimental and computational fluid dynamics studies for shock loss determination in mine air flow; Biological and passive treatment of mine waste water; Investigation of soil and water contamination vis-à-vis land use changes near mining fields. Study of human behaviour related accidents in mines; Epidemiological investigations to identify possible risk factor of occupational injuries in mines; The statistical methods for assessing risk factors included logistical regression, loglinear modeling and structural equation modeling.

Rock Mechanics / Ground Control  Finite element analysis for longwall strata control problems, and design of shield supports; Rock Joints and their influence on the stability of underground openings; Rock Mass characterization, Land reclamation and soil mechanics; Assessment of Fly ash composites as a substitute fill material for underground mine voids; Risk analysis for the safety management of coalmines; On the mechanics of rock fragmentation by drilling and cutting- studies on the linear cutting machine (LCM).

Mine Planning / Modeling  Application of various grade estimation techniques namely kriging, cokriging, stochastic simulation and neural networks for estimation of mining blocks for quality control in mines; Investigation of different statistical quality control techniques including univariate and multivariate control charts for controlling the grade of mineral at various locations; Grade control aspects in limestone and bauxite operations. Fault Tree Analyses and algorithm development for a Coal Handling Plant.

Collaborative Research  Collaborative research is ongoing with the French National Institute of Health and Medical Research (INSERM) for conducting research on injury epidemiology. In this study, the public health prevention methods were applied to occupational injuries in mines. The Department has signed a MoU with the Geotechnical Division of the Korean Institute of Geosciences and Mineral Resources (KIGAM) for undertaking a joint collaborative research on the rock mass characterization based on the image processing techniques.

Thrust Areas
1. Rock Mechanics and Ground Control
2. Surface and sub-surface Environment
3. Mine Safety and Systems Engineering
4. Advanced Surveying and Geo-informatics

New Acquisitions
1. Personal Dust Sampler Kit
2. Quester III
3. DC Calc Micromanometer
4. 9545 A Velocicalc Velocimeter
5. Hydrocarbon Gas Analyzer
6. B.G - 4 breathing apparatus
7. Furnace (Muffle)
8. Multicyclone
9. Micromine software
10. Bag Filter
11. Fine Balance
12. Soud Level meter
13. H.C. Gas detector,
14. Surveyor Stereovision system
15. Microstoric inclinometer
16. Mine Gas Analyzer
17. H.C. Gas detector,
International Collaborations
1. Memorandum of Understanding between M/s TOTAL, France and Indian Institute of Technology, Kharagpur for supporting a Chair Professorship position in Mining Engineering at IIT, Kharagpur

Lectures by Visiting Experts
1. Use of Photogrammetry for rock slope characterization, U/G support s, Oil Sands mining in Canada by Dr. Dwayne Tannant (Professor, Dept. of Mining Engg., Univ. of Alberta, Canada)
2. Surface Mining by Mr. U.K. Nag (DGM, L&T)
3. Groud Probe - Mining Technology by Dr. David Noon, (CEO & VP)
4. Mine Management at Damanjodi Mine by Mr. Aniruddha Chakraborty (DGM, Mines, Nalco, Damanjodi, Orissa)

Doctoral and MS Degrees Awarded
1. D. P. Mishra Suitability of fly ash and pond ash for stowing in underground coal mines- an investigation (Ph.D.)
2. Gnananda Budi Investigation of the shear characteristics of rock samples (Ph.D.)
4. Ravi Jade Prediction of Shock Losses in Mine Aerodynamics (Ph.D.)
5. Bijay Mihir Kunar An Epidemiological Study of Coal Miners Injuries (Ph.D.)
6. Vinayak N. Deshpande Monitoring and Analysis of Environmental Hotspot Zone around Korba Coalfield Area (MS)

Fellow - Professional Bodies

Member - Editorial Board
2. Bhattacharya, Jayanta (2006) Editorial Board Member - Industrial Insider
7. Samanta, Biswajit (2008) Associate Editor - Mining Engineering, and SME transactions

Awards & Honours
1. Das, Samir Kumar (2008) MGMI bronze medal for paper titled Compaction and consolidatibehavior of Fly ash and pond ash for stowing in underground mines
3. Chakravarty, Debashish (2008) Certificate of Merit from the Institution of Engineers India for one of the technical papers

**Sponsored Research Projects**

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Application of DGPS and High Precision Satellite Imagery for Subsidence Monitoring in Raniganj Area of ECL</td>
<td>CIL R&amp;D</td>
<td>Rs.242.42 Lakhs</td>
</tr>
<tr>
<td>2.</td>
<td>Application of High Precision Satellite Imaging and DGPS Technology for Online, Wide-Area Subsidence Monitoring Study in Raniganj Area, ECL of CIL.</td>
<td>Coal India Limited</td>
<td>Rs.242.42 Lakhs</td>
</tr>
<tr>
<td>3.</td>
<td>Automatic and Intelligent System for Fragmentation Determination in a Blasted Muck</td>
<td>IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>4.</td>
<td>Determination of rate of consolidation, flow rate, settlement and</td>
<td>TIFAC, under DST</td>
<td>Rs. 6.00 Lakhs</td>
</tr>
<tr>
<td>5.</td>
<td>Development and Implementation of Extended Finite Element Procedures (XFEM) for Cohesive Rock Joints</td>
<td>DST, New Delhi</td>
<td>Rs. 16.50 Lakhs</td>
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<tr>
<td>6.</td>
<td>Development of a mixed-culture bio-reactor for mine drainage treatment</td>
<td>Korea Institute of Geosciences and Mineral Resources, South Korea,</td>
<td>Rs. 9.00 Lakhs</td>
</tr>
<tr>
<td>7.</td>
<td>Development of Roof Fall Prediction System for Underground Mines using Wireless Network</td>
<td>Coal India Limited</td>
<td>Rs.216.98 Lakhs</td>
</tr>
<tr>
<td>8.</td>
<td>Development of Roof Fall Prediction System for Underground Mines Using Wireless Network,</td>
<td>Coal India Limited (CIL), Kolkata, India,</td>
<td>Rs.220.00 Lakhs</td>
</tr>
<tr>
<td>9.</td>
<td>Development of RS-GIS based data base for Uranium Mining and Milling in West Khasi District, Meghalaya</td>
<td>Board of Research in Nuclear Sciences,</td>
<td>Rs. 31.00 Lakhs</td>
</tr>
<tr>
<td>10.</td>
<td>Development of RS-GIS based database for Uranium Mining and Milling in the West Khasi Hills District, Meghalaya</td>
<td>BRNS, DAE, Govt. of India,</td>
<td>Rs. 32.00 Lakhs</td>
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<td>11.</td>
<td>Environmental Hotspot monitoring in Korba Area</td>
<td>Space Application Centre (SAC)</td>
<td>Rs. 16.00 Lakhs</td>
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<tr>
<td>12.</td>
<td>FIST Programme</td>
<td>Department of Science and Technology,</td>
<td>Rs. 32.00 Lakhs</td>
</tr>
<tr>
<td>13.</td>
<td>Indo Romanian R&amp;D project on Environmental impact of coal mines closure and ecological rehabilitation of mining area of India and Romania</td>
<td>DST Govt. of India and Govt. of Romania</td>
<td>Rs. 5.18 Lakhs</td>
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<tr>
<td>14.</td>
<td>Integration of GPS and InSAR data for Accurate Ground Profile Determination</td>
<td>SHELL International &amp; Exploration BV,</td>
<td>Rs. 40.00 Lakhs</td>
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<td>15.</td>
<td>Investigation on Augmentation of Life of Dump-Truck Tyres through the Improvement of Tyre Retreading Compound and Development of an Optimum Road Main</td>
<td>Coal India Ltd</td>
<td>Rs. 148.69 Lakhs</td>
</tr>
<tr>
<td>16.</td>
<td>Investigation on Augmentation of Life of Dump-Truck Tyres through the Improvement of Tyre Retreading Compound and Development of an Optimum Road Maint</td>
<td>Coal India Limited</td>
<td>Rs. 148.69 Lakhs</td>
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<td>17.</td>
<td>Investigation on Ensemble modeling approach by Multiple Neural Network using Negative correlation learning for orebody modeling</td>
<td>ISIRD</td>
<td>Rs. 3.00 Lakhs</td>
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<td>No.</td>
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<td>19.</td>
<td>Optimal Selection of Radial Basis function network for orebody modeling using multiobjective genetic algorithms</td>
<td>DST</td>
<td>2.88 Lakhs</td>
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<td>20.</td>
<td>Re-application of the S &amp; T Project titled 'Model Studies on Gravity Blind Backfilling Method and Evaluation of a Pre-Jamming Indication Parameter' in</td>
<td>Ministry of Coal New Delhi</td>
<td>395.18 Lakhs</td>
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<td>21.</td>
<td>Remote Sensing and GIS Based data infrastructure for baseline environment for new uranium mining sites</td>
<td>BRNS, DAE, Govt. of India.</td>
<td>34.00 Lakhs</td>
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<tr>
<td>22.</td>
<td>Remote Sensing GIS based data infrastructure for baseline environment for new uranium mining sites</td>
<td>BRNS</td>
<td>34.00 Lakhs</td>
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<tr>
<td>23.</td>
<td>Risk based mine production scheduling using conditional simulation and genetic algorithms for ore grade control</td>
<td>SERC, DST</td>
<td>9.10 Lakhs</td>
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<td>26.</td>
<td>Technical Study for Stability of Old and Active OB Dumps in WCL for the Dimensional Optimization</td>
<td>CIL R&amp;D Grant</td>
<td>359.00 Lakhs</td>
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<td>27.</td>
<td>Upgradation of Laboratories</td>
<td>FIST-DST</td>
<td>200.00 Lakhs</td>
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**Consultancy Projects**

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Description</th>
<th>Agency</th>
<th>Amount (Rs.)</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Design and Stability Analysis of Crown / Sill Pillars below A Filled Stope</td>
<td>Hutti Gold Mines Ltd. A Govt. of Karnataka Ltd.</td>
<td>10.97 Lakhs</td>
</tr>
<tr>
<td>2.</td>
<td>Design and Stability Analysis of Crown / Sill Pillars below A Filled Stope</td>
<td>Hutti Gold Mines Ltd. A Govt. of Karnataka Ltd.</td>
<td>10.97 Lakhs</td>
</tr>
<tr>
<td>3.</td>
<td>Design and Stability Analysis of Stopes in North, South and North extension Blocks at Bangur chromite Mine, OMC</td>
<td>Orissa Mining Corporation (OMC),</td>
<td>3.20 Lakhs</td>
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<td>4.</td>
<td>Development of a Pit Optimization software</td>
<td>KIGAM, Korea</td>
<td>4.50 Lakhs</td>
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<tr>
<td>5.</td>
<td>Development of Environmetal Control Measures for Fine Heaps</td>
<td>Gua Ore Mines, SAIL</td>
<td>0.80 Lakhs</td>
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<td>6.</td>
<td>Development of Image Processing Technique for Analyzing Rock Joints</td>
<td>Korea Institute of Geosciences and Mineral Resources (KIGAM), South Korea,</td>
<td>10.00 Lakhs</td>
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<td>7.</td>
<td>Effect of heightening on the stability aspects of TDF at Sukinda Chromite Mine</td>
<td>Tata Steel Limited,</td>
<td>250000.00 Lakhs</td>
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<tr>
<td>8.</td>
<td>Effect of Proposed Heightening Scheme on the Stability Aspects of the TailingsDamat Sukinda Chromite Mines, Tata Steel</td>
<td>Tata Steel</td>
<td>2.50 Lakhs</td>
</tr>
<tr>
<td>11.</td>
<td>Pit Optimization of Surface Coal Mine</td>
<td>Korea Institute of Geosciences and Mineral Resources (KIGAM), South Korea,</td>
<td>4.50 Lakhs</td>
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<td>12.</td>
<td>Rock mass characterization</td>
<td>Uranium Corporatin Of India Ltd,</td>
<td>1.50 Lakhs</td>
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<td>No.</td>
<td>Title</td>
<td>Client</td>
<td>Cost (Lakhs)</td>
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<td>13</td>
<td>Stability Analysis of Crown Pillars at Hutty Gold Mine</td>
<td>Hutty Gold Mine Limited</td>
<td>11.00</td>
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<tr>
<td>14</td>
<td>Stope Design and It's Stability Analysis, Narwapahar Mine, UCIL</td>
<td>Uranium Corporation of India Ltd., Govt. of India Enterprise, UCIL</td>
<td>2.85</td>
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<tr>
<td>15</td>
<td>Stopes and Pillars Design at Narwapahar Mine (140mRL to 230mRL), UCIL</td>
<td>Uranium Corporation of India Ltd., Govt. of India Enterprise, UCIL</td>
<td>3.15</td>
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<tr>
<td>16</td>
<td>Stopes Design and Their Stability Analysis at Turamdih Mine</td>
<td>UCIL - Phase I, Client: Uranium Corporation of India Ltd., Govt. of India Enterprise</td>
<td>2.98</td>
</tr>
<tr>
<td>17</td>
<td>Stopes Design and Their Stability Analysis at Turamdih Mine (UCIL - Phase I),</td>
<td>Uranium Corporation of India Ltd., Govt. of India Enterprise, UCIL</td>
<td>2.98</td>
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<tr>
<td>18</td>
<td>Studies on the stability of Underground mine openings and subsidence investigations at Tummallapali project of UCIL</td>
<td>Uranium Corporation of India Ltd., Govt. of India Enterprise</td>
<td>0.50</td>
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<tr>
<td>19</td>
<td>Study of ground vibration for Balagunda Iron &amp; Manganese Mines</td>
<td>Envimin Consultant Pvt Ltd,</td>
<td>219102.00</td>
</tr>
<tr>
<td>20</td>
<td>Study of ground vibration for Gandhamadhan Sponge Industries</td>
<td>Putulipani Iron-Ore Mines,</td>
<td>262922.00</td>
</tr>
<tr>
<td>21</td>
<td>Study on Assessment of Technologies for Storage of CO2 for Carbon Sequestration</td>
<td>NTPC</td>
<td>19.00</td>
</tr>
<tr>
<td>23</td>
<td>Technical Guidance in Respect of Geological Report of Machhakata Coal Block</td>
<td>Mahaguj Collieries Limited,</td>
<td>1.00</td>
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<tr>
<td>24</td>
<td>Testing and Characterization of Rock Parameters from a Proposed Uranium Mine in AP</td>
<td>Uranium Corporation of India Limited (UCIL)</td>
<td>1.96</td>
</tr>
</tbody>
</table>

**Patents (filed / granted)**

1. Breath Panels
2. Carbon Dosing System
3. Chemo Bio-reactor
4. Kharagpur Filter
5. Non-contact type 3-D Rock Surface Profiler

**Visits Abroad by Faculty Members**

1. **Das, Samir Kumar**
   - Project work (Petrosani University, Romania) 15 days
2. **Das, Samir Kumar**
   - To attend SGEM 2008 SYMPOSIUM and presenting a paper (Albena, Bulgaria) One Week
3. **Samanta, Biswajit**
   - Got an offer for adjunct faculty (University of Alaska, Fairbanks) May-July, 2008
4. **Bhattacharya, Jayanta**
   - Research Assignment (Korea Institute fo GeoSciences and Minerals, Daejeon, South Korea) 15 days in September-October
5. **Bhattacherjee, Ashis**
   - To set up collaboration in the field of Mine Health and Safety (University of Utah) July 14
6. **Bhattacherjee, Ashis**
   - To set up collaboration in the area of Mine Health and Safety (Utah State University) July 8-10
7. **Chakravarty, Debashish**
   - Paper presentation (Visit to Beijing, China) October 11-18, 2008
Invited Lectures by Faculty Members

1. Occupational Health and Safety Management by Das, Samir Kumar (Dept. of Mining Engg., IIT Kharagpur)
2. Key note address "Sustainable Development of Mining" by Mukhopadhyay, Subir Kumar (Central Institute of Mining and Fuel Research (CSIR), Dhanbad)
3. Assessment, Simulation and Control of Underground Coal Mine Climate by Sastry, Bhamidipati Suryan (Singareni Collieries Co Ltd, GDK-II Area, Ramagundam)
4. Economic Regeneration of Mined Lands by Bhattacharya, Jayanta (Daejeon Korea)
5. Keynote Lecture on Developments of belt conveyors system for bulk material handling and RopeCon by Pathak, Khanindra (ISMU, Dhanbad (National Seminar on Crushing, Screening and Conveying, CS&C-2008))
6. Maintenance of Bulk Material Handling System: Recent Developments by Pathak, Khanindra (NIT, Silchar (Keynote lecture at National Convention of Mechanical Engineer))
7. Methodology for Effective Teaching of Engineering to Undergraduate Students by Pathak, Khanindra (SKASVM Agadi College of Engg and Technology, Lakshmeswar, Karnataka)

Books Published


Short-Term Courses, Training Programmes and Workshops organized

1. Mines Safety and Legislation (August 11-14)
2. Mining Machinery Maintenance and Capacity Utilisation (September 26-28, 2008)
3. Safe Mining : Methods,Design&Technology (December 02-04, 2008)
5. Surface Mining Technology (May 28-30, 2008)
DEPARTMENT OF OCEAN ENGINEERING & NAVAL ARCHITECTURE

HEAD : Professor Nisith Ranjan Mandal

FACULTY

Professors
Mandal, Nisith Ranjan Dr. Inz. (Poland), Welding Distortion of Large Stiffened Structures and Welding Techniques
Misra, Suresh Chandra Ph.D. (Newcastle, UK), Marine Design, Applied Hydrodynamics
Satsangi, Subir Kumar Ph.D. (IIT Kharagpur), Structural Engineering, Ship Structures
Sen, Debabrata Ph.D. (Canada), Numerical Marine Hydrodynamics, Submerged Body Hydrodynamics, Wave-Induced Motions of Floating Bodies, Free Surface Hydrodynamics
Sha, Om Prakash Ph.D. (IIT Kharagpur), Marine Design and Production

Associate Professor
Sahoo, Trilochan Ph.D. (IISc. Bangalore), Ocean Hydrodynamics, Hydroelasticity

Assistant Professors
Bhar, Ashoke Ph.D. (IIT Kharagpur), Marine Structures
Bhaskaran, Prasad K Ph.D. (Kurukshetra), Wind-Wave Modeling, Coastal Processes, Marine Acoustics, Sediment Transport Dynamics
Warrior, Hari V Computational Fluid Dynamics, Physical Oceanography, Resistance and Propulsion

Brief Description of on-going activities
The Department is very actively involved in various projects related to hydroelasticity of large flexible structures, marine structural analysis using composite materials, marine design and production, Ocean hydrodynamics, structural reliability, ocean wave modeling, suspended sediment dynamics, computational fluid dynamics and coastal processes.

Thrust Areas
1. Marine hydrodynamics
2. Computer aided design and manufacture in marine production
3. Offshore renewable energy

New Acquisitions
1. Friction stir welding setup and various transducers

Lectures by Visiting Experts
1. Recent Trends in Ocean Research by Allan Robinson (Emeritus Professor, Harvard University)
2. R&D activities in Ocean Engineering by Farooq Mistry (Professor)
3. Discussion with Faculty members for Project Proposals by Dr.K.R.G.K. Murthy (Chairman (Ocean-Environment), Naval Research Board)
4. Discussion on joint collaborative programmes with Pusan National University, South Korea by Dr. Myung Hyun Kim (Professor, Pusan National University, South Korea)
5. Delivered a general talk to Faculty and Students in November 2005. by Dr.Trevor Blakeley (Chief Executive, The Royal Institution of Naval Architects (RINA), U.K.)
6. General Discussion with Faculty Members by Dracos Vassalos & P.K.Das (Professor, Ship Stability Research Centre, U.K.)

7. General discussion with Faculty Members by Tony Roskilly (Professor, School of Marine Science & Technology, U.K.)

8. Requirement of Naval Architect students possessing 4 year experience by Teruaki Kaibara & Tamiki Takasi (Vice-President (Engineering), ABS Singapore)

9. Discussion on proposed conference ICoSOT 2009 by Mr. Trevor Blakeley (CEO, Royal Institution of Naval Architects, U.K.)

10. Research activities pursued in the Dept. of Naval Architecture and Ocean Engineering, Osaka University, JAPAN by Vishwanath Nagarajan (Ph.D student, Osaka University)

11. Research activities pursued in Center for Marine Technology and Engineering, Portugal by Professor Carlos Guedes Soares (Professor, Instituto Superior Technico, Lisboa, Portugal)

Doctoral and MS Degrees Awarded

1. Sanjay Pratap Singh 3D nonlinear sea keeping computation of realistic ship hulls (Ph.D.)

2. Joydip Bhattacharjee Fourier analysis and allied methods in wave structure interaction problems with application in hydroelasticity (Ph.D.)

3. Pankaj Biswas Thermo-mechanical analysis of line heating process (Ph.D.)

4. Rajiv Sharma An investigation into geometric modeling, geometric analysis and laser forming of surfaces defined over arbitrary domains (Ph.D.)

5. Mihir Chandra Manna Response and control of smart rubber / rubber composite structural components using nonlinear finite element analysis (Ph.D.)

6. Suresh Kumar Studies on a class of vertical, submerged and floating breakwaters in a two layer fluid (Ph.D.)

Fellow - Professional Bodies

1. Mandal, Nisith Ranjan (2006) Fellow - Royal Institution of Naval Architects

2. Mandal, Nisith Ranjan (2001) Fellow - Institution of Engineers, India


Member - Editorial Board


4. Sha, Om Prakash (2009) Editorial Board Member - Journal of Naval Architecture and Ocean Engineering (JNAOE), Korea

Awards & Honours


2. Sha, Om Prakash (2008) Awarded “The Institution Prize” (IE) for the paper”Shipping Demand Forecasting for the Development of an Integrated Container Shipping Model f

Fellowships

### Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>An Investigation into Geometric modelling, design and Analysis of Complex Surfaces</td>
<td>Defence Research and Development Organisation (DRDO)</td>
<td>Rs. 8.57 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>An Investigation into Hydrodynamic Characteristics of Foils with and without Flaps</td>
<td>Naval Research Board</td>
<td>Rs. 25.00 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>Application of OceanSat-II data for development of a ship weather routing and safe navigation system</td>
<td>SAC, ISRO</td>
<td>Rs. 18.00 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Control of Ballast Water Problems in Ships through Design Developments</td>
<td>Ministry of Shipping</td>
<td>Rs. 50.00 Lakhs</td>
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<td>5</td>
<td>Development of a Comprehensive Atlas on Tsunami Travel Time and Propagation Model for the Indian Ocean</td>
<td>IIT Kharagpur</td>
<td>Rs. 1.10 Lakhs</td>
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<tr>
<td>6</td>
<td>Development of an Autonomous Underwater Vehicle</td>
<td>Department of Ocean Development</td>
<td>Rs. 694.00 Lakhs</td>
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<td>7</td>
<td>Development of an integrated ocean wave forecasting system and study its impact on coastal structures</td>
<td>Indian National Centre for Ocean Information Services, Ministry of Earth Sciences, Hyderabad,</td>
<td>Rs. 47.00 Lakhs</td>
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<tr>
<td>8</td>
<td>Development of an ocean forecast system for Kalpakkam</td>
<td>Indira Gandhi Center for Atomic Research</td>
<td>Rs. 30.00 Lakhs</td>
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<tr>
<td>9</td>
<td>Development of compositionally graded coating on marine propeller for improving cavitation corrosion resistance</td>
<td>Naval Research Board, DRDO</td>
<td>Rs. 35.56 Lakhs</td>
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<tr>
<td>10</td>
<td>Development of Friction Stir Welding Process for Aluminum alloy and C-Mn Steel Plates</td>
<td>Naval Research Board, DRDO</td>
<td>Rs. 16.68 Lakhs</td>
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<tr>
<td>11</td>
<td>Development of FRP Roadside Barriers for National Highways</td>
<td>National Highway authority of India</td>
<td>Rs. 11.06 Lakhs</td>
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<tr>
<td>12</td>
<td>Estimation of suspended sediment concentration onboard OCEANSAT and algorithm development for settling velocity</td>
<td>Naval Research Board (DRDO), New Delhi,</td>
<td>Rs. 4.86 Lakhs</td>
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<td>13</td>
<td>Hydroelastic Analysis of floating and submerged flexible structures</td>
<td>Naval Research Board, New Delhi</td>
<td>Rs. 18.04 Lakhs</td>
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<tr>
<td>14</td>
<td>Implementation of an integrated nested wave-current-surge model with improved air-sea coupling parameterization for Kalpakkam region</td>
<td>Indira Gandhi Centre for Atomic Research, Kalpakkam</td>
<td>Rs. 33.91 Lakhs</td>
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<td>15</td>
<td>National Programme in Marine Hydrodynamics</td>
<td>Naval Research Board, DRDO, New Delhi,</td>
<td>Rs. 255.00 Lakhs</td>
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<tr>
<td>16</td>
<td>To develop computer model to predict weld induced residual distortion of large plate panels</td>
<td>DST</td>
<td>Rs. 15.78 Lakhs</td>
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<tr>
<td>17</td>
<td>Weld Induced Distortion Analysis of 3-D Large Ship Structures</td>
<td>DST, New Delhi</td>
<td>Rs. 13.44 Lakhs</td>
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</tbody>
</table>

### Consultancy Projects

<table>
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<th>#</th>
<th>Title of the Project</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Consultancy for Project ‘Indigo’</td>
<td>Tata consultancy Services, Maeksin Shipping Co. Pvt. Ltd, Kolkata, National Ship Design &amp; Research Centre, Ministry of Shipping, GOI, Visakhapatnam,</td>
<td>Rs. 21.20 Lakhs</td>
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<tr>
<td>2</td>
<td>Consultation services towards design and manufacturing of 250 Pax steel hull ferry</td>
<td>Maeksin Shipping Co. Pvt. Ltd, Kolkata,</td>
<td>Rs. 2.00 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>Feasibility Study and Design of Shallow Draft Ore Carriers for Goa</td>
<td>National Ship Design &amp; Research Centre, Ministry of Shipping, GOI, Visakhapatnam,</td>
<td>Rs. 8.50 Lakhs</td>
</tr>
</tbody>
</table>
4. Hydrodynamic Design & Design of Control Surfaces for AUV Naval Science and Rs. 13.50 Lakhs Technological Laboratory, Visakhapatnam,

5. Hydrodynamic design of high speed light weight torped NSTL, Visakhapatnam Rs. 22.25 Lakhs

6. Lines Design of 12t Bollard Pull Tug Manaksia Ltd., Kolkata Rs. 1.00 Lakhs

7. Model testing of 12t Bollard Pull Tug Manaksia Ltd., Kolkata Rs. 1.00 Lakhs

8. Software for trajectory simulation of marine vehicles Naval Science & Rs. 25.00 Lakhs Technological Laboratory, Visakhapatnam,

9. Techno-Environmental Feasibility Study of Ganga River Heritage Cruise Circuit Modular Consultants, Rs. 4.00 Lakhs Kolkata,

10. Water entry shock estimation NSTL, Visakhapatnam Rs. 3.65 Lakhs

11. Welding Distortion Analysis ITER-India, Institute Rs. 2.00 Lakhs of Plasma Research

Patents (filed / granted)
1. A new approach of ocean parameter retrieval using neural networks
2. Development of a comprehensive ocean atlas for Indian Ocean using ARGO data

Visits Abroad by Faculty Members
1. Mandal, Nisith Ranjan Working out joint research proposal and delivering lecture in a short course on Distortion Control (University of Strathclyde, Glasgow, UK) December 10-22

Invited Lectures by Faculty Members
2. Practical 3D linear and nonlinear computational seakeeping computations for design by Sen, Debabrata (IIT Madras)
3. Numerical methods in freesurface ship and offshore hydrodynamic problems by Sen, Debabrata (Utkal University, Bhubaneshwar)
4. An overview of marine hydrodynamics and its practical applications by Sen, Debabrata (NIT Durgapur)
5. Recent Developments of Ocean Wave Modeling in India by Bhaskaran, Prasad K (Andhra University, Visakhapatnam)

Books Published

Short-Term Courses, Training Programmes and Workshops organized
1. Introduction to Naval Architecture (Oct 2008)
2. Naval Architecture Training for L&T Officers, organised at L&T Hazira Works, Surat. (22/09-17/10, 2008)
3. Practical Shipbuilding (Dec 2008)
4. Practical shipbuilding for MDL officers (04/12 to 18/12/2008)
HEAD: Professor Ram Naresh Prasad Choudhary

FACULTY

Professors
Chandra, Naresh Ph.D. (Queens University, UK), Atomic Molecular and Optical Physics, Quantum Information
Chandrasekar, A Ph.D. (IISc. Bangalore), Atmospheric Sciences
Choudhary, Ram Naresh Prasad Ph.D. (Edinburgh, UK), Condensed Matter Physics, Ferroelectricity, Liquid Crystals, Thermoelectricity, X-ray Crystallography
Ghatak, Sobhendu Kumar Ph.D. (Calcutta University), Condensed Matter Physics, Biophysics, Biophysics
Kumar, Krishna Ph.D. (IIT Kanpur), Nonlinear Instabilities, Hydrodynamics
Mathur, Balbir Kumar Ph.D. (IIT Kharagpur), Web Based Services, ERP, Microprocessors Based Systems
Raina, Prabhu Krishna Ph.D. (IIT Kharagpur), Nuclear Structure Double Beta Decay and Neutrino Physics, Nuclear Particle and Astrophysics
Ray, Samit Kumar Ph.D. (IIT Kharagpur), Nanotechnology, Condensed Matter Physics, Semiconductors Physics and Devices, Optoelectronics
Samantaray, Biswas Kumar Ph.D. (IIT Kharagpur), Experimental Physics, Structure of Matter, X-Rays
Srinivas, Veeturi Ph.D. (IIT Bombay), Electronic Properties of Solids
Taraphder, Arghya Ph.D. (IISc. Bangalore), Condensed Matter Physics

Associate Professors
Bharadwaj, Somnath Ph.D. (IISc. Bangalore), Astrophysics, Cosmology
Datta, Prasanta Kumar Ph.D. (Burdwan University), Laser Physics / Nonlinear Optics / Photonics
Kar, Sayan Ph.D. (IIT Kharagpur), Gravitation and Geometry, High Energy Physics
Roy, Anushree Ph.D. (IISc. Bangalore), Experimental Condensed Matter Physics

Assistant Professors
Chandra, Amreesh Ph.D. (IT, BHU)
Das, Amal Kumar Ph.D. (IOP Bhubaneswar), Experimental Condensed Matter Physics, Magnetism including Spintronics, Magnetic Semiconducting Nanoparticles and Thin Films, Mechanical and Magnetic Stress Measurement of Thin Films
Das, Baidya Nath Ph.D. (IIT Kharagpur), Experimental Solid State Physics
Dhar, Achintya Ph.D. (Jadavpur University), Semiconductor Nanostructures, Organic Electronics
Khastgir, Sugata Pratik Ph.D. (IOP Bhubaneswar), Mathematical Physics / High Energy Physics
Majumder, Sonjoy Ph.D. (IIA Bangalore), Atomic and Molecular Physics, Quantum Many-Body Theory, Astrophysical Spectroscopy, Nano- and Bulk-material Science

Murugesan, Subramaniam Ph.D. (University of Madras), Nonlinear Dynamics

Nath, Tapan Kumar Ph.D. (IIT Kanpur), Nanostructured Magnetic Materials, Spintronics, Magnetic Thin Films and Multilayers, Multiferroics

Nayak, Jhasak Khan Ph.D. (IP, Bhubaneswar)

Roy Chaudhuri, Partha Ph.D. (IIT Delhi), Fiber and Integrated Optics, Optoelectronics, Experimental Bio-Photonics, Optical Imaging

Shukla, Pragya Ph.D. (JNU, New Delhi), Condensed Matter Physics, Physics of Complex Systems

Singh, Ajay Kumar Ph.D. (Calcutta University), Experimental Nuclear Physics, Nuclear Structure

Srivastava, Sanjeev Kumar Ph.D. (JNU, New Delhi), Materials Engineering using Ion Beams, Nuclear Condensed Matter Physics

Thakur, Awalendra Kumar Ph.D. (NEHU Shillong), Experimental Condensed Matter Physics, Solid State Ions, Ferroelectrics and Dielectrics, Renewable Energy (Portable Power) Sources

Scientific Officer

Chakraborty, Syamal Ph.D. (IIT Kharagpur), Glass and Ceramics, Sol-gel Science, Preparatory Course Physics, Writing Popular Science

Faculty Appointments

Dr. Jhasak Khan Nayak Assistant Professor
Dr. Amreesh Chandra Assistant Professor

Brief Description of on-going activities

The Department is carrying out research and development utilizing in-house facilities and with collaboration with sister departments. Many of the facilities have been developed in the department and procured from sponsored projects. Faculty and scholars are carrying out active research in the following areas: Astrophysical Spectroscopy, Astrophysics, Atmospheric Sciences, Atomic and Molecular Physics, Biophysics, Condensed Matter Physics, Physics of Complex Systems, Cosmology, Electronic properties of solids, ERP, Bio-Photonics, Optical Imaging, Nuclear Physics, Ferroelectricity, Fiber & Integrated Optics, Optoelectronics, Gravitation and Geometry, High Energy Physics, Hydrodynamics, Laser Physics, Nonlinear Optics, Photonics, Magnetic semiconducting nanoparticles and thin films, Magnetism, Spintronics, Materials engineering, Mathematical Physics, Mechanical and magnetic stress, Microprocessors based systems, Monte Carlo Simulation of Radiation Detectors, Semiconductor Devices, Nano- and Bulk-material science, Nanostructured Magnetic Materials, Magnetic thin films and Multilayers, Multiferroics, Nanotechnology, Nonlinear Dynamics, Nonlinear instabilities, Nuclear Particle, Nuclear condensed matter physics, Nuclear Structure, Double Beta Decay and Neutrino Physics, Optoelectronics, Organic Electronics, Particle and Cluster Emission in Fission and Fusion-Fission, Physics of Semiconductor Crystals and Thin Films, Quantum Many-Body Theory, Radiation Measurement Techniques, Radiation Sensors and Dosimetry, Renewable Energy Sources, Semiconductors, Nanostructures, Solid State Ions, Thermoelectricity, Web Based Services.

Thrust Areas

1. Condensed Matter Physics
2. Non-linear Dynamics and complexity
3. Astronomy and Astrophysics
4. Nuclear and Particle Physics
Lectures by Visiting Experts

1. Hamilton's diabolic singularity by Prof. Sir. Michael Berry (Bristol University)
2. Relativistic effects and precision navigation by Prof. Ghanshyam Date (IMS, Chennai)
3. Surface tension and the cosmological constant by Prof. Joseph Samuel (RRI Bangalore)
4. Stimulated Terahertz emission of strained p-Ge and SiGe/Si quantum-well structures doped with shallow acceptors by Dr. Miron Kagan (IREE, Russian Academy of Sciences)
5. The Physics of self-gravitating systems by Prof. Rajaram Nityananda (NCRA, TIFR, Pune)
6. Viscous fingering patterns in a lifting Hele-Shaw cell by Prof. S. Taraphdar (Jadavpur University)
7. Atomic layer deposited high-k and metal nanocrystals for memory applications by Dr. S. Maikap (CGU University Taiwan)
8. Extra solar planet by Dr. Sujan Sengupta (IIA, Bangalore)
9. Spin physics with Jets in polarized proton-proton collisions at sqrt(s) = 200 GeV by Prof. Somnath Choudhury (Indiana University Cyclotron Facility)

Doctoral and MS Degrees Awarded

1. Sanjay Mondal Microstructural, magnetic, optical and transport studies of nanostructured diluted magnetic semiconducting Zn(1-x)TMxO (TM-Co, Mn, Fe, Ni) and Manganese La0.7Ba0.3MnO3 spintronic oxides (Ph.D.)
2. G Anil Kumar Some studies on important aspects of charged particle, spectroscopy with ionization, detector and some aspects of alpha induced fusion reaction with 27/13 Al (Ph.D.)
3. V F Xavier The effect of assimilation of satellite and conventional meteorological data on the prediction of tropical meteorological system over India using a mesoscale model (Ph.D.)
4. P R Das Investigations of structural, dielectric and electrical properties of some tungsten bronz ferroelectric vanadates (Ph.D.)
5. Puja Dey Investigation of Microstructural, electronic, transport, magneto-transport and magnetic properties of nano structured spintronic colossal magneto resistive manganites (Ph.D.)
6. D K Pradhan Studies on structural, vibrational, thermal and electrical properties of ionically conducting polymer nanocomposite electrolytes (Ph.D.)
7. Rama Ghosh Generation of bipertite states of qubits and characterization of their enlargement (Ph.D.)
8. Supriyo Paul Instabilities in externally driven hydrodynamic systems (Ph.D.)
9. S K Syd Ali Probing the universe using red shifted 21 cm HT (Ph.D.)
10. T K Barik Optical studies on liquids, films and soft materials (Ph.D.)
11. Srimant Pal Enhancement of membrane separation performance by turbulence promoters, electric field and plasma modification of surfaces (Ph.D.)
12. M Vasundhara Magnetic and electrical transport of Fe-based intermetallic Hauser alloys (Ph.D.)

Fellow - Professional Bodies

Member - Editorial Board
2. Chandrasekar, A (2008) Member, Editorial Advisory Committee - The Open Atmospheric Science Journal
3. Choudhary, Ram Naresh Prasad (2009) Editorial Advisory Board Member - The Open Materials Science
9. Mathur, Balbir Kumar (0) xx -
10. Ray, Samit Kumar (0) Member of the Editorial Board - Nanotrends

Awards & Honours
2. Srivastava, Sanjeev Kumar (2008) Yong Physicist Award, The Indian Physical Society

Fellowships
1. Datta, Prasanta Kumar (2008) Visiting Professor Fellowship of the Scuola Superiore Sant-Anna, Pisa, Italy for 6 months
2. Datta, Prasanta Kumar (2008) ICTP regular associate fellowship for working at the Scuola Superiore Sant-Anna, Pisa Italy for 3 months
3. Datta, Prasanta Kumar (2008) Erasmus Mundus Teaching fellowship of European Union for working at the Heriot Watt University, Edinburgh, Scotland for 2 months
6. Singh, Ajay Kumar (2008) Alexander von Humboldt Fellowship (follow up program) for three months

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A study of the impacts of initialization of the cyclonic vortex in a high resolution mesoscale tropical cyclone model</td>
<td>DST, New Delhi, India</td>
<td>Rs. 14.98 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>A Theoretical Study on Coherent Structures and Chaos in Nanoscale Ferromagnets</td>
<td>SRIC (IIT-KGP)</td>
<td>Rs. 3.00 Lakhs</td>
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<tr>
<td>3</td>
<td>Analysis, Modelling and Design of Semiconductor Optical Amplifier (SOA) based Photonic Components for Lightwave Systems and Networks</td>
<td>Japan-Indo Collaboration Programme: Kyushu University,</td>
<td>Rs. 20.00 Lakhs</td>
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<tr>
<td>4</td>
<td>Angle- and spin-resolved photoelectron spectroscopy of atoms and molecules</td>
<td>DST, New Delhi</td>
<td>Rs. 1.60 Lakhs</td>
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<tr>
<td>5</td>
<td>Assimilation of Oceansat 2 scatterometer winds in mesoscale model (Lakhs)</td>
<td>Space Application Center, ISRO, Ahmedabad,</td>
<td>Rs.11.00</td>
</tr>
</tbody>
</table>

[175] ANNUAL REPORT 2008-2009
6. Assimilation of satellite data in mesoscale models Space Application Center, ISRO, Ahmedabad, India, Rs. 18.32 Lakhs

7. Calculations of Hyperfine Structure Constants of Heavy Molecules using Relativistic Density Functional Method (DAAD Sandwiched Project, Rs.0.00 Lakhs) SRIC Rs. 3.00 Lakhs

8. Ceramic Titania Foam

9. Coherent Structures and Patterns in Nonlinear Systems DST Rs. 8.00 Lakhs

10. Cooperative Phenomenon and nanosize effects in some correlated systems BRNS Rs. 17.56 Lakhs

11. CRP-Spintronic materials - Simulation and Design of Spintronics Materials BRNS, DAE Rs.107.30 Lakhs

12. Development & characterization of nanostructured thin films for SiGe quantum well infrared photodetector and ferroelectric based gas / chemical sensors DRDO Rs.201.80 Lakhs


14. Development of Artificially Structured Nano Magnetic Materials for High Frequency Sensor Applications DRDO Rs. 31.00 Lakhs

15. Development of cantilever beam magnetometer for in-situ measurement of mechanical and magnetic properties of thin films for spintronic application DRDO Rs. 68.99 Lakhs

16. Development of Ion Conducting Polymer-Nanoceramic Surfaces as Templates CSIR, New Delhi Rs. 12.00 Lakhs

17. Development of novel magnetic materials for magnetoelectronic applications BRNS, DAE Rs. 23.00 Lakhs

18. Development of optical parametric oscillator tunable in the range of 0.35um to 16.0um for air-borne detection of chemical and biological warfare agent DRDO, Govt. of India Rs. 73.29 Lakhs

19. Development of Polymer Nano-Composite Based Rechargeable Solid State Lithium Batteries For Ambient & Subambient Temp. Applications MHRD, New Delhi Rs. 15.00 Lakhs

20. Development of Preform for High Power Fiber Laser BRNS, Rs. 24.69 Lakhs

21. Development of quantum well infrared photodetectors in wavelength range 8-14 um using Si/SiGe nanotechnology DIT Rs. 92.24 Lakhs

22. Development of terahertz sensors for biomedical imaging and remote detection of chemicals/ biological warfare agents MHRD Rs. 10.00 Lakhs

23. Experimental Investigations on electronic and thermal transport processes in maganite perovskites and development of various sensing devices CSIR Rs. 7.78 Lakhs

24. Fabrication and characterization of Novel Photonic Crystal Structures and Si/Ge Quantum Dots for Photonic Applications DST-ITPAR (Italy) Rs. 28.14 Lakhs

25. Fabrication of cost-effective AC-magnetic susceptibility measurement set up for use with a liquid nitrogen cryostat assembly down to 70 Kelvin. ISIRD, IIT Kharagpur Rs. 3.00 Lakhs

26. Fabrication of Doped Single-Mode Optical Fibers for Investigation of Bragg Grating Characteristics DRDO Rs. 24.70 Lakhs

27. Feasibility Study of Neutrinoless Double Beta Decay in 124Sn. DST, New Delhi Rs. 51.00 Lakhs
28. Giant magneto-impedance in manganite system
   CSIR Rs. 21.00 Lakhs
29. Impact of assimilating high temporal resolution data from INSAT-3D in high-resolution mesoscale model for prediction of severe weather systems over Ba
   Space Application Center, ISRO, Ahmedabad, Rs. 5.64 Lakhs
30. Investigation of Electrical-transport, Magneto-transport, Extraordinary Hall resistivity, Specific heat and Magnetic studies in nanostructured CMR man
   DST, New Delhi Rs. 128.00 Lakhs
31. Kinematics of flows in diverse contexts
   DST New Delhi Rs. 8.52 Lakhs
32. Low temperature Raman measurements on novel materials
   DST Rs. 36.00 Lakhs
33. Measuring the HI power-spectrum with the GMRT
   BRNS, DAE Rs. 7.73 Lakhs
34. On some aspects of Nano-photonics (M.I.U.R
   Italian Ministry of Education) Rs. 12.00 Lakhs
35. Optical Properties of Fluorescent Nanocrystalline Phosphates and Gallates Co-Doped with transition and rare-earth element
   CSIR Rs. 7.16 Lakhs
   DST, GOI and Italian Ministry of Foreign Affairs., Rs. 5.00 Lakhs
37. R&D in Photonic Crystal Fibers: Design, Fabrication and Experimental Characterization for Applications in Optical Communications and Sensors
   DST, GOI Rs. 35.28 Lakhs
38. Realization of packet switched node with optoelectronic and photonic technologies for ultra broadband communication systems and networks
   Ministry of Education, Italy, Rs. 35.00 Lakhs
39. Second order cascaded nonlinear optical processes for all-optical photonic devices
   DST, Govt. of India Rs. 7.62 Lakhs
40. Spectroscopy of nuclei close to beta-stability line by using complete- and incomplete-fusion and deep-inelastic reactions
   DST, GOI Rs. 13.00 Lakhs
41. Studies in Photon-Atom and Photon-Molecule Interactions
   DST, New Delhi Rs. 5.50 Lakhs
42. Studies in Quantum Information and Spectroscopy Involving Photons, Electrons, Atoms, and Molecules
   Council of Scientific & Industrial Research, Rs. 8.00 Lakhs
   CSIR, New Delhi Rs. 8.00 Lakhs
44. Studies of Atoms and Molecules in the Presence of External Fields
   CSIR, New Delhi Rs. 8.00 Lakhs
45. Studies of Transport Properties and Localisation of Waves in Random Media
   Department of Science and Technology, Rs. 14.00 Lakhs
46. Studies on impact of 3DVAR assimilation of surface, upper air and MODIS observations in mesoscale models during the Indian winter season
   SASE, DRDO, Chandigarh, Rs. 10.00 Lakhs
47. Studies on Laser-Optical Fiber-Based Micro-Imaging Techniques in the Analysis of Tissue Structure and Detection of Abnormalities
   ISRD, IIT Kharagpur Rs. 5.00 Lakhs
48. Studies on the impact of satellite data assimilation in mesoscale models
   CSIR, Rs. 10.00 Lakhs
49. Study of Giant magneto-impedance(GMI) in soft ferromagnet for sensor application
   CSIR Rs. 11.75 Lakhs
50. Study of magnetic properties of thin films on semiconductor substrates using cantilever beam magnetometer (jointl project with CSIR)
   ISIRD, SRIC, IIT Kharagpur, Rs. 3.00 Lakhs
<table>
<thead>
<tr>
<th>No.</th>
<th>Project Title</th>
<th>Organization</th>
<th>Funding Amount (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>Technology Development and Research with Photonic Crystal Fibers and Components for Advanced Photonic Sensor System</td>
<td>DRDO, GOI</td>
<td>62.84 Lakhs</td>
</tr>
<tr>
<td>52</td>
<td>Terahertz emission of Si/SiGe structures doped with shallow acceptors</td>
<td>DST - RFBR (Moscow),</td>
<td>9.63 Lakhs</td>
</tr>
<tr>
<td>53</td>
<td>The Theory of Electron Correlation and Its Applications in Molecular and Nanoscience</td>
<td>Hungarian-Indian Intergovernmental S&amp;T co-operation programme</td>
<td>0.00 Lakhs</td>
</tr>
<tr>
<td>54</td>
<td>Theoretical Study of Hyperfine Interaction in Heavy Atoms and Molecules for Quantum Computation and Frequency Standard</td>
<td>IIT-Kharagpur (ISIRD)</td>
<td>3.00 Lakhs</td>
</tr>
<tr>
<td>55</td>
<td>To study the effect of interfaces for efficient transport of carriers in organic light emitting materials</td>
<td>CSIR</td>
<td>9.91 Lakhs</td>
</tr>
<tr>
<td>56</td>
<td>Transport properties in organic light emitting materials and role of interfaces for efficient conductions (ISIRD)</td>
<td>SRIC, IIT Kharagpur)</td>
<td>3.00 Lakhs</td>
</tr>
<tr>
<td>57</td>
<td>Upgrading Raman spectrometer to microRaman spectrometer to study biomaterials</td>
<td>DRDO</td>
<td>49.80 Lakhs</td>
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</tbody>
</table>

**Consultancy Projects**

<table>
<thead>
<tr>
<th>No.</th>
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<th>Organization</th>
<th>Funding Amount (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Development of Admission Modules for IISER</td>
<td>IISER Bhopal</td>
<td>4.50 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Evaluation of Electrodes for Lithium Battery Applications</td>
<td>UNTPL, Kolkata</td>
<td>10.00 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>Students Academic Management</td>
<td>IISER Pune</td>
<td>1.75 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Thin Film Characterization</td>
<td>Various agencies</td>
<td>2.00 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>X-RAY, AFM and Impedance measurements for polymer based capacitor films and their temeperature dependance</td>
<td>EPCOS India Pvt Ltd, Pune,India,</td>
<td>0.60 Lakhs</td>
</tr>
</tbody>
</table>

**Patents (filed / granted)**

1. Terahertz frequency radiation sources and detectors based on group-IV materials and method of manufacture

**Visits Abroad by Faculty Members**

1. Sharma, Shivcharan Lal To participate and present two papers in 2008 IEEE NSS MIC RTSD Conference (Dresden, Germany) October 18-25, 2008
2. Ray, Samit Kumar Collaborative Research Work (University of Trento, Italy) One week
3. Ray, Samit Kumar Research Collaboration (University of Newcastle, UK) 3 days
4. Singh, Ajay Kumar Research collaboration (HISKP, University of Bonn) May-July
5. Chandrasekar, A For collaborative research work (Meteorological Research Institute, Tsukuba, Japan) May - July 2008
7. Raina, Prabhu Krishna Faculty exchange visit under MOU with Roma 2 University Tor Vergata. (LNGS Gran Sasso ROME Italy) July 7-16, 2008
8. Taraphder, Arghya Research collaboration (Max Planck Institute, Dresden January-April
9. Das, Amal Kumar Scientific research collaborative works (Jaharnes Kepler University (JKU), Linz, Austria) two months
10. Datta, Prasanta Kumar Indo-Bulgarian Collaboration Research (Sofia University, Bulgaria) January 29 February 4, 2008
11. Datta, Prasanta Kumar  
   Erasmus Mundus Teaching scholarship (Heriot Watt University, Edinburgh, Scotland) February 4 – March 31, 2008
12. Datta, Prasanta Kumar  
   Research work as a visiting Professor (Scuola Superiore Sant-Anna, Pisa, Italy) April 1 – December 31, 2008
13. Datta, Prasanta Kumar  
   Indo-Japan Research Collaboration meeting (Tokyo Institute of Technology, Tokyo & Osaka University, Osaka, Japan) July 1-7, 2008
14. Shukla, Pragya  
   Visiting Fellow (Newton Institute of Mathematical Sciences, Cambridge, UK) December 5-19, 2008
15. Nath, Tapan Kumar  
   To carry out Collaborative Research work on Fe-doped ZnO epitaxial films for Spintronics Applications (University of Sheffield, S3 7RH, Sheffield, UK) June 4-July 22, 2008 and December 4-24, 2008

Invited Lectures by Faculty Members
1. Students Academic Management by Mathur, Balbir Kumar (IISER Pune)
2. Hosts of All-fiber Passive Components -Fused Fiber Coupler & Hollow Optical Fiber: for Optical Comm by Roy Chaudhuri, Partha (Department of Electronics Engineering, Institute of Technology, Banaras Hindu University, Varanasi-221005)
3. Group-IV Nanophotonic Devices by Ray, Samit Kumar (University of Trento, Italy)
4. Semiconductor Nanostructures for Device applications by Ray, Samit Kumar (Inst. of Radio Physics & Electronics, Kolkata University)
5. Nanoelectronic and Sensing Devices by Ray, Samit Kumar (IIT Delhi)
6. Experiments in Nanoscience by Ray, Samit Kumar (Vidyasagar College, Kolkata)
7. SiGe based nanoelectronic and photonic devices by Ray, Samit Kumar (Univeristy of Newcastle, UK)
10. Modeling of Extreme Rainfall Events over India during SouthWest Monsoon using JMA-NHM by Chandrasekar, A (Meteorological Research Institute, Tsukuba, Japan)
11. 3-D variational assimilation of satellite and radar data using WRF model by Chandrasekar, A (Brainstorming meet at Ministry of Earth Sciences, Government of India, New Delhi)
12. Multiferroics: A Boon to Advanced Research by Choudhary, Ram Naresh Prasad (Thapar University, Patiala, Punjab (NSFD, 15th))
13. Nanoferrorellectrics: Synthesis and Characterization by Choudhary, Ram Naresh Prasad (B.S College, Danapur, Patna, Bihar (National seminar).)
14. Advances On Multifunctional Materials by Choudhary, Ram Naresh Prasad (University of North Bengal Siliguri, West Bengal (National Seminar))
15. Organic OptoElectronics : Present Status by Dhar, Achintya (BHU-IT, Varanasi)
16. Journey from 3D to 0D : nanomaterials by Dhar, Achintya (NIT, Raipur)
17. Organic and Inorganic nanostructures by Dhar, Achintya (Jadavpur University, Kolkata)
18. Organic OptoElectronics : A Review by Dhar, Achintya (IIT Kharagpur, Kolkata Ext Centre)
19. The Story of Light by Kar, Sayan (Science Education Programme on The Fascinating World of Physics, CMERI, Durgapur, May 26-31, 2008, (Sponsored by IAS, INSA and NASI))
20. Cosmological Braneworlds by Kar, Sayan (ICTS-IUCAA Workshop on Cosmology with CMB and LSS, IUCAA, Pune, August 28-31, 2008)
21. Novelty in the negative domain: facts and physics by Kar, Sayan (Science Day Lecture (Feb 27, 2009), DRDO, Balasore)
22. Placement Optimization by Mathur, Balbir Kumar (Vidyasagar University)
23. Travelling waves in 2D simulation of thermal convection by Kumar, Krishna (IISc.)
25. Microscopic Investigation of Hyperfine Field at Cu in Cr Using Energetic Heavy Ions by Srivastava, Sanjeev Kumar (Institute of Physics, Bhubaneswar)
27. Heavy Ion Induced Mixing: A Prospective Review by Srivastava, Sanjeev Kumar (University of Allahabad)
28. Magnetic and electric properties of Core-shell structured nanoparticles and composites by Srinivas, Veeput (Bose Institute of Basic Sciences)
29. Optical hysteresis behaviour of semiconductor saturable absorber by Datta, Prasanta Kumar (Dept. of Physics, Pavia University, Italy)
30. Raman and Photoluminescence Spectroscopy: Analytical Techniques to Probe Nanomaterials by Roy, Anushree (IIT Gwahati)
31. Raman Imaging and Its Applications to Medical Sciences by Roy, Anushree (SMST, IIT Kharagpur)
32. Plasmon Coupling Between Gold Nanorods and Adsorbed Organic Molecules by Roy, Anushree (Jadavpur University)
33. Nano-BioScience by Roy, Anushree (Jadavpur University)
34. Breakdown of Meyer Neldel Rule beyond Polymer Phase Transition in Bulk and Nanocomposites by Thakur, Awalendu Kumar (BU DRDO Centre, Coimbatore, Tamilnadu, India)
35. Supercapacitors: Design and Evaluation by Thakur, Awalendu Kumar (Thapar University, Patiala, India)
36. Neutrinless Double Beta Decay: Future Expectations and Perspective. Seminar at by Raina, Prabhu Krishna (Department of Physics, University of Jammu, Jammu.)
37. Tin as a candidate for low background experimentation: Some issues in Double Beta Decay by Raina, Prabhu Krishna (KINR Kiev, Ukraine)
38. Split-step bidirectional model for predicting the steady-state characteristics of a bulk semiconductor by Datta, Prasanta Kumar (Tokyo Institute of Technology, Tokyo, Japan)
39. On the measurement of imaginary part of second order optical nonlinearity by Datta, Prasanta Kumar (Tokyo Institute of Technology, Tokyo, Japan)
40. Optical hysteresis behaviour of vertical cavity semiconductor saturable gate by Datta, Prasanta Kumar (CEIIC, Scuola Superiore Sant-Anna, Pisa, Italy)
41. Derivation of closed form condition for optical bistability in vertical cavity semiconductor gate by Datta, Prasanta Kumar (CEIIC, Scuola Superiore Sant-Anna, Pisa, Italy)
42. Nanostructured CMR Manganite Oxides by Nath, Tapan Kumar (SN Bose National Center for Basic Sciences, Kolkata)
43. Colossal Magnetoerisistive Manganites (CMR): Basic understanding and Applications by Nath, Tapan Kumar (Department of Physics, University of Sheffield, U.K.)
44. Carrier Induced Room Temperature Ferromagnetism in ZnFeO films for Spin-electronics by Nath, Tapan Kumar (Department of Physics, University of Sheffield, UK)
45. Quantum Entanglement of Flying Electronic Qubits by Chandra, Naresh (Harish-Chandra research Institute, Allahabad)

Books Published

Seminars, Conferences and Workshops Organised
1. 25th IAGRG meeting
2. 9th International Conference on Vibration Problems Jan 19-22, 2009
3. CTS workshop on vibration problem
4. Teachers Academy
CENTRE FOR EDUCATIONAL TECHNOLOGY

CHAIRMAN : Professor Tapan Kumar Basu

FACULTY

Assistant Professor
Bhattacharaya, Bani Ph.D. (IIT Kharagpur), Instructional Design, Distance Education, Evaluation in Teaching-Learning
Mohanty, Atasi Ph.D. (Utkal University), Cognitive Psychology and Human Resource Development

Visiting Faculty
Ray, A. K. Ph.D., Educational Technology; Video Systems Engineering

Brief Description of on-going activities

CET, IIT Kharagpur is offering an M.Tech Programme on “Media and Sound Engineering”. The second batch of students have already joined the programme. CET has also initiated Ph.D programmes in both, areas related to educational pedagogy and in engineering. Research scholars are already working in these areas. Two research scholars have joined in the area of Educational Technology and two, in the area of Speech processing have joined the department. CET is also part of the NPTEL - Phase 2 - that has been already approved.

Thrust Areas

1. The center has produced nearly 4,800 hours of video courses in various engineering subjects. These are in use in more than 250 engineering colleges, universities and R & D laboratories. These courses are primarily used for self-learning by faculty, staff and students. Significant demand for them exists in overseas markets also. CD & DVD versions of these courses are available. CET is now also making the courses available on HDDs to be used in the Video-on-Demand (VOD) mode by institutions within their internal LAN. This allows access to any course on the LAN to a large number of users at any point of time along with the ability to control all normal play functions at will. More than 3700 users access these courses on any single day within the LAN of IIT Kharagpur.

New Acquisitions

1. Establishment of Video Systems Laboratory at CET : A state-of-the-art video systems laboratory has been set up with purchase of audio / video equipment worth Rs. 50 lakhs.

Sponsored Research Projects

<table>
<thead>
<tr>
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<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning</td>
<td>MHRD</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Identifying Inspirational Factors within the Affective Domain</td>
<td>Learning Resource Design &amp; Development Project,</td>
<td>Rs. 6.00 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>National Programme on Technology Enhanced Learning Phase 2</td>
<td>MHRD</td>
<td>Rs. 96.00 Lakhs</td>
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Consultancy Projects

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<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>National Programme on Technology Enhanced Learning</td>
<td>MHRD, Government of India,</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
</tbody>
</table>
Invited Lectures by Faculty Members

1. Educational Pedagogy” TEQUIP programme, by Bhattacharaya, Bani (BIT, Mesra, Ranchi,)

2. 05 topics- Mentoring, Social Cognition, Personal Effectiveness, Conflict Resolution, Stress Management by Mohanty, Atasi (Summer School on Educational Technology, CET, IIT, Kharagpur)

3. Bridging the Gap between School Curriculum & Teacher Education Programmes by Mohanty, Atasi (Govt. Teacher Training College, Sevayatan, Jhargram, West Medinipur, West Bengal)
CENTRE FOR OCEANS, RIVERS, ATMOSPHERE AND LAND SCIENCES

HEAD: Professor A. Chandrasekar

FACULTY

Assistant Professor

Behera, Mukunda Dev  Ph.D. (IIRS, DehraDun), Land and Vegetation Study, Vegetation Carbon and Biomass Modelling, Remote Sensing and GIS

Chakraborty, Arun  Ph.D. (IIT Delhi), Ocean Circulation Modeling, Ocean and Climate Studies

Dash, Mihir Kumar  Ph.D. (Gujarat University), Satellite Oceanography, Cryospheric Studies, Ocean Modeling

Mandal, Manabottam  Ph.D. (IIT Delhi), Observations and Modeling of Thunderstorm, Modeling of Extreme Weather Events, Regional Climate Modeling, Cloud Microphysics, Mesoscale Data Assimilation


Shaji, C  Ph.D. (IIT Delhi), Ocean Modeling and Analysis, Coastal Processes, Monsoon Oceanography

Emeritus Professor

Pandey, Prem Chand  Ph.D. (Allahabad University), Satellite Oceanography, Atmospheric Science, Antarctic and Climate Change

Faculty Appointments

Dr Shubha Verma  Joint Faculty, Assistant Professor

Dr. M.D. Behera  Assistant Professor - Transferred from RDC

New Academic Programmes

A new course named "Land System Studies" (CL60028) has been introduced as a CORAL elective from the Spring Semester of 2008-2009. Furthermore, an existing MTech CORAL lab course name was modified by introducing GIS applications and the above MTech course (CL69003) (0-0-3) 2 credits is now called as "Data Analysis and GIS Applications".

Brief Description of on-going activities

The CORAL center is actively participating in DST/MOES sponsored STORM (Severe Thunderstorms and Regional Modeling) which is in operation along East/North East part of India. Under this program a 50 m instrumented micro-meteorological tower was installed in IIT Kharagpur campus to monitor the atmospheric surface layer characteristics during the pre-monsoon thunderstorm activity. A state of art upper air sounding system was procured to study the atmospheric boundary layer dynamics during various epochs of thunderstorm activities at Kharagpur. The centre is also involved in the development of Data Assimilative Coastal Circulation Model Over Bay of Bengal; development of a Hybrid Coordinate Ocean Model (HYCOM) for the Bay of Bengal, numerical simulation of Bay-of-Bengal Circulation Features using satellite data; air-sea interaction studies, sea ice monitoring using remote sensing and satellite data obtained from Megha-Tropiques and to study any climate signal in their variation. Attempts are also underway in biodiversity characterization at landscape level using Satellite Remote Sensing and GIS for various states of India as well as Land Use and Land Cover change Dynamics. Moreover, studies involving assessment and modelling of Forest Biomass and Carbon Dynamics using Remote Sensing and GIS is on going.
Thrust Areas
1. Observations and modeling of atmosphere and oceans
2. Climate variation studies towards Climate Change

New Acquisitions
1. Vaisala DigiCORA MW31 System for measuring the vertical profiles of temperature, humidity, pressure, wind speed and wind direction
2. Cluster Computing Systems

Lectures by Visiting Experts
1. Severe Thunderstorm: Observations and Regional Modelling by Prof. U. C. Mohanty (CAS, IIT Delhi)
2. Dynamics of large-scale wind-driven circulation off the Indian coast by Dr. D. Shankar (Scientist, National Institute of Oceanography, Goa)

Member - Editorial Board
1. Pandey, Prem Chand (2007) Member Proc. of the National Acad. of Sciences, India, Physical Sciences, Allahabad

Fellowships
1. Pandey, Prem Chand (2009) Fellow, Geological Society of India

Sponsored Research Projects

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<tbody>
<tr>
<td>1</td>
<td>Development of a Hybrid Coordinate Ocean Model (HYCOM) for the Bay of Bengal</td>
<td>Indian National Centre for Ocean Information Services (INCOIS), Hyderabad</td>
<td>Rs. 43.00 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Assessmet and Modelling of Forest Biomass and Carbon Dynamics using Remote Sensing and GIS in Katerniaghat WLS, Uttar Pradesh</td>
<td>National Botanical Research Institute, Lucknow [CSIR],</td>
<td>Rs. 60.02 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>Development of a Comprehensive Ocean Atlas for Indian Ocean utilising ARGOS Data</td>
<td>Indian National Center for Ocean Information Services (MoES), Hyderabad</td>
<td>Rs. 19.00 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Development of Data Assimilative Coastal Circulation Model Over Bay of Bengal</td>
<td>SAC, ISRO, Ahmedabad, INCOIS, Hyderabad</td>
<td>Rs. 22.80 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>Development of Operational Physical Ocean Model for Bay-of-Bengal</td>
<td></td>
<td>Rs. 54.00 Lakhs</td>
</tr>
<tr>
<td>6</td>
<td>Land Use and Land Cover change Dynamics in relation to Human Dimension and Climate Change in Mahanadi River Basin, Orissa (National Remote Sensing Centre (NRSC), Hyderabad [Dept. of Space)</td>
<td>(ISRO), Govt. of India</td>
<td>Rs. 12.80 Lakhs</td>
</tr>
<tr>
<td>7</td>
<td>Monitoring of sea ice using oceanat - 2 scatterometer data for determination of climatic trend</td>
<td>Space Applications Centre (ISRO), Ahmedabad,</td>
<td>Rs. 22.80 Lakhs</td>
</tr>
<tr>
<td>8</td>
<td>Monitoring Thermodynamical structure of Atmospheric Boundary Layer during pre-monsoon convective activity over Khargpur</td>
<td>DST, Govt. of India</td>
<td>Rs.156.39 Lakhs</td>
</tr>
<tr>
<td>9</td>
<td>Rural Technology Action Group-Eastern India (RuTAG-EI)</td>
<td>O/O Principal Scientific Advisor to Government of India, New Delhi,</td>
<td>Rs. 29.60 Lakhs</td>
</tr>
<tr>
<td>10</td>
<td>Sea ice monitoring in the Arctic and the Antarctic</td>
<td>National Centre for Antarctic and Ocean Research (MOES), Goa,</td>
<td>Rs. 29.60 Lakhs</td>
</tr>
</tbody>
</table>
11. Simulation of Bay-of-Bengal Circulation Features using OCEANSAT-II Scatterometer Wind and OCM | SAC, ISRO Ahmedabad | Rs. 17.40 Lakhs
12. Study of Bay of Bengal features and its impacts on the air-sea interaction using FORMS | Indian National Centre for Ocean Information Services (INCOIS), Hyderabad | Rs. 33.90 Lakhs
13. Study of Boundary Layer Characteristics at Kharagpur during occurrence of severe thunderstorms | Department of Science and Technology, Govt. of India | Rs. 46.70 Lakhs
14. Study of variability in the Air-sea interaction over the Tropical Indian Ocean using the observations from Megha Tropiques | Space Applications Centre (ISRO), Ahmedabad | Rs. 12.24 Lakhs

Consultancy Projects

1. Development of a comprehensive ocean atlas for Indian ocean utilising ARGO Data | Indian National Center for Ocean Information Services, (MoES), Hyderabad | Rs. 19.00 Lakhs

Invited Lectures by Faculty Members

1. Global warming by Pandey, Prem Chand (Gopalpur College, Balasore)
2. Antarctic Science and Climate Change research by Pandey, Prem Chand (Orissa College of Engineering, Bhubaneswar)
3. Energy Cycle of the Atmosphere (Second Lecture) by Chakraborty, Arun (KIST Bhubaneswar)
4. Atmosphere Composition (First Lecture) by Chakraborty, Arun (KIST Bhubaneswar)
5. Tropical Atmosphere (Third Lecture) by Chakraborty, Arun (KIST Bhubaneswar)
6. Basic Idea of Probability & Autocorrelation (Fourth Lecture) by Chakraborty, Arun (KIST Bhubaneswar)
7. Measuring Carbon Content in Different Forest Ecosystems by Behera, Mukunda Dev (State Forest College, Forest Research Institute, DehraDun)
8. Tropical Pacific Ocean Circulations using Hybrid Coordinate Ocean Model (HYCOM) and Observations by Shaji, C (Ocean Engg. & Naval Architecture, Indian Institute of Technology, Kharagpur)
9. Global Warming, Will Human-Induced Climate Change Destroy the World? by Dash, Mihir Kumar (Govt.Girls PG College, Bilaspur, Chhattisgarh)
10. Turbulent Transport in Atmospheric Boundary Layer by Satyanarayana, Achanta Naga Venkata (Department of Applied Mathematics, Birla Institute of Technology, Mesra-835 215 Ranchi)
12. Experimental Programmes on Atmospheric Boundary Layer by Satyanarayana, Achanta Naga Venkata (Department of Applied Mathematics, Birla Institute of Technology, Mesra-835 215 Ranchi)
13. Land surface modeling for weather and climate prediction by Mandal, Manabottom (BIT, Mesra, Ranchi)
14. Numerical Weather Prediction using Mesoscale Modeling System MM5 by Mandal, Manabottom (Indian Air Force Station, Kalaikunda)

Short-Term Courses, Training Programmes and Workshops organized

1. Natural Resources Planning for Rural Livelihood in Murshidabad District, W.B. (1-Week)
CRYOGENIC ENGINEERING CENTRE

HEAD : Professor Vutukuru Vasudeva Rao

FACULTY

Professor
Bandyopadhyay, Syamalendu Sekhar  Ph.D. (IIT Kharagpur), Separation Processes, Natural Gas Processing, Carbon Dioxide Capture and Sequestration, Air Breathing Propulsion
Chowdhury, Kanchan  Ph.D. (IIT Kharagpur), Cryogenic Air Separation, Safety in Oxygen-rich Environment, Refrigeration and Cold Storage Technology, Simulation of Helium Liquefiers
Dey, Tapas Kumar  Ph.D. (Delhi University), Thermophysical Properties of Materials, Cryo-instrumentation, Superconducting Materials and Devices
Rao, Vutukuru Vasudeva  Ph.D. (IIT Madras), Applied Superconductivity, Vacuum Technology, Cryo Physics
Sarangi, Sunil Kumar  Ph.D. (Stony Brook)

Assistant Professors
Adyam, Venimadhav  Ph.D. (IISc. Bangalore), Magnetic Thin Films, Functional Nanocomposite, Oxide Thermoelectrics
Ghosh, Indranil  Ph.D. (IIT, Kharagpur), Compact Heat Exchangers, Sorption Cooling
Ghosh, Parthasarathi  Ph.D. (IIT Kharagpur), Simulation of Helium Liquefiers, Cryogenic Turboexpander and Expansion Devices, Low Temperature Processes
Nandi, Tapas Kumar  Ph.D. (IIT Kharagpur), Matrix Heat Exchanger, Cryogenic Hydrostatic Bearing
Sandilya, Pavitra  Ph.D. (IIT Kanpur), Gas Hydrate, Non-conventional Energy

Brief Description of on-going activities
Cryogenic Engineering Centre is engaged in teaching at UG and PG levels, sponsored research and consultancy remain at the core activity of the Centre.

The Centre is also active in Continuing Education through training engineers from industries, faculty from academic institutions, and scientists from R&D organisations by conducting short term courses and workshops in specialised areas like Cryogenic Engineering, Air Separation, Vacuum Technology etc.

Thrust Areas
1. Cryogenic Engineering
2. Advanced Materials
3. Nonconventional Energy

Doctoral and MS Degrees Awarded
1. Soma Das  Electrical, Transport and Magnetocaloric Properties in Potassium doped Langthanum Manganites (Ph.D.)
2. Arunkumar Samanta  Absorption of Carbon Dioxide into Piperazine Activated Alkanolamines (Ph.D.)

Fellow - Professional Bodies
1. Nandi, Tapas Kumar (2008)  Awarded - Institution of Engineers (India)

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Member - Editorial Board

1. Bandyopadhyay, Syamalendu Sekhar (2008) Editor - Indian Chemical Engineer (ICE)

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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Analysis &amp; Development of Conceptual Design Methodologies for Air Collection and Enrichment System of Air Breathing Propulsion</td>
<td>ISRO</td>
<td>Rs. 15.00 Lakhs</td>
</tr>
<tr>
<td>2.</td>
<td>Analytical and Computational Evaluation of Various Parameters involved in the Design of SC cables (CIC type) to be used for fusion grade magnets</td>
<td>IPR Gujarat NFP</td>
<td>Rs. 42.70 Lakhs</td>
</tr>
<tr>
<td>3.</td>
<td>Design and development of hydrostatic journal bearings for cryogenic rocket engine turbopump</td>
<td>ISRO</td>
<td>Rs. 2.40 Lakhs</td>
</tr>
<tr>
<td>4.</td>
<td>Development of an experimental test facility for process intensification of an integrated fuel system for marine energy generation</td>
<td>NMRL (DRDO)</td>
<td>Rs. 194.44 Lakhs</td>
</tr>
<tr>
<td>5.</td>
<td>Development of perforated plate matrix heat exchanger</td>
<td>DST, Kolkata</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>6.</td>
<td>Development of perforated plate matrix heat exchangers for cryogenic applications</td>
<td>Department of Science and Technology</td>
<td>Rs. 5.22 Lakhs</td>
</tr>
<tr>
<td>7.</td>
<td>Development of thermophysical measurement system for liquids and investigations on the thermal conductivity &amp; pool boiling characteristics of various</td>
<td>DST, New Delhi</td>
<td>Rs. 29.00 Lakhs</td>
</tr>
<tr>
<td>8.</td>
<td>Fabrication of oxide multiferroic thin films by RF Magnetron Sputtering: Investigation of magnetodielectric and magnetoferroelectric properties</td>
<td>DST</td>
<td>Rs. 17.00 Lakhs</td>
</tr>
<tr>
<td>9.</td>
<td>Investigations on the giant magneto-impedance of bulk and thin films of lanthanum based doped manganites &amp; development of contact less linear pos sens</td>
<td>Council of Scientific and Industrial Research, New Delhi</td>
<td>Rs. 10.12 Lakhs</td>
</tr>
<tr>
<td>10.</td>
<td>Investigation of the Effects of Tribocharging of Solid Particles on Possible Ignitions in Gaseous Oxygen System</td>
<td>Department of Science and Technology, Govt. of India,</td>
<td>Rs. 28.50 Lakhs</td>
</tr>
<tr>
<td>11.</td>
<td>Refurbishing a DC/RF Sputtering and development of Ferromagnetic/semiconductor hybrid structures for spintronics</td>
<td>SRIC</td>
<td>Rs. 4.60 Lakhs</td>
</tr>
<tr>
<td>12.</td>
<td>Safe design of systems with oxygen-rich environment</td>
<td>ISRO, IIT Kharagpur</td>
<td>Rs. 9.00 Lakhs</td>
</tr>
<tr>
<td>13.</td>
<td>Steady state and dynamic simulation of kW class helium refrigerator/liquefier for superconducting magnets used for fusion machines</td>
<td>Institute for Plasma Research, Gandhinagar, Gujarat,</td>
<td>Rs. 46.00 Lakhs</td>
</tr>
<tr>
<td>14.</td>
<td>Studies on Desorption Cooling from Activated Carbon</td>
<td>Indian Institute of Technology, Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>15.</td>
<td>Studies on gas bearings for cryogenic turboexpander</td>
<td>ISIRD, SRIC, IIT Kharagpur,</td>
<td>Rs. 4.00 Lakhs</td>
</tr>
<tr>
<td>16.</td>
<td>Synthesis and multiferroic properties of AFe12O19 (A= Ba, Sr) nanoparticles reinforced polymer nanocomposites for space applications</td>
<td>CSIR</td>
<td>Rs. 18.00 Lakhs</td>
</tr>
</tbody>
</table>

Consultancy Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Development of Software and detailed calculation for Explosive Decompression Chamber</td>
<td>Kasko Industries, Pune,</td>
<td>Rs. 0.50 Lakhs</td>
</tr>
<tr>
<td>2.</td>
<td>Parallel flow and counter flow tube-in-tube heat exchanger</td>
<td>NIT, Rourkela</td>
<td>Rs. 0.76 Lakhs</td>
</tr>
</tbody>
</table>
3. R&D Study on Aluminium Coating of Airframe Structure of PJ 10 DRDL, Hyderabad Rs. 3.50 Lakhs
4. Wetting of the Design of Vacuum Drying System Mariental India Pvt. Ltd., New Delhi, Rs. 1.00 Lakhs

Invited Lectures by Faculty Members
1. Designing of epitaxial multiferroics by Adyam, Venimadhav (IISER Kolkata)
2. Cryogenic Turboexpander in the short term course on Helium Cryogenics by Ghosh, Parthasarathi (NIT Rourkela)
3. Cooling of Superconducting Magnets: An overview by Nandi, Tapas Kumar (NIT, Rourkela)
4. Carbon dioxide capture and sequestration: perspectives and research need by Bandyopadhyay, Syamalendu Sekhar (National conference on Carbon Dioxide Capture and Sequestration-Challenges for Engineers, Anand, Gujarat)

Short-Term Courses, Training Programmes and Workshops organized
1. Cryogenic Air Separation (September 1624, 2008)
2. Cryogenic Air Separation -2008 (April 1116, 2008)
HEAD: Professor Basudam Adhikari

FACULTY

Professor

Adhikari, Basudam  Ph.D. (Calcutta University), Development of jute based fully biodegradable green composites, Development of jute-cement concrete composites, Development of jute based geotextiles, Development of jute based sound proofing panels, Development of a suitable processing technique for rubber coating of jute, Development of conducting polymer based gas sensors, Biodegradation of polyethylene films, Polymer based drug delivery systems, Development of polymer based biomimetic taste sensor, Development of volatile compound based biosensor for pest control

Banthia, Ajit Kumar  Ph.D. (Calcutta University), Speciality Polymers

Bhattacharya, Debasis  Ph.D. (Calcutta University), Synthesis and processing of nanoceramics, Ceramic Technology, Refractory materials and coatings for thermal barrier and tribology applications, Nanobioceramics for prosthetic implants through tissue engineering, Ceramics for drug delivery, Ceramics for use in energy conversion and renewable energy applications, Shape memory materials for biomedical applications, High strength ceramic armor materials, Thin film technology for electrical and electronic applications

Das, Chapal Kumar  Ph.D. (IIT Kharagpur), Nano Composites, Recycling of Waste Polymers, Direct Fluorination of Polymer Composites, In-situ Nanocomposites

Ram, Shanker  Ph.D. (BHU, Varanasi), Glasses and Disordered solids, Alloys and Intermetallics, Nanoceramics and Hybrid composites, Magnetic and Magnetocaloric materials, Ferroics and applications, Porous materials and applications, Metallic foams for biological applications, Nanofluids, Films and Nanogluces, Optical Optical materials and applications, Biomaterials, Phase Transformation, Photonics, Quantum cutting

Associate Professors

Banerjee, Susanta  Ph.D. (IIT Kharagpur), Polymer synthesis and characterization., High temperature Low-K polymers, Membranes for separation of gas mixtures, Organic light emitting polymers

Banerji, Pallab  Ph.D. (Jadavpur University), Semiconductor Materials and Devices

Jacob, Chacko  Ph.D. (Case Western, USA), Wide Bandgap Semiconductors / Nanomaterials / Direct Fluorination of Materials / Oxide semiconductors

Assistant Professors

Khatua, Bhanu Bhusan  Ph.D. (IIT Kharagpur), Polymer Blends and Composites, Polymer-clay and Polymer-CNT Nanocomposites, Polymer Blend-Clay Nanocomposites, Morphology control, Polymeric PTCR composites
Brief Description of on-going activities

Apart from teaching various courses in our M. Tech. Program on Materials Science and Engineering we also teach undergraduate and post graduate level courses on biomaterials, ceramic, polymer and electronic materials to other departments of our Institute. So far as the research activity is concerned our Centre is engaged in development and application of novel polymers, ceramics and semiconductor materials supported by our Institute as well as by various funding agencies. In the area of polymer materials besides polymer modification we synthesize new polymers for application as electronic materials, membranes for gas separation, nanoclay and carbon nanotube reinforced composites for automobiles and other high performance speciality applications. Few research projects are in progress for jute fiber reinforced cement concrete and biodegradable rigid composites. The Centre is now also engaged in a new field of welding thermoplastics, recycling waste polymers and direct fluorination of polymers. Apart from activities on structural ceramics, refractories, and bioceramics, we are also investigating various research issues related to the synthesis of nano-crystalline shape memory materials for biomedical applications, nano-fluids, nano ceramics for drug delivery, nano-structured oxides for ceramic gas sensor and cathode materials for lithium rechargeable batteries. We are also actively involved in the research on ferroic and multiferroic thin / thick films, sensors magnetic and magnetocaloric materials. Novel inorganic and organic semiconductor materials are being synthesized and characterized for various electronic and optoelectronic applications. MOCVD growth of InGaP epitaxial layers as well as quantum dots are also being carried out for various applications such as solar cell, etc. Another important area of research is the synthesis and characterization of wide band gap materials like SiC, ZnO and nitride semiconductors and nano materials for device applications. Multiwall carbon nanotubes are also being synthesized by CVD on silicon substrates.

Thrust Areas
1. Biomaterials
2. Nanomaterials / nanocomposites / sensors

New Acquisitions
1. Perkin Elmer Uv-vis-NIR Spectrophotometer
2. CHNS and O elemental analyser
3. Injection moulding machine
4. Ultra-thin film solution growth unit (L.B. spin coat, dip coat)
5. Contact angle measurement set up
6. Thermal conductivity measurement setup
7. Rheometer
8. MS-FTIR attachment for Netzsch TGA/DSC

Lectures by Visiting Experts
1. Thermodynamics of Co/Cr super lattices by Tathagatha Mukherjee (University of Nebraska, USA)
2. Engineering Solid Electrolytes for Ionic Devices by V. Thangadurai (University Of Canada)
3. Flood disaster and its management by Swami Nityasatyananda (Ramakrishna Mission Shilpapith, Belgharia, Kolkata)
4. Semiconductors: A brief history by S. Ashok (Pennsylvania State University, USA)

Doctoral and MS Degrees Awarded
1. Arfat Anis Composite Polymer Electrolyte Membranes for Fuel Cell Application (Ph.D.)
2. Sanjay Sadhukhan  Characterization of Jute Fiber and Generation of Development Stage Specific Expressed Sequence Tags in Relation to Fiber Formation (Ph.D.)

3. Tanya Das  Speciality Polymer blends of high performance thermoplastics and liquid crystalline polymers (Ph.D.)

4. Jayanta Maity  Direct fluorination of fibers & fiber Reinforced Composites (Ph.D.)

5. Anurag Gautam  Microstructural, optical and Electrical properties of Silver reinforced poly(vinyl alcohol) Nanocomposites (Ph.D.)

6. Madhumita Mukherjee  Effect of Fluorination and Oxy-Fluorination of Kevlar Fiber on the Properties of Short Fiber Reinforced Polymer Composites and its Mold Flow Simulation Study (Ph.D.)

7. Puspanjali Tripathy  Synthesis, structure and optical properties of gold reinforced polymer nanofluids and films (Ph.D.)

8. Goutam Kr Jana  Recycling of Natural Rubber Vulcanizates and Scrap Tyres by Mechanochemical Devulcanization Process (Ph.D.)

9. Ram Naresh Mahaling  Development and Characterization of Elastomeric, Thermoplastic Polymer Nanocomposites Based on Unmodified and Modified Fillers (Ph.D.)

10. Sandeep Kumar  Effect of In-Situ Fibrillation and Graphite Nanofillers on the Properties of High Performance Composites (Ph.D.)

11. Anindita Ghosh  Synthesis, characterization and properties of novel fluorinated poly(imide siloxane) co-polymers (Ph.D.)

12. Pravin Sawai  Electromagnetic interference shielding effectvenes of gfraphite filled polypropylene and polyetheramide based composites (MS)

13. R. Rajasekar  Effect of epoxidized natural rubber and nano-clay composites in natural rubber and SBR compounds (MS)

Member - Editorial Board


3. Das, Chapal Kumar (0) Member of the Editorial Board - Research Letters in Materials Science

4. Das, Chapal Kumar (0) Member of the Editorial Board - Nano Trends

5. Das, Chapal Kumar (0) Member of the Editorial Board - Advances in Materials Science

6. Jacob, Chacko (2007) Member of Editorial Board - The Open Electrical and Electronic Engineering Journal

Awards & Honours

1. Jacob, Chacko (2009)  Best Poster Award 20th MRSI AGM, Kolkata Feb 10-12

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Development of Cr3+/Cr4+co-doped stabilized c-ZrO2 nanoparticles as a new series of high temperature solid electrolytes and their other applications</td>
<td>CSIR</td>
<td>Rs. 9.00 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Development of durable water-repellent jute geotextiles with natural ecofriendly additive for application in erosion control in river banks and other</td>
<td>JMDC, Kolkata</td>
<td>Rs. 168.73 Lakhs</td>
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<tr>
<td>No.</td>
<td>Description</td>
<td>Organization</td>
<td>Cost (Lakhs)</td>
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<tr>
<td>3.</td>
<td>Development of eco-friendly / biodegradable rigid jute-based composites</td>
<td>JMDC, Kolkata</td>
<td>69.93</td>
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<td>4.</td>
<td>Development of High Performance Advanced Polymer Blends and Alloys for Aircraft Applications</td>
<td>DMSRDE, Kanpur</td>
<td>9.00</td>
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<td>5.</td>
<td>Development of jute based sound proofing composites</td>
<td>JMDC, Kolkata</td>
<td>32.26</td>
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<td>6.</td>
<td>Development of Jute Fiber Reinforced Cement Concrete Composites</td>
<td>JMDC, Kolkata</td>
<td>75.60</td>
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<td>7.</td>
<td>Development of Novel Polyphosphazene based High Performance Polymeric Composites For Wide Temperature Range Application</td>
<td>DRDO, New Delhi</td>
<td>48.08</td>
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<td>8.</td>
<td>Development of Phase Morphology in Incompatible Polymer Blends Using Nanoclay</td>
<td>DST, New Delhi</td>
<td>16.68</td>
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<td>9.</td>
<td>Development of Polymer Based Biomimetic Sensors</td>
<td>DST, New Delhi</td>
<td>10.35</td>
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<tr>
<td>10.</td>
<td>Development of Silicon Carbide Thin Films for High Temperature and High Power Devices</td>
<td>DRDO</td>
<td>49.76</td>
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<td>11.</td>
<td>Development of Suitable Production System for Natural Rubber Coated Jute Fabrics for Novel End Uses</td>
<td>JMDC, Kolkata</td>
<td>30.00</td>
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<td>12.</td>
<td>Development of Volatile Compound Based Biosensor for Pest Control</td>
<td>DST, New Delhi</td>
<td>11.15</td>
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<tr>
<td>13.</td>
<td>High coercivity magnetic AFe12O19 (A: Ba and/or Sr) nanofibrils of controlled shape anisotropy for radar and other high frequency applications</td>
<td>CSIR, New Delhi</td>
<td>15.00</td>
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<tr>
<td>14.</td>
<td>Infrastructure Development for the Wet Chemical Synthesis of Advanced Ceramics</td>
<td>ISIRD, SRIC, IIT Kharagpur,</td>
<td>3.00</td>
</tr>
<tr>
<td>15.</td>
<td>MOCVD growth and characterization of InGaP/GaAs and InGaP quantum dot solar cell</td>
<td>DST</td>
<td>35.57</td>
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<tr>
<td>16.</td>
<td>MOCVD growth of GaAs epitaxial layers for solar cell applications</td>
<td>ISIRD, SRIC, IIT Kharagpur,</td>
<td>3.00</td>
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<tr>
<td>17.</td>
<td>Molecularly engineered novel membrane precursors and preparation of novel polymer nano-composite membranes for selective separation of gas mixture for hydrogen energy storage, combustion and other high temperature processes</td>
<td>Department of Atomic Energy, Mumbai,</td>
<td>19.00</td>
</tr>
<tr>
<td>18.</td>
<td>Novel Nano-structured Ceramics for Gas Sensing Applications</td>
<td>Department of Information Technology</td>
<td>30.77</td>
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<tr>
<td>19.</td>
<td>Phase stability and intergranular giant-magnetoresistance properties in (La1-xEux)0.67Ca033MnO3 in a hybrid nanocomposite structure</td>
<td>UGC-DAE Consortium for Scientific Research (Indore)</td>
<td>1.00</td>
</tr>
<tr>
<td>20.</td>
<td>Preparation of Novel Polymeric Materials for Chemical Sensor Application: Synthesis and Tailoring of Properties in Molecular Level</td>
<td>DRDE / DRDO</td>
<td>7.54</td>
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<tr>
<td>21.</td>
<td>Preparation of poly(amide siloxane) in bulk quantity for analytical sample inlet</td>
<td>DRDE/DRDO, Gwalior</td>
<td>8.54</td>
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<td>22.</td>
<td>Synthesis and characterization of novel light emitting poly(arylene)s and poly(arylene ether)s and derivative thereof</td>
<td>CSIR</td>
<td>9.06</td>
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<tr>
<td>23.</td>
<td>Synthesis by suspension polymerization and characterization of PMMA/clay and PS/clay nanocomposites</td>
<td>ISIRD, SRIC, IIT Kharagpur</td>
<td>3.40</td>
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<td>24.</td>
<td>Thin film shape memory alloys for device applications</td>
<td>DRDO</td>
<td>300.00</td>
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<tr>
<td>25.</td>
<td>Use of nanocomposites for efficient welding of thermoplastics</td>
<td>DST-DFG</td>
<td>7.64</td>
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</tbody>
</table>
27. Wet chemical synthesis of novel cathode materials for lithium ion rechargeable batteries Council of Scientific and Industrial Research Rs. 10.46 Lakhs

Consultancy Projects

1. Development of Composites KE Technical Textiles Pvt. Ltd., Kharagpur, Rs. 0.40 Lakhs

Visits Abroad by Faculty Members

1. Banerji, Pallab to attend MRS 2008 Fall Meeting and to present a paper (Boston, USA) December 1-5, 2008
2. Banerjee, Susanta Collaborative research (Follow up Programme of Humboldt Foundation) (Leibniz-Institute for Polymer Research, Dresden, Germany) 02 Months (19 May to 18 July, 2008)
4. Majumder, Subhasish Basu as a visiting scientist for collaborative research (Department of Physics, University of Puerto Rico, San Juan, Puerto Rico (USA) 1 month (June 6 to July 6)
5. Ram, Shanker Research (University of Ulm, Germany) May-July 2008
6. Das, Chapal Kumar INS-A-PAS Bilateral exchange programme (Wroclaw University of Technology, Poland) June-July
7. Das, Chapal Kumar DST-DFG programme (TU-Chemistry, Germany) June
8. Das, Chapal Kumar On invitation to deliver lecture (IPF-Dresden, Germany) July

Invited Lectures by Faculty Members

1. MOCVD growth of Nanostructure Devices by Banerji, Pallab (Indian Association for the Cultivation of Science, Kolkata)
2. CVD of Nanomaterials: DST Advanced School on Nano Science & Technology by Banerji, Pallab (S.N. Bose National Centre for Basic Sciences, Kolkata)
4. Semi-fluorinated polym(ether imide)s for advanced application by Banerjee, Susanta (Pune, India)
5. Molecularely engineered novel semifluorinated polymers: Low-k materials by Banerjee, Susanta (Philips University Marburg, Germany)
6. Molecularely engineered novel semifluorinated polymers: Low-k materials by Banerjee, Susanta (Leibniz-Institute for Polymer Research, Dresden, Germany)
7. My Journey in Materials Science: From Ceramics to Semiconductors by Jacob, Chacko (Department of Ceramic Engineering, IT-BHU)
8. Nanomaterials for Electronic Applications by Jacob, Chacko (NIT, Rourkela)
9. Nanomaterials for Electronics by Jacob, Chacko (Crystal Growth Centre, Anna University)
10. Coordination Polymerization Made Easy by Banthia, Ajit Kumar (Department of Chemistry, Utkal University, Bhubaneswar)
11. Nano-Life Savior by Banthia, Ajit Kumar (Danapur College, Bihar)
12. Intelligent Society and Environment by Banthia, Ajit Kumar (PIET, Rourkela)
13. Biopolymers and Biomaterials Recent Thoughts by Banthia, Ajit Kumar (Jadavpur University)
14. Polymers Inspiration and Prespiration by Banthia, Ajit Kumar (IASST, Guwahati)
15. Biomedical Applications of Polymers by Banthia, Ajit Kumar (IASST, Guwahati)
16. Drug Delivery by Banthia, Ajit Kumar (IASST, Guwahati)
17. Conducting polymer nanocomposite as sensor material: An overview by Adhikari, Basudam (Tailormade nanomaterials and Applications for Chemical and Bio-Sensors, CGCRI, Jadavpur)
18. Polymers as Hi-Tech Materials by Adhikari, Basudam (Birla Institute of Technological Museum)
19. Polymers for Hi-Tech Applications and was invited as Chief Guest of the function by Adhikari, Basudam (National Science Day, 2009 at DMSRDE, Kanpur)
20. Taste Sensing with Polymers in New Era in Polymer Science and Technology by Adhikari, Basudam (Department of Polymer Science and Technology, Calcutta University, Kolkata)
21. Role of polymers in sensor devices for environment monitoring and agriculture by Adhikari, Basudam (CGCRI, Jadavpur for a Technical Colloquium for a Chemical Hub)
22. Radiative emission in surface plasmon bands in gold nanofluids and nanocomposites of biomaterials by Ram, Shanker (Banaras Hindu University)
23. Functional metamaterials and applications by Ram, Shanker (Banaras Hindu University, Varanasi, India)
24. Functional nanomaterials and applications by Ram, Shanker (Banaras Hindu University, Varanasi)
25. Nanomaterials for electronic applications by Ram, Shanker (Banaras Hindu University, Varanasi)
26. Ferromagnetic CrO2 nanocomposites - a new series of ferromagnetic materials of spintronics and applications by Ram, Shanker (Department of Physics, Osmania University, Hyderabad, India)
27. In-situ synthesis of ceramic nanocomposites of stabilized zirconia for high temperature applications by Ram, Shanker (Department of Mechanical Engineering, Banaras Hindu University, India)
28. Surface enhanced spectroscopy in gold nanofluids for biomaterials and other applications by Ram, Shanker (Department of Physics, Allahabad Hindu University, India)

Seminars, Conferences and Workshops Organised
1. International Conference of High-Tech Materials (ICHTM-09)

Short-Term Courses, Training Programmes and Workshops organized
2. Optoelectronic Materials & Devices (29 December 29, 2008 - January 03, 2009)
RELIABILITY ENGINEERING CENTRE

HEAD : Professor V. N. Achutha Naikan

FACULTY

Professor

Associate Professor
Naikan, V N Achutha Ph.D. (IIT Kharagpur), Reliability Engineering, Maintenance Engineering and Management

Assistant Professor
Chaturvedi, Sanjay Kumar Ph.D., Maintenance Engineering, Network Reliability, Reliability

Senior Lecturer

Brief Description of on-going activities
The Centre is regularly organizing short term courses on latest topics of Reliability Engineering for officers and engineers of the Industry, Defense Organizations and R&D Establishments. Accelerated Life Testing of some important components of Atomic Reactor has been carried out in the Environmental testing laboratory of the Centre. Sponsored Projects on reliability issues of missile systems are also being carried out in the Centre. Safety issues in operation of nuclear power plants is an important activity ongoing in the Centre.

Thrust Areas
1. Software Reliability
2. Condition Monitoring and Maintenance
3. Reliability Testing and Design

International Collaborations
1. Collaborative Research work on "Software Reliability Modelling" with DNV Norway is progressing

Lectures by Visiting Experts
1. Warranty Models by Dr. D.N.P. Murthy (Professor, Queensland University, Australia)
2. Warrantees - Theory and practices of Warranty data by Dr. Md. Rezaul Karim (Professor, University of Rajshahi, Bangladesh)
3. Reliability Design by Prof. K. B. Misra (RAMS Consultants, Jaipur)

Doctoral and MS Degrees Awarded
1. K. Saravan Kumar Early Software Reliability and Quality Prediction (Ph.D.)

Fellow - Professional Bodies
1. Misra, Ravindra Babu (2000) Fellow - Institution of Engineers India
**Member - Editorial Board**

1. Chaturvedi, Sanjay Kumar (2008) *Associate Editor*
   - International Journal of Performability Engineering
2. Misra, Ravindra Babu (2007) *Member of Editorial Board*

**Sponsored Research Projects**

<table>
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<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design of Minimal Cost Backbone Network Layout for Given Capacity and Reliability Requirements</td>
<td>VEICET</td>
<td>Rs. 16.00 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>FIST PROGRAM : Infrastructure Development in Environment Lab, REC</td>
<td>DST</td>
<td>Rs. 36.50 Lakhs</td>
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<tr>
<td>3</td>
<td>Reliability Analysis of Garuda</td>
<td>DRDL, Hyderabad</td>
<td>Rs. 11.68 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Reliability Prediction of DLS</td>
<td>DEAL Dehradun</td>
<td>Rs. 8.63 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>Software Reliability &amp; Safety</td>
<td>DNV Norway</td>
<td>Rs. 22.50 Lakhs</td>
</tr>
</tbody>
</table>

**Consultancy Projects**

1. ALT on Connectors                                                                 | ECIL/BARC             | Rs. 2.25 Lakhs |
2. RAMS Model for Project ASTRA                                                        | DRDL Hyderabad        | Rs. 11.00 Lakhs |
3. Reliability Improvement of Metering Products                                          | Secure Meters Ltd. Udaipur | Rs. 20.00 Lakhs |
4. Reliability Modeling of GG                                                            | DRDL/RCI              | Rs. 6.44 Lakhs |
5. Reliability Prediction of DLS                                                        | DEAL Dehradun         | Rs. 8.63 Lakhs |
6. Reliability work Package for a missile project                                         | DRDL, Hyderabad       | Rs. 8.00 Lakhs |
7. Reliability Work Package for Missile Project: Phase II                                | DRDL, Hyderabad       | Rs. 12.50 Lakhs |
8. Reliability Work Package of Garuda                                                    | DRDL, Hyderabad       | Rs. 8.00 Lakhs |
9. Shutdown Probabilistic Safety Assessment of Kakrapara Nuclear Power Plant            | NPCIL, Mumbai         | Rs. 10.22 Lakhs |
10. Software and Hardware Reliability Modelling of AGNI-III missile                      | ASL, DRDO, Hyderabad  | Rs. 8.00 Lakhs |

**Invited Lectures by Faculty Members**

1. Reliability in Space Systems by Misra, Ravindra Babu (Dept. of Space Hyderabad)

**Books Published**


**Short-Term Courses, Training Programmes and Workshops organized**

1. Product Reliability Assurance and Assessment                                          | (August 4-6, 2008)   |
2. Reliability Engineering for DRDO Engineers                                             | (June 2008)          |
4. Strategic Quality Control of Coal, for managers and engineers from Kothagudam Coal Mines | (November 13-15, 2008) |


RUBBER TECHNOLOGY CENTRE

HEAD : Professor Tapan Kumar Chaki

FACULTY

Professor

Bhowmick, Anil Kumar  Ph.D. (IIT Kharagpur), Nanocomposites, Polymer Blends and Thermoplastic Elastomers, Polymer Modification, Adhesion

Chaki, Tapan Kumar  Ph.D. (IIT Kharagpur), Electron Beam Modification of Polymers, Carbon Nanotube based Polymer Composites, Conductive Rubber Composites for EMI Shielding Application, Nano Silica based Thermoplastic Elastomers, Waste Plastics Modified Bitumen for Highway Application

Khastgir, Dipak  Ph.D. (IIT Kharagpur), Polyurethane Foam Composites with Special Properties, Conductive Polymer, Conductive Polymer and Composites, High Voltage Polymeric Insulator, Piezo Rubber and Composites, Nano Composites

Nando, Golok Behari  Ph.D. (IIT Kharagpur), Polymer blends- reactive compatibilization and miscibility, Vulcanization by conventional and nonconventional methods such as Electron beam irradiation, Modification of natural and synthetic latices, Nano material development from flyash and rubber nanocomposites, Thermoplastic polyurethane laponite clay nano composites, Polymer blends as implant devices and scaffolds in tissue engineering, Polymer modification and new materials development, Surface modification of additives and multifunctional properties

Tripathy, Deba Kumar  Ph.D. (IIT Kharagpur), Polymer Blends and Alloys, Elastomers, Rubber Engineering, Metal Forming, Unconventional Machning, Polymer Composites and Nanocomposites, Microcellular Rubber

Assistant Professors

Bandyopadhyay, Abhijit  Ph.D. (IIT Kharagpur), Polymer Science and Technology

Chakraborty, Kalyan Kumar  Ph.D. (Calcutta University), Polymer Science and Technology


Naskar, Kinsuk  Ph.D. (University Twente), Polymer Blends and Composites, Thermoplastic Elastomers and TPVs, Rubber Compounding and Vulcanization

Singha, Nikhil Kumar  Ph.D. (IIT Bombay), New polymerization techniques to prepare tailor-made new rubber and polymers, Block and graft copolymer, Thermo reversible smart polymers, Tailor-made Polymer nanocomposite, Modification of elastomers, Thermoplastic Elastomers (TPE) and Thermoplastic Vulcanizates (TPV), Polyurethanes, Characterization of Polymers and Rubbers
Brief Description of on-going activities

The Centre works in close collaboration with other departments and centers of this Institute and other R&D organizations in India and abroad. Several research projects sponsored by different agencies are in operation. The faculty members are engaged in different research areas:

1. Polymer nanocomposites
2. Chemical modification of rubbers
3. Thermoplastic elastomers based on novel blends and alloys
4. Recycling of rubber waste
5. Ionomers
6. Conductive rubber composites for electrical and electronics application
7. Electron beam modification of polymers
8. Rheology and processability of rubber compounds and polymer blends
9. Microcellular rubber composite for various industrial application
10. Development of rubber blends and composites for different industrial application like cable, oil seal, tank track pad, vibration isolators
11. Adhesion
12. Biodegradable polymers
13. Controlled radical polymerization
14. Polymers for biomedical application.

Thrust Areas

1. Nanocomposites
2. Polymer composites for electronic applications
3. Controlled polymerization for synthesis of new tailor-made and bio-active polymers
4. Rubber in medical and health care applications
5. Recycling of waste polymer and rubber

New Acquisitions

1. A Zwick UTM Z010 machine has been procured by the Centre.
2. Electro-mechanical Actuator (Zwick - Roell)
3. DESMA Injection Moulding Machine

Lectures by Visiting Experts

1. Atomic Force Microscopy by Dr. S. Magonov (Veeco, California, USA)
2. Dynamic Mechanical Analysis of Rubbers. by Dr. Arnaud Favier (Metravib, France)
3. Rubber Product Technology by Dr. Rabin Mukhopadhyay (Director, Hasteri J. K. Tyres Ltd. Kankroli, Rajasthan)
4. Modern characterization techniques for polymers by Dr. D. K. Setua (Deputy Director, DMSRD, Kanpur)
5. Scope of collaboration RTC, IIT Kharagpur with Polymer Science Dept. Yamagata University, Japan by Prof. Kiyohito Koyama (Director of the International Centre, Yamagata University, Japan)

Doctoral and MS Degrees Awarded

1. Madhuchhanda Maiti Fluoroelastomer-Layered Silicates Nanocomposites: Preparation, Characterization and Properties (Ph.D.)
2. Sambhu Bhadra Preparation, Properties, Processing and Applications of Polyaniline and its Composites (Ph.D.)
3. Anirban Ganguly  Preparation and properties of Thermoplastic elastomer-Clay Nanocomposites from Unmodified and Chemically Modified Poly(styrene-(ethylene-co-butylene)-styrene) Triblock Copolymer (Ph.D.)

4. Samik Gupta  Preparation properties of Novel Poly(Phenylene Ether) based thermoplastic elastomers (Ph.D.)

5. Haimanti Datta  Synthesis and Properties of polyacrylates and their nanocomposites by atom transfer radical polymerization (Ph.D.)

Fellow - Professional Bodies
2. Bhowmick, Anil Kumar (1988)  Awarded - Indian Rubber Institute

Member - Editorial Board
1. Bhowmick, Anil Kumar (2007)  Member of the Editorial Board - J. Natural Rubber Research
2. Bhowmick, Anil Kumar (2007)  Member of the Editorial Board - J. Applied Polymer Science
4. Bhowmick, Anil Kumar (2007)  Member of the Editorial Board - Polymer and Polymer Composites
5. Bhowmick, Anil Kumar (2007)  Member of the Editorial Board - J. Adhesion Science and Technology
7. Bhowmick, Anil Kumar (2007)  Member of the Editorial Board - Rubber Chemistry and Technology (USA)

Fellowships

Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>An approach for recycling of polymeric wastes</td>
<td>ISIRD, SRIC, IIT</td>
<td>Rs. 1.00 Lakhs Kharagpur,</td>
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<tr>
<td>2.</td>
<td>Block Copolymers in Emulsion</td>
<td>Asian Paints Limited</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>3.</td>
<td>Development of Adv Polym Mat for Improved Electric/ESD Properties using Nano Add. for Space Appl.</td>
<td>ISRO, IIT</td>
<td>Rs. 10.00 Lakhs Kharagpur cell,</td>
</tr>
<tr>
<td>4.</td>
<td>Development of advanced polymeric materials for improved electrical/ESD properties using nano additives for space application</td>
<td>KCSTC, IIT Kharagpur</td>
<td>Rs. 2.00 Lakhs</td>
</tr>
</tbody>
</table>
5. Development of Castor Oil Based polyurethane Nanocomposite for Biomedical Application
   CSIR, New Delhi Rs. 7.00 Lakhs
6. Development of Electron Beam Irradiated Composites based on Multi-Walled Carbon Nanotubes in Polymer Matrices
   DAE, Mumbai Rs. 14.60 Lakhs
7. Development of Jute based coated Textile
   AICTE, New Delhi Rs. 15.05 Lakhs
8. Development of Modified Bituminous Binder using Waste Plastics
   DST, West Bengal Rs. 4.00 Lakhs
9. Development of novel applications using electron beam irradiation: (i) improved extrudability of raw and waste polymers, (ii) adhesion improvement of
   DAE Rs. 17.67 Lakhs
10. Development of special purpose heat resistant cable insulating compounds based on polyolefins and polydimethylsiloxane rubber blends using EB
    DAE, BARC, Mumbai Rs. 13.11 Lakhs
11. Dynamically vulcanized blends (TPVs) based on polyolefin elastomer (POE) via peroxide crosslinking
    CSIR, New Delhi Rs. 9.56 Lakhs
    DAE, BARC, Mumbai Rs. 14.00 Lakhs
13. Flexible EMI Shielding Materials from Conductive Rubber Based Composites
    ARDB, Govt. of India Rs. 14.07 Lakhs
14. Frontier methods of preparation and characterization of nanocomposites
    Bridgestone Corporation Japan, Rs. 0.00 Lakhs
15. Fundamental Studies on Improvement of Ageing and Degradation Resistance of the Hydrogenated Nitrile Rubber
    Lanxess, Germany Rs. 35.00 Lakhs
16. Fundamental Studies on Structure and Properties of Nanocomposite Rubbers for the Applications
    Goodyear Tire and Rubber Company, Akron, Ohio, USA, Rs. 24.00 Lakhs
17. Impact resistance of sensor loop belts
    Phoneix Yule Rs. 2.50 Lakhs
18. Influence of modification of nanotubes on properties of EVA nanocomposites
    DRDO, HQ, New Delhi, Rs. 4.24 Lakhs
19. Nanotechnology and radiation processing of organic-inorganic hybrid materials based on thermoplastic elastomer
    DST, New Delhi Rs. 9.00 Lakhs
20. Novel Microporous Polymeric Membranes for Medical Applications
    DBT, New Delhi Rs. 21.00 Lakhs
21. Novel rubber based nanocomposites using nanofibers and nanographites: Development, structure and properties
    DRDO, Rs. 20.80 Lakhs
22. Novel thermoplastic elastomers based on Epoxidized Natural Rubber and PP by dynamic crosslinking
    DST, New Delhi Rs. 10.32 Lakhs
23. Novel thermoplastic elastomers based on silicone rubber by dynamic vulcanization
    ISIRD, IIT Kharagpur Rs. 3.00 Lakhs
24. Polyurethane Foam for Radioactive Material Transportation Packages
    Department of Atomic Energy, Rs. 30.00 Lakhs
25. Preparation of Equivalent standards for Rubber mix and Products
    DRDL, Hyderabad Rs. 4.00 Lakhs
    Phoenix-Yule, Kalyani Rs. 0.00 Lakhs
27. Rheological behaviour of nanocomposites based on biodegradable polymers
    DST-JSPS Rs. 2.00 Lakhs
28. Segmented polyurethane (SPU) based nanocomposites from functionalized nanoclays with special reference to fire and flammability
    ISRO, Bangalore Rs. 6.00 Lakhs
<table>
<thead>
<tr>
<th>No.</th>
<th>Project Description</th>
<th>Implementing Agency</th>
<th>Cost (Lakhs)</th>
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<tr>
<td>29.</td>
<td>Segmented Polyurethane clay nano composites for better fire and flame resistant properties.</td>
<td>ISRO, Bangalore</td>
<td>10.76</td>
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<tr>
<td>30.</td>
<td>Study of Modification and Properties of Thiol Terminated Liquid Polymers by Chemical Reaction with Nanostructures Functional Materials</td>
<td>ISRO, Thiruvanthapuram</td>
<td>18.00</td>
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<td>31.</td>
<td>Tack and Cured Adhesion of Brominated Isobutylene Paramethyl Styrene with other Rubbers</td>
<td>ExxonMobil, Baytown, Texas, USA,</td>
<td>24.00</td>
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<td>32.</td>
<td>Tailor-made graft copolymerization on elastomers using controlled radical polymerization</td>
<td>CSIR, New Delhi</td>
<td>10.92</td>
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<tr>
<td>33.</td>
<td>Transition Metal Catalyzed Radical Polymerization of the Specialty Monomers</td>
<td>Department of Science &amp; Technology,</td>
<td>14.00</td>
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</tbody>
</table>

**Consultancy Projects**

1. Ageing, failure analysis and life estimation of rubber seals of military aircraft
   - RCMA, Pune
   - Cost: 9.15 Lakhs

2. Analysis and development of sensor loop in conveyor belt
   - Phoenix Yule Ltd.,
   - Cost: 4.00 Lakhs

3. Characterization of Emulsion samples (CESP)
   - Asian Paints Limited
   - Cost: 0.50 Lakhs

4. Characterization of PET Resin through IR and XRD Studies
   - South Asian Petrochemicals Ltd.,
   - Cost: 0.50 Lakhs

5. Development of Conductive Compounds 1&2
   - AppaloTyre
   - Cost: 0.56 Lakhs

6. Development of Elastomeric Bearings
   - Hindustan Aeronautics Limited (HAL), Foundry and Forge Division, Bangalore India,
   - Cost: 2.25 Lakhs

7. Development of Fire Resistant Conveyor Belt Compound as per AS-S grade
   - Phoenix Yule Limited, 11/1, Sarat Bose road, Kolkata,
   - Cost: 3.57 Lakhs

8. Development of fire resistant energy optimized belt
   - Phoenix Yule
   - Cost: 2.00 Lakhs

9. Development of Flame resistant Cable compound
   - Servel Udyog LTD, New Delhi,
   - Cost: 2.50 Lakhs

10. Development of Heat and Flame resistant conveyor belts as per AS-S specifications
    - PYL, Kalyani, W.Bengal,
    - Cost: 3.57 Lakhs

11. Development of High Temperature Sealing Compound
    - NICCO Engineering Service LTD, Kolkata,
    - Cost: 1.50 Lakhs

12. Development of Lead free Bonder Compound for Steel Cord Conveyoy Belt
    - Phoenix Yule Limited, 11/1, Sarat Bose road, Kolkata,
    - Cost: 3.60 Lakhs

13. Development of rubber clad rolls used in the PLTCM and the ECL sections of the cold rolling mill complex
    - Tata Steel, Jamshedpur,
    - Cost: 7.30 Lakhs

14. Development of Steel Cord Conveyor Belt Cover Compound with High Tensile Strength
    - Phoenix Yule LTD, Kalyani,
    - Cost: 2.77 Lakhs

15. Development of Two Part Compound for conveyor belt
    - Phoenix Yule, Kalyani
    - Cost: 3.20 Lakhs

16. Elimination of Pit Mark on Platen during Vulcanisation of FR Conveyor Belt
    - Phoenix Yule
    - Cost: 2.69 Lakhs

17. Studies of the Technical Requirements of Elastomeric Inflatable Seals
    - IGCAR, Kalpakkam
    - Cost: 22.00 Lakhs

18. Studies on the technical requirements of elastomeric inflatable seals
    - Indra Gandhi Centre for Atomic Research, Kalpakkam,
    - Cost: 18.00 Lakhs

19. Use of Advanced Materials in Conveyor Belt Technology (Sanctioned)
    - Phoenix Yule Limited, Kalyani,
    - Cost: 0.00 Lakhs

20. Utilization of waste rubber
    - Packwell Ind., New Delhi,
    - Cost: 1.60 Lakhs
Patents (filed / granted)
1. Development of speciality rigid polyurethane foam
2. Fire Retardant Intumescent High Density Rigid Polyurethane Foam for Specialty applications

Visits Abroad by Faculty Members
1. Khastgir, Dipak
   Visited and discussed on future collaborative work with Prof Mika Martin Head of the institute (Institute of Chemical Technology, Technicka5, Technical University, Prague Federal Republic of Czechoslovakia) December 2
2. Khastgir, Dipak
   Visit and discussion on future Collaborative work between RTC and IPF (Institute of Polymer Science (IPF) Dresden Germany) December 8-10
3. Khastgir, Dipak
   Visit and discussion with Prof Dussen Berek for possible collaborative work (Slovak Polymer Institute, Bratslva) December 5-7
4. Singha, Nikhil Kumar
   To participate in Collaborative Research Program under INSA, New Delhi and DFG, Germany (Leibniz Institute For Polymer Research, Dresden, Germany) May-July, 2008
5. Singha, Nikhil Kumar
   To discuss about the Collaborative Research Program (Max Planck Institute, Golm, Berlin) July, 2008
6. Bhowmick, Anil Kumar
   To deliver invited lecture (Scrap to profit conference, Clemson University, Rubber Manufacturer Association, San Diego, California San Diego, California) May 6-8
7. Bhowmick, Anil Kumar
   To deliver invited lecture (2nd TPE Conference Rubber Division, ACS, Dearborm MI) May 1-2
8. Bhowmick, Anil Kumar
   To deliver invited lecture (8th International Symposium on Ionizing Radiation and Polymers (IRaP 2008), Brazil) October 12-14
9. Bhowmick, Anil Kumar
   To deliver invited lecture (Rubber Mini Expo and 174th Technical Meeting & Educational Opportunities, Louisville, Kentucky, USA) October 14-16
10. Nando, Golok Behari
    INSA-SAS Bilateral Exchange programme (Bratislava, Slovakia) December 3-23, 2008
11. Nando, Golok Behari
    To visit three universities and deliver seminar talks (Germany) December 7-15, 2008

Invited Lectures by Faculty Members
1. Development and Application of Conductive rubber based Composites by Khastgir, Dipak (Institute of Chemical Technology Tecnicka5, Technical University of Prague, Czech Republic)
2. Developments of Rubber Components by Chaki, Tapan Kumar (Naval Science and Technology Laboratory, Visakhapatnam)
3. Polymer Nanocomposites by Chaki, Tapan Kumar (Sikkim Manipal Institute of Technology, Sikkim)
4. Application of Reverse Engineering in Rubber Industry by Chaki, Tapan Kumar (Indian Rubber Institute, Kolkata)
5. Macromolecular Engineering by Controlled Radical Polymerization by Singha, Nikhil Kumar (IPF, Institute of Polymer Research, Dresden, Germany)
6. Functional Polymers by Controlled Radical Polymerization by Singha, Nikhil Kumar (Pidilite Industries Limited, Mumbai)
7. Rubbers used in conveyor belts by Chattopadhyay, Santanu (Phoenix Yule Ltd., Kalyani)
8. Training of senior and middle level Managers on basic Rubber science and Technology by Chattopadhyay, Santanu (PYL, Kalyani)
9. Preparation and Properties of Thermoplastic Polyurethane Nanocomposite by Melt Blending: Effect of O by Tripathy, Deba Kumar (Cochin, Kerala, India)
10. Synthesis and characterization of Polyurethanes from renewable resources and nano clay composites by Nando, Golok Behari (The Polymer Institute, Bratislava, Slovakia)
11. Tack of Brominated isobutylene-co-p-methylstyrene (BIMS) Rubber by Bhowmick, Anil Kumar (Exxonmobil, Houston, USA)
12. Thermoplastic Elastomeric Nanocomposites by Bhowmick, Anil Kumar (2nd TPE Conference Rubber Division, ACS, Dearborn MI)
13. Waste Rubber: Characterization, Properties, and Utilization in Virgin Rubbers and Plastics by Bhowmick, Anil Kumar (Scrap to profit conference, Clemson University, Rubber Manufacturer Association, San Diego, California San Diego, California.)
14. Polymer Nanocomposites- Some Recent Studies by Bhowmick, Anil Kumar (Exxonmobil, Linden, USA)
15. Electron Beam Crosslinked Gels Preparation, Characterization by Bhowmick, Anil Kumar (8th International Symposium on Ionizing Radiation and Polymers (IRaP 2008), Brazil)
16. Vulcanization and viscoelastic properties of nanocomposites based on natural rubber by Bhowmick, Anil Kumar (Rubber Mini Expo and 174th Technical Meeting & Educational Opportunities, Louisville, Kentucky, USA)
17. Morphology and Thermo-mechanical Response of Polyurethane Nanocomposites by Bhowmick, Anil Kumar (Rubber Mini Expo and 174th Technical Meeting & Educational Opportunities, Louisville, Kentucky, USA)
18. Nanotechnology in Rubber-Myth or Reality? by Bhowmick, Anil Kumar (Cochin University of Science and Technology, Cochin, India)
19. Application of Nanofillers in Rubber by Bhowmick, Anil Kumar (IRMRA, Mumbai)
20. Rubber Processing-An Overview by Bhowmick, Anil Kumar (Polymer Processing Society, Goa)
22. Nano material development and Rubber nano composites by Nando, Golok Behari (Technical University, Chemnitz, Germany)
23. Effect of Compatibilizer on the microstructure thermal and mechanical Properties of EPR/PP hybrid Na by Nando, Golok Behari (Martin Luther University, Merseburg, Haale(Saale) Germany)
24. Synthesis and Characterization of Polyurethanes and lapopnite Clay nano composites by Nando, Golok Behari (Institute of Macromolecular Chemistry, Prague, Czech Republic)
25. Polymer- the Contemporary issues and recent developments by Nando, Golok Behari (Thapar University, Patiala, Punjab)

Books Published


Seminars, Conferences and Workshops Organised

1. India Rubber Expo 2009
RURAL DEVELOPMENT CENTRE

HEAD: Professor Pratap Bhanu Singh Bhadoria

FACULTY

Associate Professors
Bhowmick, Pradip Kumar  Ph.D., D.Litt., Tribal and Rural Development
Lahiri, Debabrata  Ph.D. (BHU, Varanasi), Agricultural Economics, Transfer of Technology, Transfer of Technology
Mahapatra, Subhash Chandra  Ph.D. (IIT Kharagpur), Agronomy, Development and Transfer of Rural Technology

Brief Description of on-going activities
1. Teaching: 2 courses (RD30002 and RD30004) at undergraduate level as professional breadth
2. Research and Development:
   i) Essential oil production technology
   ii) Fish feed production from non-conventional sources
3. Extension: Technology transfer through Rural Technology Action Group (RuTAG-EI)

Thrust Areas
1. Development and Transfer of Technology, Tribal Development

New Acquisitions
1. Rural Technology Action Group- Eastern India (RuTAG-EI)

Member - Editorial Board
   - Man and Life
2. Bhowmick, Pradip Kumar (2006) Editorial Board Member
   - Indian Journal of Millennium Development Studies
   - Man and Life
   - Indian Journal of Millennium Development Studies
5. Lahiri, Debabrata (2006) Member
   - Indian Journal of Agricultural Marketing

Sponsored Research Projects

<table>
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<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Appriasal on NREGA</td>
<td>Ministry of Rural Development</td>
<td>Rs. 7.00 Lakhs</td>
</tr>
<tr>
<td>2.</td>
<td>Demonstration of Technologies for Green House Production of Roses and Extraction of Rose Oil</td>
<td>Science and Society Division, Department of Science &amp; Technology, Govt. of India, New Delhi</td>
<td>Rs. 17.65 Lakhs</td>
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</table>

Visits Abroad by Faculty Members
1. Bhowmick, Pradip Kumar  For Conducting Ph.D. Viva (Dhaka University, Department of Anthropology) 4 Days
G. S. SANYAL SCHOOL OF TELECOMMUNICATIONS

HEAD: Professor Saswat Chakrabarti

FACULTY

Professor
Chakrabarti, Saswat Ph.D. (IIT Kharagpur), Telecommunication Engineering

Assistant Professor
Das, Suvra Sekhar Ph.D. (Aalborg University, Denmark), Wireless Communications

Faculty Appointments
Dr. Suvra Sekhar Das Assistant Professor

Faculty Resignation
Prof. R. Gangopadhyay Emeritus Professor

Brief Description of on-going activities
1. MAC protocols in Wireless Adhoc Networks and WMAN
2. Physical Layer Technologies for Next Generation Cellular, WMAN and WLAN
3. Loss-less Compression Methods for Images and Pictures
5. Synchronization algorithms for OFDM based wireless transmission
6. Physical Layer Modeling of Light Paths in WDM based Passive Optical Networks
7. Wireless Sensor Networks
8. Physical Layer Issues related to UWB communication
9. Radar signal processing
10. BioMedical Signal Acquisition and Processing

Thrust Areas
1. Wireless Communication and Networks 2. Software Radio

New Acquisitions
1. Tornado Embedded Board based on TMS320C6416 DSP with data acquisition (Texas Instruments)
2. Xilinx XUP ? A Field Programmable Gated Array Design Kit

Lectures by Visiting Experts
1. BioMEMS by Dr. A. T. Kalghatgi (CRL, BEL)
2. Next Generation Networks by Prof. Ramjee Prasad (University of Alborg)
3. Error Control Coding by Prof. R. E Blahut (Univ. of Illinois, UC)
4. Software Radio Architecture by Prof. G. Ascheid (University of Aachen, Germany)
5. Network Error Correcting Codes by Prof. B. Sunder Rajan (IISc, Bangalore)

Doctoral and MS Degrees Awarded
1. Md Safiulla Design of Baseband Transceivers (MS)
2. Debasish Bera Design and Development of Turbo Convolutional Code using SOVA for DVB-RCS Standard (MS)
3. Sujay Deb Biomedical Signal Acquisition for Assessment of Cardiovascular Health and Telemonitoring (MS)
### Sponsored Research Projects

<table>
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<tr>
<td>1</td>
<td>Design and Development of a Telecom Convergence Switch</td>
<td>Santech Commn. Inc.,</td>
<td>Rs. 100.00 Lakhs Kolkata</td>
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<tr>
<td>2</td>
<td>Design and Development of Turbo Convolutional and Product Codes'</td>
<td>DEAL, DRDO,</td>
<td>Rs. 9.20 Lakhs</td>
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</table>
RAJIV GANDHI SCHOOL OF INTELLECTUAL PROPERTY LAW

HEAD : Professor Subhasish Tripathy

FACULTY

Assistant Professors
Bandyopadhyay, Tapas Kumar  Semiconductor and IP, Competition Law and Policy, Data Security, Nanomaterials
Chugh, Archana  Ph.D. (University of Delhi), Marine Bioprospecting, TK Biofuels, Eco Innovations, IP Creation and Protection in Novel Technologies
Dube, Dipa  Ph.D. (Calcutta University), Criminal Law, Disability and Victimization, Handicrafts and IP
Dube, Indrajit  Ph.D. (Calcutta University), Corporate Laws, Competition Law
M. Padmaavati  Ph.D. (Central University Hyderabad), Biodrugs, Drug Policy Mechanisms, Bioinnovations
Nandy, Sujit Kumar  Procedural Law, Property Law
Raju, K. D.  Ph.D. (JNU), International Law, WTO & IPR
Shreya, Matilal  LL.M. (Case Western), Post Modern Legal Theories, Economic Analysis of Patent Law, Doctrine of Equivalent

Faculty Appointments
Mr. Shreya Matilal  Assistant Professor

Faculty Re-employment (Upto 65 years age)
Mr. S. K. Nandi  Visiting Faculty

Faculty Resignation
Ms. Ashirbani Dutta  Senior Lecturer

Brief Description of on-going activities
1. Research in diverse issues of Intellectual Property Law and Policy framework under the Microsoft Centre of Excellence in Intellectual Property Research and Technology Policy
2. Implementation of the Institute of Corporate Affairs
3. Training Programme on IPR for Officers, sponsored by the Government of Orissa, Department of Textiles
4. TIFAC Eastern Region "Women Scientist Scholarship Scheme" Program

Thrust Areas
1. Intellectual Property Law
2. Corporate Laws

Lectures by Visiting Experts
1. Impact of Bay Dole Act on Innovation by Prof. Anando Mohan Chakrabarti (University of Illinois)
2. Challenges faced by Online Service Providers and Changes in Intellectual Property and IT Framework by Prof. Madhukar Sinha (Centre for WTO Studies, IIFT)
3. How to avoid Patent Prosecution Errors by Dr. Raj S. Dave (Darby & Darby P.C., USA)
4. USPTO & IP Strategy by Seema S. Rao (USPTO)
5. WIPO Policy & Initiatives by Ms. Gao Hang (Deputy Dean, WIPO)
6. Introduction to WIPO World Wide Academy by Martha Chikowore (WIPO)
7. Constitutional Law and Governance by Justice Pratap Ray (Calcutta High Court)
8. Federalism in India by Prof. Vijay Kumar (National Law School of India University Bangalore)
9. Information Technology Law by Prof. V.C. Vivekanandan (NALSAR Hyderabad)
10. IP as a Career Option by Dr. Vidya Sagar (Remfry & Sagar)
11. Patent Drafting by Mr. Bhupathi Raju (Fox & Mandal, Bangalore)

Member - Editorial Board
1. Dube, Indrajit (2009) Editor - International Journal on Corporate Governance

Awards & Honours
1. Shreya, Matilal (2008) CALI Award For Future Excellence

Fellowships

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<tr>
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<th>Title of the Project</th>
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<tbody>
<tr>
<td>1</td>
<td>A Status Report of Service Conditions, Benefits and Hazards of Working Women in West Bengal and Karnataka</td>
<td>Ministry of Labour and Employment, SRIC IIT</td>
<td>Rs. 3.03 Lakhs</td>
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<tr>
<td>2</td>
<td>Agricultural biotech invention resource</td>
<td>Competition Commission of India and World Bank</td>
<td>Rs. 6.30 Lakhs</td>
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<td>3</td>
<td>Competition Policy &amp; Law and Intellectual Property Law</td>
<td>National Foundation for Corporate Governance</td>
<td>Rs. 6.50 Lakhs</td>
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<td>4</td>
<td>Corporate Governance in SMEs</td>
<td>Government of India and World Bank</td>
<td></td>
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<tr>
<td>5</td>
<td>Disability and Victimization of Women</td>
<td>Ministry of Social Justice and Empowerment, x</td>
<td>Rs. 6.50 Lakhs</td>
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<td>6</td>
<td>IICA Hub</td>
<td>Ministry of Corporate Affair, Microsoft Corporation India Private Limited</td>
<td>Rs. 40.00 Lakhs</td>
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<td>7</td>
<td>Microsoft Scholars Program</td>
<td>ISIRD IIT Kharagpur</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
<tr>
<td>8</td>
<td>Mining and Mapping of Bioresource based Traditional Knowledge in Paschim Medinipur (West Midnapore), West Bengal.</td>
<td>ISIRD IIT Kharagpur</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
<tr>
<td>9</td>
<td>Protection of IP through the instrument of Criminal Law</td>
<td>MHRD, DST, Department of Pharmaceuticals, Ministry of Chemicals and Fertilisers,</td>
<td>Rs. 8.50 Lakhs</td>
</tr>
<tr>
<td>10</td>
<td>Role of flavonoids in disease response in maize</td>
<td>DST, New Delhi</td>
<td>Rs. 15.00 Lakhs</td>
</tr>
<tr>
<td>11</td>
<td>Study of the mechanism of price control of drugs in selected countries</td>
<td>ISIRD, IIT Kharagpur</td>
<td>Rs. 1.01 Lakhs</td>
</tr>
<tr>
<td>12</td>
<td>Traditional Handicrafts in West Bengal and Intellectual Property Protection Strategies</td>
<td>Ministry of Textiles</td>
<td>Rs. 9.50 Lakhs</td>
</tr>
<tr>
<td>13</td>
<td>Women in BPO Sector</td>
<td>ISIRD, IIT Kharagpur</td>
<td>Rs. 1.01 Lakhs</td>
</tr>
<tr>
<td>14</td>
<td>Women Scientist Scholarship Scheme (DST</td>
<td>TIFAC-PFC</td>
<td>Rs. 60.00 Lakhs</td>
</tr>
</tbody>
</table>

Consultancy Projects
1. Develop Knowledge Management for IICA                                             | Ministry of Corporate Affair                    | Rs. 6.48 Lakhs |
2. Geographical Indications in Orissa                                                | Textiles Department, Government of Orissa,      | Rs. 23.00 Lakhs |
3. Manpower and Infrastructure requirement of IICA Ministry of Corporate Affair Rs. 6.48 Lakhs
4. Review and Finalizing the Governance Structure of IICA Ministry of Corporate Affair Rs. 3.24 Lakhs
5. Role and Functions of School and Center of IICA Ministry of Corporate Affair Rs. 15.06 Lakhs
6. Senior Legal Consultant Khaitan & Partners Rs. 3.00 Lakhs

Visits Abroad by Faculty Members
1. Chugh, Archana Conference paper presentation Oral & poster both (UK, University of Edinburgh) 5 days

Invited Lectures by Faculty Members
1. Property Law by Nandy, Sujit Kumar (National University of Juridical Sciences, Kolkata)
2. Civil Procedure, Art of writing orders and judgements by Nandy, Sujit Kumar (State Judicial Academy, Kolkata)

Books Published

Seminars, Conferences and Workshops Organised
1. Academia Industry Partnership
2. Industry Academia Summit

Short-Term Courses, Training Programmes and Workshops organized
1. AICTE Sponsored Induction Programme on IPR for Engineering College Teachers (15 days)
2. Capacity Building Programme on Geographical Indications and Designs for Orissa Government Officials (One Week)
3. DST-TIFAC Women Scientists Scholarship Scheme in IPR (2008-2009)
New Academic Programmes
The School currently offers one M.Tech programme in "Infrastructure Design and Management". The first batch of M.Tech students has been admitted during the 2008-2009 academic year.

Brief Description of on-going activities
The school was inaugurated by Padma Bhushan Professor Lord Shusantha Kumar Bhattacharyya of Warwick Manufacturing group on 18th of August 2008 (Institute Foundation Day). An advisory Council comprising eminent experts from different fields as external experts has been constituted. The first meeting of the advisory council meeting was held on 29th March 2009.

Thrust Areas
1. **Transportation Engineering**: Planning, design, operation and management of highways, airport and seaport infrastructure
2. **Environmental Engineering**: Planning, design, operation and management of water supply and waste management systems, Environmental Impact Assessment
3. **Facilities Infrastructure**: Urban infrastructure planning and design, Facility programming and specialized building design, building automation systems design, building management systems, regional infrastructure planning and construction
4. **Power Systems**: Planning, design, operation and management of Thermal, hydel and Nuclear Power Plants, Renewable Power Plants, Power generation, transmission and distribution, power system planning and reliability
5. **Infrastructure Project management Infrastructure Financing and Infrastructure Regulatory Issues**

New Acquisitions
1. The school has acquired 10 desk top computers, PRIMAVERA and MX Roads softwares
SCHOOL OF INFORMATION TECHNOLOGY

HEAD: Professor Indranil Sen Gupta

FACULTY

Associate Professors
Ghosh, Soumya Kanti Ph.D., Network Security, Spatial Database
Gupta, Arobinda Ph.D. (Iowa), Distributed Systems, Ad Hoc Networks
Sural, Shamik Ph.D., Information Security, Image and Video Processing

Assistant Professors
Misra, Sudip Ph.D. (Carleton University, Canada), Computer Networks, Software Engineering
Sreenivasa Rao, Krothapalli Ph.D. (IIT Madras), Speech Processing, Multimedia Signal Processing, Pattern Recognition, Neural Networks

Faculty Promotions
Dr, Soumya Kanti Ghosh Associate Professor

Brief Description of on-going activities
Computer and Communication Networks: Development of architectures, protocols and algorithms for mobile ad hoc networks, vehicular ad hoc networks, wireless sensor networks and wireless mesh networks. Geographical Information System: Enterprise-wide GIS database development and its policies and protocols to make it accessible as platform independent and support for decision making are under research and development. Human Computer Interaction: Development of adaptive user interfaces and automatic usability evaluations with simulated human user. Interface in Indian languages are under development to support physically disabled people. Speech Processing: Researchers working in this area are focusing on characterization and incorporation of emotions in speech, speaker recognition system for handheld devices in varying background environments and development of Text-to-Speech (TTS) system for Indian languages. Network Security: Various areas of network security are being explored, like penetrating testing, development of new algorithms for cryptography, their efficient and attack-resistant hardware implementation etc. Systems Security: Survivable information system architecture to tolerant with potential information warfare attacks is under development. Such systems are typically characterized by the presence of a large repository of sensitive data in a distributed environment. The architecture takes into account the presence of multiple operating systems and database platforms, their known and potential vulnerabilities as well as possibilities of simultaneous attacks from adversaries. It will be developed as a generic model which can be used to build specific information systems in a number of application domains like e-governance, finance and insurance, education, etc.

Thrust Areas
Distributed computing, wireless ad hoc and sensor networks, ubiquitous computing, network security, database systems and data mining, systems security, human computer interaction, geographical information system, speech processing, computer vision, VLSI design.

International Collaborations
1. With Prof. Sakti Pramanik, Michigan State University, USA
2. With Prof. V. Atluri, Rutgers University, USA
3. With Prof. M. S. Obaidat, Monmouth University, USA
4. With Prof. I. Woungang, Ryerson University, Canada
5. With Prof. B. J. Oommen, Carleton University, Canada
Lectures by Visiting Experts
1. Advanced Topics on Speech Processing by Dr. Samudra Vijaya (TIFR, Mumbai)
2. Advanced Topics on Speech Processing by Mr. S. P. Kishore (IIIT Hyderabad)
3. The Role Mining Problem - A Formal Perspective by Prof. V. Atluri (Rutgers University)
4. Indexing and Querying Multi-Media Data in Hybrid Data Spaces by Prof. Sakti Pramanik (Michigan State University)

Doctoral and MS Degrees Awarded
1. Rajiv Misra Domination algorithms for lifetime problems in self-organizing ad hoc and sensor networks (Ph.D.)
3. Suprio Das A Fuzzy System for Impact Analysis on TV Audience by Billboard Advertising in Soccer Matches (MS)
4. Syamantak Das A Novel Technique for Resistance Extraction and Current Density Profiling of Lateral Power arrays (MS)
5. Alokesh Chatteropadhyay An energy aware routing protocol for mobile ad hoc networks (MS)
6. Aditi Roy Modeling and Extraction of Views and States from Echocardiogram Video (MS)
7. Amlan Kundu Detection of Credit Card Fraud and Database Intrusion using Sequence Alignment (MS)

Member - Editorial Board
1. Misra, Sudip (2007) Associate Editor
   - EURASIP Journal on Wireless Communications and Networking
   - Journal of Computer Systems, Networks and Communications
   - International Journal of Ad Hoc and Ubiquitous Computing
   - International Journal of Communication Systems
   - International Journal of Automation and Computing
   - Security and Communication Networks
   - International Journal of Theoretical and Applied Computer Sciences
   - International Journal of Information and Coding Theory
   - IET Communications (formerly, IEE Proceedings on Communications)
    - International Journal of Internet Protocol Technology
    - International Journal of Communication Networks and Distributed Systems
    - Computers & Electrical Engineering Journal
    - Telecommunication Systems Journal
    - Journal of High Speed Networks
15. Samanta, Debasis (2008) *Honorary Member of the Editorial Board*
   - International Journal of BioSciences and Technology
16. Samanta, Debasis (2008) *Member of the Editorial Board*
   - ICFAI University Journal of Information Technology
17. Samanta, Debasis (2008) *Member of the Editorial Board*
   - International Journal of Communication Networks and Distributed Systems (IJCNDS),
   - International Journal of BioSciences and Technology
   - The Open Signal Processing Journal
20. Sreenivasa Rao, Krothapalli (2009) *Member*
   - International Journal of UWB Communications and Systems
   - International Journal of Data Mining Modelling and Management
   - International Journal of Applied Metaheuristic Computing
23. Sural, Shamik (2008) *Member, Editorial Board*
   - International Journal of Artificial Intelligence and Soft Computing

**Awards & Honours**

1. Sural, Shamik (2009) *Alexander von Humboldt Fellowship*

**Sponsored Research Projects**

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>An Integrated Framework for Testing Object-Oriented Programs</td>
<td>Department of Science and Technology (DST), Govt. of India</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>2.</td>
<td>Bio-inspired and nature-inspired solutions in wireless ad hoc and sensor networks</td>
<td>Department of Science and Technology, ISIRD, IIT Kharagpur</td>
<td>Rs. 7.00 Lakhs</td>
</tr>
<tr>
<td>3.</td>
<td>Characterization and incorporation of emotions in speech</td>
<td>ISIRD, IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>4.</td>
<td>Content-Based Information Retrieval from Multimedia Databases</td>
<td>IIT Kharagpur</td>
<td>Rs. 2.88 Lakhs</td>
</tr>
<tr>
<td>6.</td>
<td>Development of an Enterprise GIS based on open GIS standards</td>
<td>Department of Science &amp; Technology (DST), New Delhi,</td>
<td>Rs. 40.50 Lakhs</td>
</tr>
<tr>
<td>7.</td>
<td>Development of Multimodal User Interface to Internet for Common People in India</td>
<td>DIT, New Delhi</td>
<td>Rs. 58.00 Lakhs</td>
</tr>
<tr>
<td>8.</td>
<td>Development of Spatio-temporal Access Control Models</td>
<td>Dept. of Science &amp; Technology, Govt. of India</td>
<td>Rs. 16.18 Lakhs</td>
</tr>
<tr>
<td>9.</td>
<td>Development of Text-to-Speech (TTS) system for Indian languages</td>
<td>Department of Information Technology,</td>
<td>Rs. 35.66 Lakhs</td>
</tr>
<tr>
<td>10.</td>
<td>DSM-Aware Synthesis of Low Power Circuits</td>
<td>Intel, USA</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>11.</td>
<td>DSM/UDSM-Aware Synthesis for Low-Power High-Performance CMOS VLSI Circuits</td>
<td>CSIR, New Delhi</td>
<td>Rs. 14.00 Lakhs</td>
</tr>
<tr>
<td>12.</td>
<td>Efficient Index-supported Multimedia Search on the Internet</td>
<td>Dept. of Science &amp; Technology</td>
<td>Rs. 6.38 Lakhs</td>
</tr>
</tbody>
</table>
13. Enhanced SANYOG: A Portable Communication Tool for the Speech and Neuro Motor Impaired People
   Media Lab Asia Rs. 71.00 Lakhs

14. Handling Anomalous Behaviors and Threats in Vehicular Networks
   GM India Science Lab Rs. 16.20 Lakhs

15. Microsoft Lab Setup
   Microsoft Corp. USA Rs. 35.00 Lakhs

16. Modeling and Management of Dynamic Multimedia Objects
   Dept. of Science and Technology, Govt. of India, Rs. 18.00 Lakhs

17. Online Authentication Checking System with IRIS Biometric
   Indian Institute of Technology Kharagpur Rs. 03.00 Lakhs

18. Properties of High Dimensional Euclidean Space and their Applications in Approximate Nearest Neighbor Search on Multimedia Databases
   Department of Science and Technology, Government of India Rs. 3.30 Lakhs

19. Shruti: A Vernacular Speech Recognition System
   Media Lab Asia Rs. 0.00 Lakhs

20. Speaker recognition system for handheld devices in varying background environments
   Department of Science and Technology Rs. 23.03 Lakhs

21. Survivable Information System Architecture with Intrusion tolerance, Containment and Recovery in Distributed Environment
   Dept. of Information Technology, Govt. of India, Rs. 55.00 Lakhs

Consultancy Projects
1. Design & Development of a Penetration Testing And Security Assessment Tool
   Ministry of Defence Government of India Rs. 49.00 Lakhs

2. Development of parameterized templates and R-extraction tools
   National Semiconductor Corporation, Santa Clara, USA, Rs.153.00 Lakhs

3. GM-CRL, IIT Kharagpur - VANET Communication & Security Group
   General Motors Rs.500.00 Lakhs

4. Placement and Routing of analog test Structures
   National Semiconductor Corporation, Santa Clara, USA, Rs. 46.00 Lakhs

Visits Abroad by Faculty Members
1. Sural, Shamik
   To attend conference (Turin, Italy, ) 01/09/2008-06/09/2008

2. Sural, Shamik
   To attend conference (Naples, Italy, ) 07/09/2008-10/09/2008

3. Gupta, Arobinda
   Present Paper (Dunedin, New Zealand, ) Dec 1-5,

4. Samanta, Debasis
   IEEE Region 10 Meet (Hanoi, Vietnam, ) 27 February - 01 March, 2008

5. Ghosh, Soumya Kanti
   Invited talk at OGC (Open Geospatial Consortium) Meet (Atlanta, USA, ) 15-19 September 2008

Invited Lectures by Faculty Members
1. Misra, Sudip (National Conference on Computer Networks (NCCN), Bangalore)


4. Misra, Sudip (International Conference on Computing, Communication and Networking (ICCCN-2008), Karur, Tamil Nadu)

5. Misra, Sudip (National Conference on Computational Learning Theory (NCLT-2008), Bhubaneswar, Orissa)

7. Misra, Sudip (International Conference on Systemics, Cybernetics, and Informatics (ICSCI 2008), Hyderabad)

Books Published

Seminars, Conferences and Workshops Organised
1. IEEE R 10 Colloquium and 3rd International Conference on Industrial Information Systems
2. Indian Conference on Computer Vision, Graphics and Image Processing
3. Tutorial on Speech Processing

Short-Term Courses, Training Programmes and Workshops organized
SCHOOL OF MEDICAL SCIENCE & TECHNOLOGY

HEAD: Professor Ajoy Kumar Ray

FACULTY

Assistant Professors

Bhattacharya, Sangeeta Das MD (Johns Hopkins University), Teaching Methods in Evidence Based Medicine, Epidemiology of Pediatric HIV in West Bengal, Use of Electronic Medical Records in the Management of Chronic Disease, Improving College Health in the Indian Scenario

Chakraborty, Chandan Ph.D. (IIT Kharagpur), Biostatistics, Pattern Classification Techniques for Automated Diagnostics, Histopathological and Molecular Image Processing, Epidemiological study

Chatterjee, Jyotirmoy Ph.D., Macro-Micro-Molecular Imaging and Analysis for Early Diagnosis of Precancer-Cancer and Wounds, Genetics and Molecular Profiling of Precancer-Cancer and Wounds, Wound Healing and Tissue Engineering, Radiation Hormesis

Chaudhury, Koel Ph.D. (Delhi), Oxidative Stress and Infertility, Proteomics and Reproductive Health

Das, Soumen Ph.D. (IIT Kharagpur), BioMEMS and Biotransducers, Microfluidic Devices, Characterization of Electrophysiological Parameters of Biological Species, Medical Instrumentation

Dhara, Santanu Ph.D. (IIT Kharagpur), Biomaterials and Tissue Engineering, Fabrication and Surface Modification

Mandal, Mahitosh Ph.D. (Jadavpur University), Cancer Biology, Signal Transduction, Apoptosis, Angiogenesis


Mitra, Analava Ph.D. (IIT Kharagpur), Diabetology and Herbal Medicine, Neutraceuticals

Faculty Appointments

Dr. Chandan Chakraborty Assistant Professor

Faculty Promotions

Dr. Chandan Chakraborty Assistant Professor

Brief Description of on-going activities

1. Development of research laboratories at new SMST complex
2. Creation of micro / nano fabrication facility for basic and applied medical research
3. Development of micro-fluidic Biochips / Bio-MEMS for medical application
4. Development of single molecule DNA template nano-assembly and manipulation techniques
5. Design and Development of FPGA based artificial retinal chip
6. Laser speckle imaging of blood-flow in microcirculation
7. Development of micro-CT for pre-clinical investigation
8. Dynamics of Cardio-vascular responses to space flight
9. Development of statistical analyzer and disease pattern recognizer for Oral Pre-cancer and cancer
10. Design of an intelligent diagnostic tool through the extraction of diagnostic rules for asthma

ANNUAL REPORT
2008-2009
11. Integrated macro and micro-imaging on various healing and non-healing wounds including oral and breast precancer and cancer for their early characterization through image processing and analysis as well as integration with clinico-epidemiological features
12. Physico-chemical characterization of natural wound healing agents for the development of wound dressing technology
13. Development of detailed database on respiratory rhythms for identifying their temporal and spatial characteristics in health and disease
15. Characterization of natural materials for wound healing and development of wound healing technology
16. Development of biodegradable scaffold for tissue engineering and wound research
17. In vitro screening of anti-diabetes molecules
18. Design of a three dimensional scaffold and drug delivery system in arthritic hip joint
19. Design, Synthesis and reactivity of beta-lactum based hybrid molecules
20. Health Food and its applications
21. Signal Transduction
22. Molecular Tergated Theraphy
23. Cancer Biomarker
24. New Cancer Drug Development
25. Neutraceuticals and Herbal medicine

**Thrust Areas**

1. Medical Imaging and Image Processing
2. Medical Instrumentation
3. Bio-MEMS
4. Medical Statistics and Pattern Recognition
5. Medical Expert System
6. Tissue Engineering
7. Bio-Materials
8. Drug Design
9. Cancer Biology
10. Signal Transduction
11. Proteomics and reproductive health
12. Diabetology and Herbal Medicine
14. Genetics and Molecular Profiling of Pre-cancer-Cancer and Wounds
15. Internal Medicine
16. Pediatrics HIV

**New Acquisitions**

1. Microscope
2. HPLC
3. GEL-electrophoresis
4. ELISA
5. Ultrasound
6. Antigen Retrieval system

**Fellow - Professional Bodies**

Member - Editorial Board

1. Dhara, Santanu (2009) *Editorial Board Member*
   - International Journal of BioSciences and Technology
2. Mandal, Mahitosh (2008) *Editorial Board Members*
   - International Journal of BioSciences and Technology
   - Journal of institution of Engineers
   - Studies in Ethno-medicine
   - Journal of Association of Food Scientists and Technologists (India)
   - African Journal Of Biochemistry Research
   - International Journal of Human Ecology
   - International Journal of BioSciences and Technology
   - Anthropology Today: Trends, Scope And Applications
    - Journal of Medicinal Plants Research
    - Journal of Clinical and Diagnostic Research
    - International Journal of Food Science and Technology
    - International journal of Library Science

Awards & Honours

2. Mandal, Mahitosh (2008) *Best Poster Award* , *International Conference, KIIT University, Bhubaneswar, Orissa, INDIA.*
3. Chaudhury, Koel (2009) *Dr. CS Dawn Prize for best paper presentation in the category of Modern Technology in Womens Health*
4. Chakraborty, Chandan (2007) *ISCA Young Scientist Award in the 94th Indian Science Congress*

Sponsored Research Projects

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<thead>
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<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A Computer-Aided Diagnostic System for Bronchial Asthma using a Clinico-Epidemiological Knowledgebase</td>
<td>SRIC, IIT Kharagpur</td>
<td>Rs. 1.00 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Characterization of Indian Honey &amp; its Integration with wound Dressing System</td>
<td>SRIC, IIT-Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>Comparative Evaluation Of Anti-diabetic Potential of Two Indian Medicinal Plants in Vivo</td>
<td>IIT Kharagpur</td>
<td>Rs. 4.40 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Design &amp; Development of a Distributed Database System, Statistical Analyser and Disease Pattern Recogniser for Preventive &amp; Promotive Healthcare in Ru</td>
<td>DIT, Govt. of India</td>
<td>Rs. 25.68 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>Design Development and Feasibility Study of a Versatile Low Cost FES for Hemiplegics</td>
<td>Ministry of Social Justice and Empowerment</td>
<td>Rs. 20.00 Lakhs</td>
</tr>
<tr>
<td>No.</td>
<td>Project Title</td>
<td>Funding Agency</td>
<td>Amount</td>
</tr>
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<tr>
<td>6</td>
<td>Design, analysis and optimization of navigation grade silicon based MEMS accelerometer</td>
<td>ISRO-KCSTC Cell</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>7</td>
<td>Determining the Mechanisms of S100A7 (Psoriasin) in Mediating Anoikis Resistance and Tumor Progression in Squamous Cell Carcinoma of the Oral Cavity</td>
<td>SRIC, IIT, Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>8</td>
<td>Development of a Medical Expert System for Screening &amp; Diagnosis of Coronary Artery Diseases</td>
<td>(VECC Kolkata, DAE Govt. Of India, VECC, Kolkata)</td>
<td>Rs. 43.20 Lakhs</td>
</tr>
<tr>
<td>9</td>
<td>Development of a Medical Expert System for screening &amp; Diagnosis of Coronary Artery Diseases</td>
<td>ISRO, IIT Kharagpur</td>
<td>Rs. 05.00 Lakhs</td>
</tr>
<tr>
<td>10</td>
<td>Development of a MEMS based assay for bio-chemical diagnostics</td>
<td>ISRO, IIT Kharagpur</td>
<td>Rs. 05.00 Lakhs</td>
</tr>
<tr>
<td>11</td>
<td>Development of a Statistical Analyzer based Computer Aided Diagnostic (CAD) System for Asthma</td>
<td>SERC Fast Track Scheme for Young Scientist, DST, Govt. of India</td>
<td>Rs. 7.50 Lakhs</td>
</tr>
<tr>
<td>12</td>
<td>Development of MEMS based accelerometers for aerospace applications</td>
<td>NPMASS, ADA, Bangalore,</td>
<td>Rs. 448.90 Lakhs</td>
</tr>
<tr>
<td>13</td>
<td>Development of novel nano-bio composite osteogenic matrices for cell based bone tissue engineering.</td>
<td>DRDO</td>
<td>Rs. 21.60 Lakhs</td>
</tr>
<tr>
<td>14</td>
<td>Development of Scaffold for Tissue Engineering</td>
<td>SRIC, IIT Kharagpur</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
<tr>
<td>15</td>
<td>Feasibility study of MEMS based biochip platform for characterisation of biospecies</td>
<td>IIT Kharagpur</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
<tr>
<td>16</td>
<td>Impact of Follicular Fluid and IVF Media-Generated Oxidative Stress on Oocyte Maturation, Fertilization and Subsequent Embryo Development</td>
<td>Dept. of Biotechnology</td>
<td>Rs. 9.26 Lakhs</td>
</tr>
<tr>
<td>17</td>
<td>Laser Speckle Imaging of Bloodflow in Microcirculation</td>
<td>SRIC, IIT Kharagpur</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
<tr>
<td>18</td>
<td>Medical Image Analysis and MEMS based flow sensor development (MIA)</td>
<td>Texas Instruments India</td>
<td>Rs. 92.00 Lakhs</td>
</tr>
<tr>
<td>19</td>
<td>MEMS based micropropulsion devices for microsatellite programme</td>
<td>ISRO, Bangalore</td>
<td>Rs. 122.96 Lakhs</td>
</tr>
<tr>
<td>20</td>
<td>Net Shape Fabrication of Dental Crown using Computer Numerical Control (CNC) Machining of Green Ceramic Composites</td>
<td>DBT, India</td>
<td>Rs. 43.02 Lakhs</td>
</tr>
<tr>
<td>21</td>
<td>Purification and characterization of azurin from Pseudomonas aeruginosa 2453&amp; its application in human breast cancer cells</td>
<td>AICTE, New Delhi</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>22</td>
<td>Synthesis, development and invitro characterization of bio-inert Yttria / Ceria coated / stabilized ZrO2 toughened Alumina composites for biomedical appl</td>
<td>DBT, India</td>
<td>Rs. 32.60 Lakhs</td>
</tr>
<tr>
<td>23</td>
<td>To investigate the role of matrix metalloproteinases &amp; tissue inhibitors of metalloproteinases in follicular fluid of women with endometriosis</td>
<td>WB-DST</td>
<td>Rs. 7.68 Lakhs</td>
</tr>
<tr>
<td>24</td>
<td>Understanding the impact of pediatric HIV-1 infection on childhood immunization coverage in WB</td>
<td>IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>25</td>
<td>Web enabled medical information access using handheld devices in a wireless environment for telemedicine application</td>
<td>Ministry of GoI Comunications and Information Technology</td>
<td>Rs. 62.10 Lakhs</td>
</tr>
</tbody>
</table>

**Patents (filed / granted)**

1. Cellular geometry features of epithelial cells in FNAC samples of benign and malignant breast lesions
2. Oral Mucosa characterization at tissue level and cellular level for early detection of oral cancer
Visits Abroad by Faculty Members
1. Mandal, Mahitosh Visiting Assistant Professor (Virginia Commonwealth University, Virginia, USA) 10th May- 9th July

Invited Lectures by Faculty Members
2. Data classification techniques in bioinformatics by Chakraborty, Chandan (Workshop on Bioinformatics, Biotechnology Dept., IIT Kharagour)
3. Biological Applications of Computer by Mitra, Analava (MITS Raygadh)
4. Safe Mining : Methods, Design and Technology- Medical aspects by Mitra, Analava (IIT Kharagpur)
5. OCT in Characterization of wounds by Chatterjee, Jyotirmoy (VECC-DAE, Kolkata)
6. An integrated approach & molecular imaging for wound repair through tissue regeneration by Chatterjee, Jyotirmoy (Indo-Australian Discussion Meeting on Biomedical Devices at New Delhi- Invited by DBT, New Delhi)
7. Development of Medical Expert System by Chakraborty, Chandan (Variable Energy Cyclotron Center (VECC) Kolkata)
8. “Rheological Characterization of Colloidal Slurries” by Dhara, Santanu (Short Term Course on Advanced Ceramics Processing & Characterization organized by NIT, Rourkela)
9. “Advanced Processing of Ceramics via Colloidal Slurry” by Dhara, Santanu (NIT Rourkela )
11. Advanced Shape Forming of Ceramics by Dhara, Santanu (CGCRI, Kolkata)
12. Retinal Prosthesis by Manjunatha M (Electrical Engineering Department, IIT-Bombay)
13. Medical Image Processing based on DSP and FPGA by Manjunatha M (VECC-Kolkata (Societal applications of Computer))
14. S100A7 (Psoriasin) Mediates Anoikis Resistance and Tumor Progression in Squamous Cell Carcinoma by Mandal, Mahitosh (KIIT University, Bhubaneswar, Orissa, INDIA)
15. The molecular effect of ZD6474, a dual tyrosine kinase inhibitor of EGFR and VEGFR on breast cancer by Mandal, Mahitosh (Madras, IIT, India)
16. Threshold level of ROS in follicular fluid of women undergoing IVF by Chaudhury, Koel (IVF and Infertility Research Centre, Ranchi)

Seminars, Conferences and Workshops Organised
1. National Workshop on Technology in Health Care: Prospects and Challenges
2. National Workshop on Technology in healthcare: Prospects and challenges
3. Recent trends & Techniques in medical imaging & image analysis (QIP)

Short-Term Courses, Training Programmes and Workshops organized
1. Recent trends & Techniques in medical imaging & image analysis (November 3-8, 2008)
2. Recent Trends and techniques in Medical Imaging (5 days)
NEW ACADEMIC PROGRAMMES

The M. Tech. programme in Water Management aims at providing integrated and interdisciplinary approaches, involving hydrological, biophysical, chemical, economic, institutional, legal, and policy-planning aspects, to solve water-related challenges in agriculture, industry, and domestic sectors. The programme is designed for professionals and fresh graduates with Agricultural, Civil, Mechanical, and Mining engineering background. It aims to develop knowledge, insight and skills required to design, implement, and evaluate water management policies and strategies for making judicious use of water and achieving effective governance of water resources. The programme consists of foundation, specialization, and integration phases. The foundation phase provides latest insights, context, and concepts in integrated water and environment management issues. In the specialization phase, the students choose to make in-depth study either in Rural and Urban Water Management or Agricultural Water Management. In the integration phase, the students are challenged to bring together and apply their cumulative learning process in the form of an M. Tech. thesis.

BRIEF DESCRIPTION OF ON-GOING ACTIVITIES

Collaborative research project with CORAL on Land use and Land Cover (LULC) Dynamics in Relation to Human Dimensions and Climate in Mahanadi River Basin, Orissa, funded by NRSC, Hyderabad, 2009-2012

THTUS AREAS

1. Management of Excess Water
   i) Rainwater Conservation and Reuse
   ii) Managed Aquifer Recharge
   iii) Agricultural Land Drainage
   iv) Wastewater Management

NEW ACQUISITIONS

1. Softwares such as ERDAS for remote sensing and MIKE BASIN for basin planning have been procurred.

INTERNATIONAL COLLABORATIONS

1. Institute of Water Resources Management, Hydrology and Agricultural Hydraulic Engineering, Leibniz University Hannover, Germany

LECTURES BY VISITING EXPERTS

1. Water Networks by Prof. Iven Mareels (Dean, Melbourne School of Engineering, Australia)
VINOD GUPTA SCHOOL OF MANAGEMENT

HEAD : Professor S. Srinivasan

FACULTY

Professors
Bagchi, Tapan P  Ph.D. (University of Toronto), Scheduling of Production and Services, Metaheuristics (GA), Software Engineering and Quality Assurance, Macroeconomic Modeling in Forecasting, Mathematical Modeling of Business and Information Systems, Taguchi Methods in Quality Engineering

Ghosh, Ranjan  D.Sc. (Columbia University), Operations Management, Project Management, Supply Chain Management

Guin, Kalyan Kumar  B.Tech. (IIT Kharagpur), Marketing Research, Quant Modelling of Business Strategy, Entrepreneurship

Sinha, Gautam  Ph.D. (IIT Kharagpur), Operations Management / SCM / Manufacturing Strategy / HR

Associate Professors
De, Sadhan Kumar  Ph.D. (UK), E-Business / E-Commerce, Enterprise Systems / ERP, Management of Technology and Innovation

Rajib, Prabina  Ph.D. (IIT Kharagpur), Corporate Finance, Risk Management, Commodity Derivatives


Assistant Professors
Datta, Biplab  Ph.D. (IIT Delhi), Marketing Management, Leadership and Teamwork, Industrial Marketing, High-Tech Marketing, Human Behaviour in Organisation

Datta, Saroj Kumar  Ph.D. (University of Burdwan), Strategic Management, Marketing Management


Mishra, Chandra Sekhar  Ph.D. (Utkal University), Corporate Finance, Financial Reporting and Analysis, Financial Markets, Management Accounting, Company Valuation


Mukhopadhyay, Susmita  Ph.D. (Calcutta University), Organizational Behaviour, HR, Business Ethics, Microfinance


Sahney, Sangeeta  Ph.D. (IIT Delhi), Marketing Management, Services Quality, Buyer Behavior, Quality Management in Services

Faculty Appointments
Dr. Tapan Bagchi  Professor
Dr. Ranjan Ghosh  Professor
Dr. Aradhna Malik  Visiting Assistant Professor
Dr. Swarup Mandal Adjunct Professor
Dr. Prithwis Mukherjee Adjunct Professor
Dr. Ramanuj Majumdar Adjunct Professor

Faculty Retirement
Dr. Santanu Roy Associate Professor

New Academic Programmes
1. Formulating a Dual Degree Postgraduate programme in Financial Engineering with interested departments at IIT Kharagpur.

Brief Description of on-going activities

Thrust Areas
1. Entrepreneurship
2. Financial Engineering
3. Small and Medium Enterprises

International Collaborations
1. Continuing collaboration with University of Nebraska, Omaha, and Creighton University

Lectures by Visiting Experts
1. Social Entrepreneurship on the IIT Campus by Prof. Dhrubesh Biswas (MD, STEP, IIT Kharagpur)
2. Corporate governance and its implications for budding managers by Prof. Indraji Dube (Rajiv Gandhi School of Intellectual Property Law of)
3. Product management and brand development by Mr. Deepak Ranjan (General Manager (Marketing), Adhunik Cement)
4. Turnaround of Hindustan Copper Limited: A case study by Mr. O. P. Chugh (Executive Director (Modernization), Hindustan Copper Limited)
5. Functional aspects and importance of customer relationship management by Mr. Mohan Kumar Silaparasetty (Industry Leader, IBM-India)
6. Corporate entrepreneurship by Mr. Allwin Agnel (Founder and CEO, Pagalguy.com)
7. Stress management by Dr. A. K. Dutta (Renowned Heart Specialist and spiritual leader)
8. Turnaround of Kolkata Municipal Corporation: A case study by Mr. Debasish Som (Head, Eastern Region, Feedback Ventures)
9. The financial crisis of 2008: Causes and consequences by Dr. Mandira Roy (Independent research professional, New York City area)
10. Importance of reliability in designing of industrial products by Dr. D. N. P. Murthy (Research Professor, Division of Mechanical Engineering, University of Queensland, Australia)
11. Importance of reliability in designing of industrial products by Dr. Rezaul Karim ()
12. Global Entrepreneurship by Prof. Vijaya L. Narapareddy (Associate Professor, Daniels College of Business, University of Denver, USA)
13. Adoption of new products: Finding early adopters and impact of selection bias in trial evaluation by Dr. Arun Bhattacharya (Principal, Advanced Analytics, Wolters Kluwer Health, Pharma Solutions Group, New Jersey, USA)
14. New product development by Ms. Jayshree Saha ()
15. Venture capitalism: Opportunities in India by Mr. Paresh Sheth (Chief Distribution Officer, FirstRand Bank)
16. IT Management in Banking by Mr. Anupam Shringi (Director & Head- Cost and Resource Management; Program Manager - Big Rock Initiatives at UBS)
17. Global Economy, Indian Economy and Markets and their Immediate and Long term Prospects by Mr. R. Ravimohan (Managing Director and Region Head (South and South East Asia), Standard and Poors)
18. Basel II: Challenges Ahead of the Indian Banking Industry" by Mr. V. Vasanthan (Regional Head, RBI, Kolkata)
19. Supply chain management by Mr. Saurabh Tiwari (Sector Manager (Planning and Procurement), Cadbury India Limited)
20. Introduction to the Toastmasters Club by Mr. Kunal Pabrai (Toastmasters)
21. Business Technology at Indian Oil ( SAP implementation) by Mr. S. Ramasamy (Executive Director (IS), Indian Oil Corporation Ltd.)

Doctoral and MS Degrees Awarded
1. Rajesh Kumar B. An Analytical Study on Mergers in India (Ph.D.)
2. Uttam Kumar Chatterjee Uni TPM: A Fast Track TMP Implementation Approach and Its Applications (Ph.D.)
3. Madhurima Deb Customer Relationship Management (CRM) Practices in Indian Retailing Sector-Focussed Study on Retailer-Customer Relationship Outcomes (Ph.D.)

Fellow - Professional Bodies
1. De, Sadhan Kumar (1991) Fellow - The Institution of Engineers (India)

Member - Editorial Board
5. Pradhan, Rudra Prakash (2008) Editorial Board Member - Pragayaan

Awards & Honours

Fellowships
2. Pradhan, Rudra Prakash (2008) SAP Fellowship
### Sponsored Research Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Development of Scheduling Algorithm and its Software Implementation for Multi-Satellite Operations Scheduling by Genetic Algorithms</td>
<td>ISTRAC ISRO Bangalore</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Development of Soundproofing Composite Materials Using Jute Products</td>
<td>Jute Manufacturers Development Council, Kolkata,</td>
<td>Rs. 32.26 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>EXTECIM Eurindia Scientific Project on E-Commerce and Intelligent Manufacturing</td>
<td>Ecope de Mines, Nantes France,</td>
<td>Rs. 3.50 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Impact of Select Issues in Consumer Demographics and Psychographics on Online Buying Behavior</td>
<td>ISIRD - IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>Optimum Sizing of Regional Aircraft and Domestic Air Traffic Projection till 2025</td>
<td>NAL Bangalore</td>
<td>Rs. 10.00 Lakhs</td>
</tr>
<tr>
<td>6</td>
<td>Quality Management System for Education Programmes of IIT Kharagpur</td>
<td>ISIRD IIT Kharagpur</td>
<td>Rs. 3.00 Lakhs</td>
</tr>
<tr>
<td>7</td>
<td>Rule-based and Auto0nomous:Specifying Conditions for the Successful Implementation of ISO 9000</td>
<td>NSF and University of Minnesota USA</td>
<td>Rs. 5.00 Lakhs</td>
</tr>
</tbody>
</table>

### Consultancy Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Project</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Employee Engagement</td>
<td>Tata Metaliks</td>
<td>Rs. 0.60 Lakhs</td>
</tr>
<tr>
<td>2</td>
<td>Implementation of Lean Engineering Practices at Base Repair Depot, Nasik</td>
<td>Indian Air Force</td>
<td>Rs. 56.00 Lakhs</td>
</tr>
<tr>
<td>3</td>
<td>Manpower study of CBM and MBA Basin</td>
<td>ONGC</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>4</td>
<td>Restoring Industrial harmony for textile and dyeing industries of Rajarhat</td>
<td>Rajarhat dyeing and Bleaching association</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>5</td>
<td>Six Sigma Defect Reduction Project Demonstration on Shop Floor</td>
<td>Tata Bearings Plant, Kharagpur</td>
<td>Rs. 0.00 Lakhs</td>
</tr>
<tr>
<td>6</td>
<td>To conduct Employee Engagement Survey</td>
<td>SRIC</td>
<td>Rs. 0.60 Lakhs</td>
</tr>
</tbody>
</table>

### Visits Abroad by Faculty Members

<table>
<thead>
<tr>
<th>#</th>
<th>Faculty Member</th>
<th>Event/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pradhan, Rudra Prakash</td>
<td>To attend Nobel Laureates meeting (Germany and Switzerland) August 20-23</td>
</tr>
<tr>
<td>2</td>
<td>Sahney, Sangeeta</td>
<td>Presented Paper at an International Conference, eCASE 2009, January 8-10, 2009 (Singapore)</td>
</tr>
</tbody>
</table>

### Invited Lectures by Faculty Members

<table>
<thead>
<tr>
<th>#</th>
<th>Topic</th>
<th>Faculty Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Commodity Derivatives</td>
<td>Rajib, Prabina (XLRI, Jamshedpur)</td>
</tr>
<tr>
<td>2</td>
<td>Emerging Trends in Indian Capital Market</td>
<td>Rajib, Prabina (Vidyasagar University)</td>
</tr>
<tr>
<td>3</td>
<td>Personality Traits of Entrepreneurs</td>
<td>Mukhopadhyay, Susmita (STEP-IIT KGP)</td>
</tr>
<tr>
<td>4</td>
<td>Counseling Airmen</td>
<td>Mukhopadhyay, Susmita (Air Force Station, Salua)</td>
</tr>
<tr>
<td>5</td>
<td>CSR</td>
<td>Mukhopadhyay, Susmita (Tata Bearings)</td>
</tr>
</tbody>
</table>

### Books Published

<table>
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<tr>
<th>#</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
</tr>
</thead>
</table>
Seminars, Conferences and Workshops Organised
1. Departmental Research Seminar Series initiated
2. Forecasting Financial Markets in India
3. Georgia Tech-IITKGP toward IT-Enabled Value Creation through Engineering
5. Statistical Modelling for Data Analysis
6. Teachers Training Programme on Managerial Economics

Short-Term Courses, Training Programmes and Workshops organized
1. AICTE/MHRD Summer School "Skill development of new management faculty" (July-August 2008)
2. Competency Development for New Management Faculty (July 7-20, 2008)
3. Emerging Trends in Capital Market and Equity Valuation (September 06-10, 2008)
4. Equity Valuation & Emerging Trends in Indian Capital Market (September 06-10, 2008)
5. ERP and Integration of Business Processes (23 June- 6 July 2008 & July 14-22, 2008 at Kolkata)
6. ERP : Technologies and Applications to Integrate the Business Supply Chain (December 19-27, 2008)
7. Practical Leadership (23-6-2008 to 5-7-2008)
PART - II

CENTRALIZED UNITS AND SERVICES

& ALUMNI AFFAIRS

&

INTERNATIONAL RELATIONS
The various activities of the office of the Dean of Alumni Affairs over the past one year are as follows:

1. A new alumni affairs website [www.alumnet.iitkgp.ernet.in](http://www.alumnet.iitkgp.ernet.in) has been created by the newly formed Alumni Cell student members to facilitate alumni all over the globe to register online. The site has taken on the look with added facilities like online payment. The new website is already operational.

2. An extremely popular Alumni newsletter “KGPian” is being published regularly every three months. Presently it is running in its 6th year.

3. The 58th Foundation Day of the Institute was celebrated on 18th August, 2008. The 2nd Nina Saxena Excellence in Technology Award, a first of its kind India-wide Technical Innovation Award instituted by IIT Kharagpur in 2006 was presented to Dr. Subhash P. Andey, Scientist, GeoEnvironment Management Division, NEERI, Nagpur by the Chief Guest Lord S.K. Bhattacharya, Director of Warwick Manufacturing Group, UK. The award consists of a cash prize of Rs. 51,000/- and a gold plated plaque. Commemorating the spirit of Dr. Nina Saxena, B.Tech. (Hons.), ECE 1992, who passed away tragically in 2005, the award is an attempt to encourage and promote technical innovation with a social development focus. The award is the result of a lot of hard work on Nina's husband, Dr. Akhil Sahai's part; also our alumnus.

4. Distinguished Alumnus Award was conferred on alumni of IIT Kharagpur who have distinguished themselves in their own domain of work and made their Alma Mater proud during the 54th Annual Convocation held on 25th July 2008. Dr. Duvvuri Subbarao, Dr. Pradip K. Roy, Dr. Anil K. Malhotra and Sri. Shantanu Mohapatra were awarded the Distinguished Alumnus Award. Dr. Pradip K. Roy, Dr. Anil K. Malhotra and Sri. Shantanu Mohapatra received the award in person whereas Dr. Duvvuri Subbarao could not attend the function.

5. The New Year brought together the alumni of the Institute again for the sixth time to IIT in the form of 6th Annual Alumni Meet 2009 held during 3rd - 4th January 2009. The Meet was, dedicated to those who graduated in the years 1959 and 1984. Many alumni came with their spouses and some with children and even grand children. To commemorate the occasion a Souvenir, “Yearnings of Yore Volume VI” was published. The programme consisted of Inauguration & Award Ceremony, Alumni General Meeting, Hall Reunion, Cultural Programme by ETMS and TDS and HASYA KAVI SAMMELAN. A small memento was presented to all participants belonging to the Silver Jubilee and Golden Jubilee Batches. For the first time the entire function was conducted and organized by the student members of the newly formed Alumni CELL.
6. PAN IIT 2008 was held at IIT Madras, Chennai during 19-21 December 2008. Prof. Damodar Acharya, Director; Prof. M. Charkraborty, Dy. Director; Prof. Amit Patra, Dean (AA&IR); Prof. Dhrubesh Biswas, Managing Director (STEP) and few students of the alumni cell attended the event.

INSTITUTE LECTURE SERIES

1. Dr. Chi- Foon Chan President, Synopsis Inc, USA - 8th July, 2008 delivered lecture on “Economic Challenges and Technological Complexities in the High-tech World of Today”

2. Dr. Gary vanLoon President, Shastri Indo-Canadian Institute, New Delhi 23rd July, 2008 delivered lecture on “Global Water Challenges”


4. James Lin, Vice President, Technology Infrastructure Group, National Semiconductor Corporation 30th July, 2008 delivered lecture on “Future of EDA Industry”

5. Swami Sarvapriyanandaji Maharaj Ramakrishna Mission, Belur Math 13th August, 2008 delivered lecture on “Ancient Wisdom for the Modern Age The Philosophy of the Upanishad”

6. Dr. P. M. Bhargava Chairperson, Anveshana, Hyderabad- 28th August, 2008 delivered lecture on “Scientific Basis of Aesthetic Appreciation: Why do we respond to beauty”

7. Dr. Ganesh Pandey Dy. Director, National Chemical Laboratory, Pune- 4th September, 2008 delivered lecture on “Oddyssey with Radical Ions”

8. Dr. M. Vidyasagar Executive Vice President, Tata consultancy Services, Hyderabad 23rd September, 2008 delivered lecture on “The human body as a dynamical system: Motivations and applications to drug development”


10. Prof. D. P. Chandrasekharan Professor of Forensic Sciences & Guest Faculty, National Law University, Jodhpur & National Law School of India University, Bangalore - 10th November, 2008 delivered lecture on “Role of Engineering in Crime Investigation”

11. Prof. Rajarshi Basu Director, Women’s Study Centre, Viswa Bharti University-11th November, 2008 (National Education Day Lecture) delivered lecture on “Contributions of Maulana Abul Kalam Azad both in pre and post-independence era”

12. Dr. T. Ramasami Secretary, Department of Science and Technology, New Delhi-22nd November, 2008 delivered lecture on “Chromium Induced Apoptosis”

13. Sir Richard Stagg British High Commissioner, New Delhi, India-10th December, 2008 delivered lecture on “Interaction with Faculty and Students”

15. Rao R. Tummala  
Director, Microsystems Packaging Research Center (PRC), Joseph. M Petit Chair Professor in Microsystems Packaging Georgia Tech., Atlanta, USA  
22nd January, 2009  
delivered lecture on “Advances on Nano Assembly in 3 Dimensions”

15. Vinod K. Gaur  
Distinguished Professor, Indian Institute of Astrophysics, Koramangala, Bangalore - 5th February, 2009  
delivered lecture on “The Earth’s Changing Climate Through The Aeons”

16. Dr. Pinakpani Chakrabarti  
Professor and J.C. Bose National Fellow, Department of Biochemistry and Bioinformatics Centre, Bose Institute, Kolkata - 28th February, 2009 (Science-Day Lecture)  
delivered lecture on “Features of Protein Structures”

17. Rajeev Sangal  
Director, International Institute of Information Technology, Hyderabad - 12th March, 2009  
delivered lecture on “To Follow Or To Lead : Aiming High With Self Confidence”

18. Mr. J. N. Mohanty  
Secretary, Satsang Vihar Delhi, Saha Prati Ritwik (SPR), Satsang  
17th March, 2009  
delivered lecture on “Contemporary Challenges : Role of the Young Generation”

MAJOR DONORS
1. Mr. Ranbir “Ron” Singh Gupta  
(B.Arch/1970/ARP) for development of a School of Infrastructure, Ranbir & Chitra Gupta School of Infrastructure Design and Management (RCGINFRATECH)

2. Mr. Anand Deshpande  
(B.Tech/1984/CSE/Patel)  
Towards 1984 Batch Endowment Fund

3. Mr. Sekar Srinivasan  
(B.Tech/1984/CSE/LLR)  
Towards 1984 Batch Endowment Fund

4. Mr. Rahul Kumar Jha  
(B.Tech/2005/Mech)  
Towards creation of a Soft-Computing Laboratory in the Mechanical Engineering Department

VISIT OF THE ALUMNI
1. Mr. Ron Gupta  
Visited several times in the year and discussed about the Ranbir & Chitra Gupta School of Infrastructure Design & Management, formation of the Advisory committee and Programme Implementation Committee, inauguration of the School and initiation of the academic programme and school location both temporary and permanent site, building design, schedule etc.

2. Prof. Lord Sushantha Kumar Bhattacharyya  
Director, Warwick Management Group, Warwick was the Chief Guest on 18th August, 2008, the Institute Foundation Day. He was awarded D.Sc. (Honoris Causa)

3. Dr. Prabhakant Sinha  
Educator, entrepreneur and thought leader and a former Associate Professor of Marketing from the Kellogg School of Management at Northwestern University, USA visited IIT Kharagpur and interacted with Director, Deputy Director and other faculty members of Chemical Engineering Department
4. 19 nos. of alumni (Class of 19661971, ARP Dept.) visited IIT Kharagpur during February 2123, 2009 to rekindle their alma mate and to relive the campus in those days.

MEMORANDUM OF UNDERSTANDING SIGNED

We have had a number of renowned universities coming forward with exchange programmes and the Institute has seen an influx in successful Memoranda of Understanding (MoU) and Memoranda of Agreement (MoA) lately.

MoUs signed during the academic year 2008-2009 are as under :

1. UC Berkeley, USA
2. University of Rome, “Tor Vergata”
3. RWTH, AACHEN, Germany
4. Berlin Institute of Technology (TU Berlin), Germany
5. University of Southampton
6. Leibniz University, Hannover, Germany
7. The University of Warwick, Warwick
8. University of Tokyo, Japan
9. Lulea University of Technology, Sweden
10. National Semiconductor Corporation, USA
11. University of Utah, Utah
12. University of Ontario, Canada
13. Politecnico di Milano, Italy
14. National University of Singapore
15. TOTAL, France

INTERNATIONAL VISITORS

1. Mr. Mohan Yegnashankaran Senior Vice President, Worldwide Technology Development, National Semiconductor Corporation and Mr. James Line, Vice President, Technology Infrastructure Group, NSC visited IIT Kharagpur on 30th July, 2008.
2. Prof. Iven Mareels Dean, Melbourne School of Engineering and Dillan Golightly, Program Coordinator, Melbourne School of Engineering, University of Melbourne, VIC, 3010 visited on 20th August, 2008.
3. Prof. Joy Laskar Georgia Institute of Technology and Prof. Renu Laskar, Clemson University, USA visited during November 1213, 2008.
4. Dr. Tetsuo SHIMIZU Associate Professor, Department of Civil Engineering, University of Tokyo visited during March 78, 2008.
6. Prof. Bill Wakeham Vice Chancellor, and Ms. J. L. Nesbitt, Deputy Director of the International Office and Regional Director, University of Southampton, Southampton, UK visited during March 2324, 2009.
EXCHANGE STUDENTS

1. Two girl students - Ina HAYDOUTOV and Michèle BERGER from University of Science and Technology, Polytech'Lille - Graduate School of Engineering, France did their 3-months (30-04-08 to 30-07-08) project in the field of Food Science from the Dept. of Agricultural and Food Engineering Department.

2. Mr. Toren Monson, a student of University of Utah, Utah, USA is doing Spring semester 2009 in the Dept. of Computer Science and Engineering, IIT Kharagpur.

3. Mr. Jan-Hernik Meier, a Masters student of Geography in the Leibniz University, Hannover, Germany is doing his internship for three months (1st February to 30th April, 2009) in the School of Water Resources, IIT Kharagpur.
ADVANCED TECHNOLOGY DEVELOPMENT CENTRE

CHAIRMAN : Professor Partha Pratim Chakrabarti

FACULTY ASSOCIATED

Professor

Chakrabarti, P. P.
Computer Science & Engineering
Ph.D., Artificial Intelligence, CAD for VLSI Design of Algorithms, Formal Verification
Lahiri, S. K.
Advisor, Sponsored Research & Industrial Consultancy
Ph.D., Microelectronics, VLSI, MEMS, Integrated optics
Sengupta, S.
Electronics & Electrical Communication Engineering
Ph.D., Computer vision, Multimedia
Patra, A.
Electrical Engineering
Ph.D., VLSI Design of Power Converters, Industrial Information Technology
Basu, A.
Computer Science & Engineering
Ph.D., Embedded Systems, Artificial Intelligence application
Banerjee, S.
Electrical Engineering
Ph.D., Bifurcation Theory, Chaos, Nonlinear Dynamics
Roy, S. K.
Physics & Meteorology
Ph.D., Solid State Physics, thin film, nanotechnology
Pal, S. P.
Computer Science & Engineering
Ph.D., Computational geometry, Design and analysis of algorithms
Manna, I.
Metallurgical & Materials Engineering
Ph.D., Corrosion and Surface Protection, Phase Transformation, Nano-cermets, Physical Metallurgy, Surface Engineering, Wear of Metals
Bhattacharya, S.
Civil Engineering
Ph.D., Structural Engineering
Ghosh, A.
Biotechnology
Ph.D., Virology and Molecular Biology
Basak, A.
Chemistry
Ph.D., Bioorganic Chemistry
Dey, S.
Biotechnology
Ph.D., Microbial and Plant Biotechnology
Chakraborty, S.
Mechanical Engineering
Ph.D., Micro fluidics
Mishra, H. N.
Agricultural & Food Engineering
Ph.D., Food Technology
Prasad, Suresh
Agricultural & Food Engineering
Ph.D., Food Process Engineering, Post Harvest Engineering
Pathak, S. S.
Electronics & Electrical Communication Engineering
Ph.D., Digital Communication

Associate Professor

Bhattacharyya, T. K.
Electronics & Electrical Communication Engineering
Ph.D., Microelectronics, VLSI, MEMS
Jacob, Chacko
Materials Science
Ph.D., Wide Bandgap Semiconductors / Nanomaterials / Direct Fluorination of Materials / Oxide semiconductors
Majumdar, G. C.
Agricultural & Food Engineering
Ph.D., Post Harvest Engineering, Food Engineering, Agri. Systems Management

ANNUAL REPORT
2008-2009
Dutta Gupta, S.  Ph.D., Plant Tissue Culture & Biotechnology
Agricultural & Food Engineering
Dey, Joykrishna  Ph.D., Physical Chemistry
Chemistry

Assistant Professor
Dhar, A.  Ph.D., Condensed matter Physics, nanotechnology
Physics & Meteorology
Das, S.  Ph.D., MEMS and Microsystems including Bio-MEMS and Bio-Transducers, Microelectronic devices, Medical Instrumentation and Medical chip design.
Medical Science & Technology
Srivastav, P. P.  Ph.D., Food Technology
Agricultural & Food Engineering
Rao, P. S.  Ph.D., Post Harvest Engineering, Aquacultural Engineering
Agricultural & Food Engineering
Guha, P.  Ph.D., Agronomy
Agricultural & Food Engineering

Senior Scientific Officer
Gangopadhyay, Pranabendu  Ph.D., Photonics, Optical Metrology, Optical Materials, MOEMS, Microelectronics

LABORATORIES INVOLVED
i) Microelectronics Laboratory
ii) MEMS Design Centre
iii) Integrated Optics Laboratory
iv) Kalpana Chawla Space Technology Cell
v) Microscience Laboratory
vi) Advanced VLSI Laboratory
vii) Advanced Laboratory for Plant and Genetic Engineering
viii) Communication Empowerment Laboratory
ix) Optel-IIT Fiber-Optic Center

RESEARCH AND DEVELOPMENT
Brief descriptions of on-going activities
Micromachining and MEMS are one of the major areas of research at Advanced Technology Development Centre. In addition to that, the fabrication of silicon and non silicon based microelectronic devices and ICs are also focused area of research at different laboratories under ATDC. Several government departments including NPSM / ADA, ISRO, DRDO, DST and BARC have funded projects to develop microsensors for special applications. During the last one year the MEMS devices developed in the laboratory include silicon piezoresistive accelerometer and microthruster and flow sensors. The technology for fabrication of silicon accelerometer has been transferred to Semiconductor Complex Limited, Chandigarh. Activities have been started on development of high sensitive MEMS accelerometer based on quantum tunneling phenomena and silicon MEMS pressure sensor.

Design and development of MEMS based micropropulsion devices for micro / nano satellite programme such as Microthruster, Microvalve and Micropump.

The MEMS design laboratory, a national facility created under NPSM programme is actively involved with design work on MEMS including microfluidic devices. A number of students from various departments like ATDC, E&ECE, Electrical, Mechanical, Biotechnology, Material Science Department / Centre are involved in the Design Centre to do their project / thesis works. Other academic Institutions like Jadavpur University and CMERI, Durgapur, are also involved in the Design Centre. Research and development is also undertaken in the field of Integrated Optics. An integrated-optic design software have been developed and copyrighted. Fabrication and characterization of titanium indiffused lithium niobate
waveguides, directional couplers, power splitters, switches for fiber-optic communication networks have been performed. Research is being carried out on thin film nanostructures, semiconductor, ferroelectric and magneto-resistive films for microelectronics and sensor applications under various government sponsored projects at MicroScience Laboratory of Dept. of Physics & Meteorology. A number of thrust areas have now emerged based on core competency available in the Advanced VLSI Laboratory. These include analog and RF circuits, wireless communication and Baseband processing, direct conversion receivers, power management circuits, processors and IP cores for embedded applications and design for testability. More than 60 different chips have been fabricated and tested. 15 leading companies have joined the AVLSI Consortium. More than 12 ongoing collaborative research projects funded by the Government of India and leading companies including National Semiconductors, Intel, Synopsys, Infineon, Texas Instruments, Si2 Microsystems, Agilent, Tessolve, Analog Devices and General Motors. The laboratory also offers regular intensive training to students of IIT Kharagpur. Buoyed by these initial successes, the laboratory is striving to attain still higher levels of excellence. Research directions are diversifying to new areas of mixed-signal SOCs, IP cores for embedded applications and analog DFT. Existing expertise on formal verification and optimization methods is being applied to design verification, synthesis and CAD Tool development for the deep sub-micron processes. More than fifty Doctoral and Masters students are working on various emerging areas. The Centre for Theoretical Studies (CTS) is primarily engaged to generate and nucleate theoretical research on fundamental aspects of basic and engineering sciences.

The Advanced Laboratory for Plant Genetic Engineering is dedicated to develop technologies suitable to enhance the productivity potential of some of our major crop plants through biotechnological approach. The laboratory has met with some success in identifying specific genetic elements associated with fiber development in jute stem through functional genomic approach. Additionally, attempts to map the individual seven linkage groups of jute are underway. Discovery of certain plant genes and regulatory elements involved in the metabolic pathway of fatty acid synthesis and modification of their functional role in case of synthesis of seed oil of Indian mustard (Brassica juncea), are in active state of pursuit. Additionally, attempts have been initiated to genetically tamper the lignin biosynthetic pathway in vegetative parts of jute and sorghum plants by anti-sense approach. Major attempts have also been made in strategy development for generation of genetically modified crop plants resistant against insect pests belonging to lepidoptera, coleoptera and homoptera. Some success could be attained in case of cotton, Brassica and rice. Discovery of novel insecticidal genes from plants and bacteria and generation of transgenic crop plants expressing these insecticidal genes have been accomplished. Attention has also been directed towards development of efficient transformation methods for certain recalcitrant crop plants that have not yet been accessible to gene transfer methodologies. Further, development of marker free transgenic plant generation and site-specific integration of transferred DNA have figured as major targets of activities in order to enhance the efficacies of gene transfer techniques to a great height. The laboratory has also developed a microbial bioprocess technology using the state of the art of bio-film technology for high through-put production of superior quality of jute fibers. The technique reduces production time by ~70% and results significantly low effluents and green house gases. The process thus developed is safe for human handling and offers excellent quality control ensuing at least 2-3 grades better fiber quality against methods that are in use by the jute growers. Further, attempts to explore the possibilities for generation of jute fiber based bio-composites have also been initiated. The laboratory is further working on microbial bio-film based technology for high through-put production of specific carbohydrate macerating enzymes that carries industrial significance.

**Thrust Areas**

- Inertial MEMS
- Micro Sensors and actuators for automobile, space, and defense applications
- Micropropulsion device for micro / nano satellite application
- RF-MEMS
- Bio-MEMS
- Semiconductor devices
- Nanotechnology
- Lithium niobate integrated optics
- Astrophysics
- Cosmology
xi) Nonlinear Sciences
xii) Theoretical condensed matter physics
xiii) Wireless communication and Baseband processing
xiv) Analog and RF circuits
xv) Plant biotechnology

New Acquisitions:

i) MEMS vaporising liquid microthruster
ii) Microflow for microvalve, micropump
iii) MEMS flow sensors
iv) Integrated-optic switch
v) MEMS accelerometer for aircraft motion sensing
vi) Tunneling accelerometer and Capacitive accelerometer

ON-GOING RESEARCH PROJECTS

Sponsored Projects

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Development of Silicon Microsensors for Flow Measurement</td>
<td>MHRD</td>
<td>On-going</td>
</tr>
<tr>
<td>3.</td>
<td>Design, analysis and optimization of navigation grade silicon based MEMS accelerometer</td>
<td>ISRO-KCSTC cell</td>
<td>On-going</td>
</tr>
<tr>
<td>4.</td>
<td>Upgrading facilities for MEMS design activities at national resource centre</td>
<td>NPMASK, ADA, Bangalore</td>
<td>On-going</td>
</tr>
<tr>
<td>5.</td>
<td>Development of MEMS based components for RF applications</td>
<td>NPMASK, ADA</td>
<td>On-going</td>
</tr>
<tr>
<td>6.</td>
<td>Development of MEMS based accelerometers for Aerospace applications</td>
<td>NPMASK, ADA</td>
<td>On-going</td>
</tr>
<tr>
<td>7.</td>
<td>MEMS based micro-propulsion devices for micro-satellite programme</td>
<td>ISRO</td>
<td>On-going</td>
</tr>
<tr>
<td>8.</td>
<td>Multi-scale modeling to study the role of atomic scale defects in CNT-based nanocomposites</td>
<td>DST</td>
<td>On-going</td>
</tr>
<tr>
<td>9.</td>
<td>Effects of non-linearity and viscoelasticity of blood and wall tissues and magnetohydrodynamic effects on the flow field in arteries in normal and pathological states</td>
<td>CSIR, New Delhi</td>
<td>On-going</td>
</tr>
<tr>
<td>10.</td>
<td>Kinematics of flows in diverse contexts</td>
<td>DST, New Delhi</td>
<td>On-going</td>
</tr>
<tr>
<td>11.</td>
<td>Measuring the HI power spectrum with the GMRT</td>
<td>BRNS, DAE, Mumbai</td>
<td>On-going</td>
</tr>
<tr>
<td>12.</td>
<td>Targeted gene integration in rice and cotton</td>
<td>National Fund for Basic Science, ICAR</td>
<td>On-going</td>
</tr>
<tr>
<td>13.</td>
<td>Establishment of independence of Linkage Groups of jute through trisomic analysis in order to construct the genetical and physical map of jute genome.</td>
<td>DBT</td>
<td>On-going</td>
</tr>
<tr>
<td>14.</td>
<td>Application of technology for tomato hybrid seed industry involving rural women for employment and income generation</td>
<td>DST</td>
<td>On-going</td>
</tr>
<tr>
<td>15.</td>
<td>Recombinant DNA for development of a male-sterility system in jute.</td>
<td>DBT</td>
<td>On-going</td>
</tr>
<tr>
<td>16.</td>
<td>Generation and cataloguing of bast fibre developmental stage specific EST library from jute</td>
<td>DBT</td>
<td>On-going</td>
</tr>
<tr>
<td>17.</td>
<td>Design and fabrication of high sensitivity micro machined silicon tunneling accelerometer with micro-g resolution</td>
<td>ISRO</td>
<td>On-going</td>
</tr>
<tr>
<td>18.</td>
<td>Development &amp; characterization of nanostructured thin films for SiGe quantum well infrared photodetector and ferroelectric based gas / chemical sensors</td>
<td>DRDO</td>
<td>On-going</td>
</tr>
<tr>
<td>19.</td>
<td>Terahertz emission of Si / SiGe structures doped with shallow acceptors</td>
<td>DST</td>
<td>On-going</td>
</tr>
</tbody>
</table>
20. Synthesis and characterization of nanostructured materials for functional and structural applications  

DST  On-going

21. Fabrication and characterization of Novel Photonic Crystal Structures and Si / Ge Quantum Dots for Photonic Applications  

DST-ITPAR, Italy  On-going

22. Design, analysis and optimization of navigation grade silicon based MEMS accelerometer  

ISRO-KCSTC  On-going

23. Medical image analysis and MEMS based flow sensor development  

DST  On-going

24. Feasibility study of MEMS based biochip platform for characterisation of biospecies  

IIT Kharagpur  On-going

25. All India Coordinated Research Project on Post Harvest Technology  

ICAR, New Delhi  On-going

26. A Value Chain on Aloe Vera Processing  

ICAR, New Delhi  On-going

27. Development of Silicon Carbide Thin Films for High Temperature and High Power Devices  

DRDO  On-going

28. All India Coordinated Research Project on Post Harvest Technology  

ICAR, New Delhi  On-going

29. A Value Chain on Aloe Vera Processing  

ICAR, New Delhi  On-going

Consultancy Projects

#  Title of the Project  Sponsor(s)  Duration
1. Development and realization of high Q-factor quartz double ended tuning forks using micromachining technology  

ISRO-IISU  On-going

2. Development of ADC and Receiver for wireless applications  

Si2 Microsystems  On-going

3. Design of RFIC modules  

National Semiconductor Corporation, USA  On-going

4. Design and processing of MEMS microstructure for mechanical property evolution  

DMRL, Hyderabad  On-going

5. Thin Film Characterization  

Various agencies  On-going

VISITS ABROAD BY FACULTY MEMBER

1. Prof. S. K. Ray  Group-IV Nanophotonic Devices, University of Trento, Italy

2. Prof. S. K. Ray  SiGe based nanoelectronic and photonic devices, University of Newcastle, UK

3. Prof. S. K. Ray  Visiting Professor, Tokyo Institute of Technology, May-June, 2007


5. Dr. T. K. Bhattacharya  DST / JSPS Project work, University of Tokyo, Japan, April 2008

6. Dr. T. K. Bhattacharya  IndoTrento programme for advanced research, ITPAR programme, Italy, June 2009

INVITED LECTURES BY FACULTY MEMBERS

1. Prof. S. K. Ray  Semiconductor Nanostructures for Device applications at Institute of Radio Physics & Electronics, Kolkata University

2. Prof. S. K. Ray  Nanoelectronic and Sensing Devices at IIT Delhi

3. Prof. S. K. Ray  Excitements in Nanoscience at Vidyasagar College, Kolkata


5. Prof. S. K. Ray  Semiconductor Nanostructures for Futuristic Devices at Annual Convention of Indian National Academy of Engineering, Goa

6. Dr. Soumen Das  Invited Lecture: Nanoelectronics: Science, nanotechnology, engineering and applications, IIT Kharagpur

7. Dr. Soumen Das  Invited Lecture: 3D bioengineering, IIT Bombay
8. Dr. Soumen Das Invited Lecture: Nanobioengineering and family welfare, IIT Kharagpur
10. Dr. Chacko Jacob My Journey in Materials Science: From Ceramics to Semiconductors at Department of Ceramic Engineering, IT-BHU
11. Dr. Chacko Jacob Nanomaterials for Electronic Applications at NIT, Rourkela
12. Dr. Chacko Jacob Nanomaterials for Electronics at Crystal Growth Centre, Anna University

LECTURE BY VISITING EXPERT
1. Mr. Sourabh Datta Chowdhury Ongoing research activities at Maxim, 2009

BOOK PUBLISHED

<table>
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<tr>
<th>#</th>
<th>Name of the Author(s)</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
</table>

PATENTS GRANTED
2. A patent application on "The technology which leads to improved production of bast fibers using bacterial biofilm' is presently placed on the “Technologies Developed” Web-portal of IIT Kharagpur

LAURELS & DISTINCTIONS
1. Dr. P. Gangopadhyay Royal Society Incoming Fellowship to UK

COLLABORATIVE EFFORTS
1. A joint collaboration research project on" Development of micromechanical inertial and flow sensors for environmental / biomedical application" sponsored by DST, Govt. of India in going on under an Indo-Italian research programme. (ITPAR). Collaborating Institute - ITC - inst. Trento, Italy
2. A Proposal on "Indo - US centre for advanced and futuristic manufacturing" has been submitted by IIT Kharagpur to Indo-US Science and Technology forum. Under this proposal Advanced Technology Development Centre, IIT Kharagpur will be a partner institution

FACILITIES NEW ADDITION
Recently IIT Kharagpur has installed a new novel custom made MBE (Molecular Beam Epitaxy) machine, Riber France made. The versatile MBE system is Compact, flexible and affordable with features carefully designed to meet the highest specifications for the research of all III-V compound semiconductor materials. This is a "Vertical Reactor" technology, with 3-inch wafer diameter integrated system. The MBE has Arsenide and Nitride growth facilities with 6 cells. Out of the 6 cells, one is Arsenic valved cracker which allows evaporating As$_2$ and As$_4$ both the allotropes. The presence of cracker cell gives us the flexibility to maintain As$_2$:As$_4$ ratio for optimizing the Gallium Arsenide growth along with reloading of As without disturbing the chamber vacuum. Also the machine has both Ammonia (NH$_3$) and plasma N$_2$ sources for Gallium Nitride growth. Ammonia will be used for thick film growth and plasma N$_2$ for very fine structures. Besides, the MBE has double dopant (Si and Mg) cell for acceptor and donor impurities. The cryogenic pump is used for 10$^{-11}$ Torr vacuum and the pump is water cooled. So, uninterrupted water supply to the pump is essential to maintain the vacuum system. The uninterrupted power supply to the system is at the same time important to power the cryo-pump, turbo-molecular pump, computer, HMI and all the cells. For that a custom designed UPS & generator system has been successfully installed.
COMPUTER & INFORMATICS CENTRE

HEAD : Professor Prabir Kumar Biswas

Officer

Nanda, Dilip Kumar M.Sc., DIIT, Ph.D. (IIT Kharagpur), IT Infrastructure Management and Operations, Application Software & Numerical Techniques

Goswami, Partha B.Tech. (CU), M.Tech. (IIT Kharagpur), Enterprise & Optical transport network

Singh, Pramod Kumar (on lien) B.Tech., M.Tech., Ph.D. (IIT Kharagpur), Algorithm and Data Network

Roy, Devshri B.Tech., M.Tech., Ph.D. (IIT Kharagpur), Artificial Intelligence, DBMS

Dutta, Bimal Kanti M.Sc., PGDCS (Roorkee Univ.), DBMS, OS, Algorithms, Computer Networks, Distributed DBMS & Graphics Programming

Das, Surid Kumar B.Tech., M.Tech. (Rajasthan Vidyapith Deemed University), Hardware, Computer Network

Chattopadhyay, A M.Sc., MS (IIT Kharagpur), Hardware, OS, Network Security & Applications

Das, Sudipto B.Tech., M.Tech. (Rajasthan Vidyapith Deemed University), OS & Network Applications

FACILITIES

(i) Network Facility

Institute has its long history of network growth and witnessed several re-engineering and expansion of networking infrastructure. Computer and Informatics center (CIC) is always in the process of exploring efficient solutions and process to address the ever expanding networking needs of the institute. Presently Institute backbone network is based on Gigabit Ethernet, which is spread over the Academic and Hall areas. The Core Switching infrastructure is in the Centre, the Distribution Switching elements are in the Departments & Halls and the Access Switching elements are in the Laboratories or in the floor of the corridors. Internet connectivity has been upgraded and rearranged with two STM1 (155 Mbps) links in order to cater to the high bandwidth (bandwidth utilization report is available at http://144.16.203.239) requirement of the Institute. The CIC is maintaining two registered domains (iitkgp.ernet.in and iitkgp.ac.in) and owning 8 Class C IP address from APNIC. The Centre has upgraded the Institute's lease line connectivity with the two extension centers (8Mbps each) located at Bhubaneswar and Kolkata. The National Knowledge Network is also terminated at CIC through 1 Gbps redundant links. CIC has put in place a Wi-Fi based Wireless LAN network at couple of hot spots. Limited residential users are continuing network access through telephone networks. Users may lodge their network related complaints at 82385 between 8 am to 10 pm apart from the web based complaint interface at http://www.cic.iitkgp.ernet.in/sw/src/login.php.

The Centre has taken up Networking Expansion / Upgradation at School of Medical Science & Technology (SMST), Rajiv Gandhi School of Intellectual Property Law, Ashutosh Mukherjee Hall of Residence, Mother Teresa Hall of Residence, ERP Development Lab at Industrial Engineering & Management Department and Central Library. The networking of the SMST is on the verge of completion. Design, up-gradation and extension of the networks in the various Departments/Centers as per their requirements have also been undertaken by CIC. The Centre is gradually replacing UTP based backbone to OFC based backbone. As a pilot project towards this, initiative has been taken to upgrade the network in the Physics department located in three floor of Main building. A Major component of application traffic is due to web access through proxy servers. Users need to often select / change proxy servers to facilitate improved throughput. The Centre is in the process of procuring proxy server load-balancing switch to distribute the client requests among the proxy servers and to make the proxy server usage more efficient.
The Centre is in the process of upgrading the existing PPP servers used by the dialup users of the campus by providing a Remote Access Server (RAS) which will be interfaced with Institute PBX to support 120 number of simultaneous dialup connections. This upgradation will help the residential users to access network through dialup link as redundancy to the existing ADSL connections. The Centre is going to provide the existing spare fiber infrastructure and space to house head-end of Gigabit passive optical network (GPON) that is being planned.

(ii) Laboratory Facility

The three number PC laboratories of the CIC are fully functional with around 100 seats in each laboratory. Students are engaged in regular laboratory classes in these laboratories. The students for their browsing and other computational uses utilize the Terminal Room of the Centre. The Center is maintaining Work Station Laboratory for research scholars of the Institute. Servers available in the Centre are connected to the institute LAN and the users can work from any corner of the academic campus. CIC also provides computational servers to the students with specific hardware and software requirement for their research. The Centre has also provided support to set up network laboratory during various network related short-term course and is looking forward to setting up a full-fledged hardware & software based network simulation laboratory. One more PC Laboratory with around 50 seats is being planned to be set up in order to cater to the requirements of student's laboratory of the Institute.

(iii) Email & Web Hosting Facility

The Centre is continuing support to the mail services in two domains namely ernet.in and ac.in to all its users along with general notifications services to a group of users through gmail. Major departmental servers are maintained in the Server laboratory of the Centre. In addition to this all major web servers and the facweb server for the interested faculty members is also maintained in the Server laboratory of the Centre.

(iv) Software Facility

Users are updating their desktops with the latest version of CA eTrust Anti Virus software from Centre. Software's like Abacus (for finite element modeling and analysis), MATLAB (for integrated technical computing), Solid Works (for Engineering drawing), SPSS (statistical package) is also available to the Users of the IIT community. The Institute also has Microsoft campus wide licensing.
CONTINUING EDUCATION CENTRE

DEAN : Professor Ajay Chakrabarty

FACILITIES

(a) Equipments
(i) High luminosity overhead projectors.
(ii) LCD Panel for multimedia projection.
(iii) 3M Multimedia Projector.
(iv) Shure cordless microphone and transmitter / receiver set.
(v) Ahuja tape recorder and public address system.

(b) Software
(i) Distance Education Database (from International Centre for Distant Learning)
(ii) KOMPASS Industrial Directory of India giving details of over 60,000 companies
(iii) Macromedia Authorware (4.0.6 licences)
(iv) Adobe Photoshop - graphics package
(v) Microsoft Front Page Express - for Web page development
(vi) Microsoft Office 2000 Professional
(vii) Microsoft Windows 2000 Professional
(viii) Microsoft Windows 2000 Server with terminal server facility
(x) ALGOR FEM package for stress fluid flow and electrostatic field analysis

PARTICULARS OF M.TECH AND PH.D SCHOLARS JOINED / COMPLETED

(i) No. of Teachers completed Ph.D degree : 21
(ii) No. of Teachers completed M.Tech programme : 13
(iii) No. of Teachers joined Ph.D programme : 17
(iv) No. of Teachers taking advance admission to Ph.D programme : 18
(v) No. of Teachers joined M.Tech. programme : 14

CD CELL ACTIVITIES

(i) Manuscripts for text books completed : 05
(ii) No. of Text books approved : 05
(iii) No. of CAI packages approved : 0

SEMINARS / WORKSHOPS / CONFERENCES / SYMPOSIA / SHORT TERM COURSES ORGANIZED

(i) Total No. of Workshops / Conferences Organized : 14
(ii) Total No. of participants attended : 560

<table>
<thead>
<tr>
<th>#</th>
<th>Short Term Courses organized under</th>
<th>No. of Courses</th>
<th>No. of participants</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>QIP (AICTE) Short Term Courses</td>
<td>09</td>
<td>267</td>
<td>10 Weeks</td>
</tr>
<tr>
<td>2.</td>
<td>MHRD / AICTE Special Summer Short Term Courses</td>
<td>14</td>
<td>450</td>
<td>28 Weeks</td>
</tr>
<tr>
<td>3.</td>
<td>MHRD / AICTE Special Winter Short Term Courses</td>
<td>08</td>
<td>391</td>
<td>09 Weeks</td>
</tr>
<tr>
<td>4.</td>
<td>Sponsored / Self finance Short term courses</td>
<td>65</td>
<td>1950</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>96</strong></td>
<td><strong>3058</strong></td>
<td></td>
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</tr>
</tbody>
</table>
CENTRAL RESEARCH FACILITY

CHAIRMAN : Professor Indranil Manna

FACULTY ASSOCIATED

Prof. A. K. Das  
Vice Chairman, Life Science Division

Prof. Rahul Mitra  
Vice Chairman, Materials Division

Prof. A. Basak  
In charge, CD Polarimeter

Prof. M. Bhattacharjee  
In charge, EPR

Prof. S. K. Srivastava  
In charge, ESCA

Prof. S. K. Ghosh / Prof. T. K. Maiti  
In charge, FACS

Prof. I. Manna  
In charge, FESEM, XRD, HRXRD

Prof. B. Adhikari  
In charge, FTIR

Prof. T. K. Nath  
In charge, Hall Effect

Prof. R. Banerjee  
In charge, HPLC

Prof. Rahul Mitra  
In charge, HRTEM

Prof. K. K. Ray  
In charge, UTM (Instron)

Prof. A. K. Das  
In charge, MALDI

Prof. S. Roy  
In charge, Mass Spectrometer

Prof. S. B. Singh

Prof. J. Dutta Majumder  
In charge, Optical Emission Spectrometer

Prof. B. K. Dhindaw  
In charge, Optical Microscopy and Mechanical Testing

Prof. P. K. Datta / Prof. P. Roy Chowdhury  
In charge, Optical Fibre

Prof. A. K. Ghosh  
In charge, PCR, 2-D Gel. DNA Sequencer

Prof. M. Chakraborty

Prof. R. Mitra  
In charge, SEM, Analytical SEM

Prof. C. Jacob  
In charge, SPM

Prof. S. Das  
In charge, TEM

Prof. K. Das  
In charge, Thermal Analysis

Prof. S. H. Dey  
In charge, LC-MS / MS

Senior Scientific Officer

Datta, Amal Kumar  
Ph.D. (IIT Kharagpur), Experimental & theoretical condensed matter Physics

Maiti, Rabindranath  
Ph.D. (IIT Kanpur), Inorganic Chemistry, Scanning Electron Microscopy and Metal Matrix Composites

RESEARCH AND DEVELOPMENT

Brief descriptions of on-going activities:

2D GEL :

Two-dimensional gel electrophoresis system: This equipment is used for analyzing protein samples (qualitative and quantitaive) provided by investigators (students, scholars and faculty of the department of Biotechnology, SMST, ALPGE).

DNA sequencer; Real time Polymeric Cyclic Reaction (PCR) analyzer, 2-Dimensional gel electrophoresis:

Automated DNA sequencer: This equipment is used to determine nucleotide sequence of DNA samples provided by different investigators (students, scholars and faculty of the department of Biotechnology, SMST, ALPGE and AgFE).

Real Time PCR machine: This machine is used to analyze gene expression level (quantitative) in different tissue samples provided by investigators (students, scholars and faculty of the department of Biotechnology, SMST, ALPGE)
FACS:
The BD FACSCalibur™ system is four-color, dual-laser, bench top system capable of both cell analysis and sorting. This machine designed specifically to support a wide range of applications like immunophenotyping, absolute counting, residual white blood cell enumeration, stem cell analysis, DNA analysis and isolation by sorting. Recent Experiments carried out with this instrument:
1) Drug delivery
2) Detection of apoptotic cell death by TUNEL Assay
3) Interaction between cell and fluorescent labeled toxin molecules etc.
4) Cell cycle analysis
This instrument is currently used by both internal and external users. At least 20 samples / day are analyzed by this machine.

FESEM Lab.:
The field emission gun assisted scanning electron microscopy (FE-SEM, Supra 40V, Carl Zeiss, Germany) provides an excellent scope of microstructural characterization using secondary or back-scattered imaging, energy dispersive spectroscopy and electron back scattered diffraction analysis. This facility offers the highest resolution imaging facility by SEM in this Institute and eastern part of India. The samples analysed include various metals and alloys, semi-conducting and insulating films, refractories, polymeric and ceramic powders, failed engineering components and hybrid / composite materials. Besides offering services to the DST project (through which this equipment was purchased) members and Institute scholars / researchers this instrument has provided important services to several industries and neighbouring institutes. A challenging consultancy job was conducted concerning pipeline failure analysis for a petroleum company abroad. A new deposition unit has been installed for SEM analysis of non-conducting samples. This FE-SEM unit has also been used for laboratory classes of a few departments. The average utilization rate of this instrument has been about 90% of the stipulated working hours. Recently a new project has been initiated for microstructural characterization of sensor materials being developed by a collaboration between IGCAR, Kalpakkam and IIT Kharagpur.

FTIR Lab:
FTIR analysis of different samples in powder, liquid and also film form in MID-IR and FAR-IR range was done at both ambient and above ambient temperatures by our institute students and faculties. We also served outside institutes and industries by analyzing their samples.

Hall Effect:
The Hall effect laboratory at CRF, IIT Kharagpur provides the facilities to measure temperature and magnetic field dependent Hall effect, Magneto-resistance and electrical resistivity of various materials, namely, pure semiconductors, oxide semiconductors, dilute magnetic semiconductors, noble metals, transition metals, GMR, CMR materials, composites, nanoparticles, heterojunctions etc. either in thin film or bulk pellet form. The Hall measurement set up consists of a high field electromagnet (up to 1 Tesla magnetic field) and a magnet power supply, variable temperature cryostat down to 77 K, Rotary vacuum pump with readout gauge, water chiller (150 litre tank) with circulation pump, various measuring equipments (Precision Current source, Nanovoltmeter, Gaussmeter, Temperature controller, 9 channel Scanner), UPS, voltage stabilizer (3 phase input / 3 phase output), a PC for automated measurement etc.. The set up needs 8 litres liquid nitrogen every day as a coolant (procured from Cryogenic Engineering Centre).
The temperature and magnetic field dependent Hall voltage, Magneto-resistance and electrical resistivity measurement facilities are provided to various departments in IIT KGP (Physics, Material Science Centre etc.) regularly. The measurements are done in manual mode (by the laboratory technician) as the computer automated mode is not working at present. As the set up is working in manual mode, every sample measurement takes about 5-6 hours, mainly due to the data are taken by hand. The temperature controller and the Gaussmeter (Hall probe for field measurement) components have been sent for repairing to the company in USA as those were malfunctioning. Recently, the company has intimated that they have successfully repaired those components (a letter from them is enclosed). They are going to handover those repaired items to our freight forwarder soon. Once those components arrive soon, the
unit will be ready for complete measurement of any sample in automated faster mode in the temperature range of 77–300 K. At present measurements are done in manual mode. The maintenance of the set up is also done in regular basis. The water chiller, the connected copper tubes, water flow switches and monitors to the magnet, the water flow pumps etc. gets rusted/oxidized very often. Thorough cleaning and changing of water in the tank are done regularly to run the magnet power supply and the electromagnet smoothly by sufficient effective cooling of them. The maintenance of variable temperature cryostat (VTI) and the sample holder are also done regularly.

HRTEM Lab:

The HRTEM laboratory is equipped with the JEOL JEM-2100 High Resolution Transmission Electron Microscope, OXFORD INCA EDS microanalytical system and GATAN CCD camera. The JEOL JEM 2100 HRTEM is used for observation of specimens to observe the microstructures at high resolution, up to the level of arrangement of atoms, and determination of the crystal structure and chemical composition at selected positions. The machine is routinely used for research on nano-structured materials, including bulk alloys, thin films and powders. In addition, it is used for identification and composition of phases, measurement of grain size, and to study line defects and stacking faults in metallic, intermetallic and ceramic samples, as well as composites. In addition, it is possible to study phase transitions at low temperatures using the specimen holder operating at the liquid nitrogen temperature. The users of the HRTEM from IIT, Kharagpur include the students and faculty members of the departments of our institute include Biotechnology, Chemistry, Chemical Engineering, Cryogenic Engineering, Electronics and Electrical Communication Engineering, Electrical Engineering, Geology, Mechanical Engineering, Metallurgical and Materials Engineering, Materials Science Centre, Rubber Technology Centre, Physics, and so on. The external users include the other educational institutes, R&D laboratories and industries. The projects associated with the equipment are based on aluminium alloys, steels, composites, Biomaterials, Nanostructured materials, steel, intermetallics, Rubber and polymer based composites, Ceramic materials, Electronic Materials, etc. The laboratory has received and executed orders for study of a large number of samples from RDCIS, SAIL, Ranchi. A large number of publications, as well as Ph.D., M.Tech and B.Tech theses have come out with contributions from HRTEM laboratory.

MALDI-ToF:

Matrix Assisted Laser Desorption Ionization (MALDI)-Time of flight (ToF) mass spectrometry has provided continuous service to the internal (within IIT) and external users for mass analysis of polymers, proteins and other small molecules (>500Da). This is also used for biomarker identification of different species.

Optical Microscope Lab:

The Optical Microscopy and Characterization Lab. has been busy with all the time slots full and is being used by most of the departments of IIT Kharagpur, like, Electronics & Electrical Communication Engineering, Chemical Engineering, Rubber Technology Center, Mechanical Engineering, Metallurgical & Materials Engineering etc.

Optical Fiber Lab:

A. Upgradation /Renovation of infrastructure

(i) **Optical lathe**: The mechanical zig (the unit of two-motor based rotation chuck system, oxy-hydrogen flame-brush assembly) of the optical lathe has been set into operation. The control electronics (the interface / drive card) has been replaced and calibrated. The system has now **fully operational** and has been tested with PCF preform collapse four times in last 3 months.

(ii) **Chiller plant**: The chiller plant that supplies cold water to the oxy-hydrogen burner has been renovated with the replacement of plant accessories.

(iii) **Nitrogen plant**: the nitrogen plant has been thoroughly upgraded along with the replacement of **solenoid valves, supply pipe lines** and **flow-controlling electronic components**. The system is being regularly used.
B. Fabrication of PCF perform

Pure quartz-tube (both solid rods and capillary tubes) were stacked in the form of a cylindrically symmetric arrayed structure with a solid rod as the core surrounded by capillaries in a closed-pack form. Using oxy-hydrogen flame in the optical lathe, the structure has been transformed into PCF preform collapsing the same at a temperature off ~ 1800°C. Fabrication of PCF using “stack & draw” has been a challenging task nationwide. Thus, this has been a great development from the point of view of research achievement. Other designs of PCF as sensor are currently underway and will be attempted next for configuring PCF based photonic sensor.

PROTEIN CRYSTALLOGRAPHY:

Protein X-ray Crystallography (PX): Rigaku Micromax 007 X-ray generator is equipped with RaxisIV++ detector and X-stream cryo for X-ray diffraction studies of protein crystals to determine their 3D structure in atomic resolution. Three dimensional structures of proteins from pathogenic organisms like M. tuberculosis and S. aureus have been determined.

SEM:

Research and Development:

The SEM laboratories are equipped with 1) JEOL JSM-5800, 2) ZEISS EVO-60 Scanning Microscopes. The analytical attachments with these instruments are OXFORD ISIS-300, INCA Energy-250 EDS systems, INCA Wave-500 WDS system and HKL Channel-5 EBSD system. These SEM are most useful instruments for the people working with the surface and interface characterization of materials in particular. The students and faculties of various departments of the institute involved in materials research has been extensively used the instrument during last one year. The external users from various educational institutes, R&D laboratories and industries from different parts of the country, also have utilized the facility for their research work with satisfaction.

The projects associated with the instrument are aluminium alloys, In-situ composites, failure analysis of materials, Biomaterials, Nanostructured materials, Microalloyed steel, Laser surface alloying, Cutting tool materials, Functionally graded materials, Intermetallics, Rubber and polymer based composites, Ceramic materials etc.

SPM Lab:

The Scanning Probe Microscopy (SPM) Lab is being used to analyze materials on a microscopic and nanoscopic scale to determine surface morphology, phase separation, etc. Surface topography of various metals, semiconductor, ceramic and polymer samples were studied. Phase imaging of polymer sample surface was done successfully. Research workers of different departments and centres of this institute (Physics, Chemistry, Chemical engineering, SMST, Materials Sc, MME, RTC, Biotechnology, Mechanical engineering and ECE) use the laboratory for different surface studies of their samples. The SPM controller was upgraded to achieve better results. In September 2008 some problem was detected and thereafter the machine is shut down and the repairing is under process. Before shut down the machine was used for 27 hrs.

TEM and TEM Sample Preparation Lab:

The laboratory is proving excellent services to users of our Institute and from outside organizations, Research workers from Vidyasagar University, Kalyani University, S.N.Bose Institute, Kolkata, Appolo Tyres, Kochi University, Presidency College used the sample preparation facilities for making samples for TEM study.

Thermal Analysis:

Thermal analysis is one of the most basic characterization tools and is often used to study degradation of materials, reaction mechanisms and phase transformations in materials, etc. In our thermal analysis laboratory, we have one Differential Scanning Calorimeter (DSC), one Thermo-gravimetric and Differential Thermal Analyzer (TG-DTA) and one Thermo Mechanical Analyzer (TMA). These facilities are used by research workers of different departments and centres of the institute as well as outside institutions and institutions.
industrial organizations. The DSC is being extensively used to study the thermal stability of nanocomposites, glass transition temperatures of polymeric materials, and curing of polymeric materials. The recent works of significance done with the TG-DTA system include the evaluation of thermal stability of polymer nano composites, TG studies on the calcination of aqueous combustion synthesized metal oxide powders, analysis of reactions towards formation of new ceramic compounds, effect of mechanical milling on the reaction onset temperature of aluminum based nano composites, etc.. The TMA is being used to study the sintering behaviour of nano composite materials as well as to determine the thermal expansion coefficients of composite materials.

XRD LABORATORY : X-Pert Pro PW 3040/60 (High Resolution) and PW1710

X-ray diffraction (XRD) facility of CRF includes three units : PW Philips 1710, Expert PRo I and Expert PRo II. While the first unit is used for routine powder diffraction studies, Expert PRo I is dedicated to texture and residual stress analysis and high temperature XRD. Expert PRo II unit is utilised for powder diffraction at normal and high resolution and low angle incidence mode. All the three units are extensively used to conduct phase analysis and identification, crystallite size determination, plastic strain measurements, surface residual stress measurements, phase transition studies (ex situ and in situ), volume fraction determination and failure analysis of engineering components. Besides catering to the entire Institute community for XRD analysis, these units are utilised for teaching in UG and PG level by several Departments within IIT and even Institutes / colleges in the neighbouring region.

The Philips PW1710 X-Ray diffractometer has provided continuous service to the internal (within IIT) and external users for diffraction analysis of metallic, ceramic and polymeric samples to identify the phases and their distribution, determine volume fraction of the phases, monitor phase transition and evaluation and evaluate normal residual stress, phase evaluation studies in nanocrystalline and amorphous products have yielded the most interesting series of results from the work carried out in this laboratory in the past one year.

The Panalytical X-Pert Pro PW 3040/60 High Resolution-I and High Resolution-II X-Ray diffractometer has also provided continuous service to the internal (within IIT) and external users. Normal phase analysis with X'Celerator, monitor phase transition and evaluation and evaluate normal residual stress, Texture, Thinfilm (GIXRD) and Phase transformation at High Temperature, phase evaluation studies in nanocrystalline and amorphous products have yielded the most interesting series of results from the work carried out in this laboratory in the past one year.

Consultancy work from several industries, universities and research organization like Vidyasagar University; Department of Central Mechanical Engineering Research Institute (CMERI), Durgapur, Central Institute of Plastics Engineering and Technology (CIPET),Bhubaneswar, Utkal University, Visvabharati University, Shantiniketan and was undertaken by the XRD Lab, CRF, IIT Kharagpur.

HPLC :

HPLC is an efficient technique used for the separation of macro/micro molecules such as organic compounds, amino acids, nucleotides, aroma/fragrance, enzymes and proteins etc. The present system procured and installed at CRF was from M/s Agilent Technologies. The instrument has the following facilities:

There are quaternary pumps, along with different detectors like Refractive Index (RI) and Photo diode array at variable wavelengths, manual injecting valves, ports. There are various columns available for separating different molecules along with the guard columns which are placed anterior to the separating column. The active fraction from the column can be eluted and separated for further analysis through fraction collector. The Chem Station software controls the instrument where the detail analysis of the data can be obtained.

HPLC is now one of the most powerful tools in analytical chemistry, with the ability to separate, identify and quantify the compounds that are present in any sample that can be dissolved in a liquid. Today, trace concentrations of compounds, as low as “parts per trillion” (ppt), are easily obtained. HPLC can be applied to just about any sample, such as pharmaceuticals, food, nutraceuticals, cosmetics, environmental matrices, forensic samples, and industrial chemicals.
New Acquisitions:

1. **SEM**: ZEISS EVO-60 Scanning Microscope (Carl Zeiss, Germany); INCA Energy-250 EDS systems, INCA Wave-500 WDS system and HKL Channel-5 EBSD system (Oxford Instruments, UK)

2. **New Acquisition**: ZEISS EVO-60 Scanning Microscope (Carl Zeiss, Germany); INCA Energy-250 EDS systems, INCA Wave-500 WDS system and HKL Channel-5 EBSD system (Oxford Instruments, UK)

SERVICE RENDERED TO OTHER INSTITUTES:

IIT Roorkee, Ravenshaw College, Vidyasagar University, IACS Calcutta, ISM Dhanbad, NML Jamshedpur, BIT Meshra, Cochin University of Science and Technology and NIT Durgapur. SAIL R&D, IACS Kolkata, VSSC Trivandrum, S.N. Bose Institute Kolkata, IIT Guwahati, IIT Kanpur, Mahatma Gandhi University, Kottayam (Kerala), PSG College of Technology, Coimbatore, ISM Dhanbad, Viswabharati University, BESU Shibpur, Jadavpur University Kolkata, Vidyasagar University, etc.

VISITS ABROAD:

Dr. Santi Mohan Mandal, Technical Assistant, CRF, is at present in the Department of Neurology, University of Texas Medical Branch (UTMB), Galveston, USA as a Research Fellow and he is on EOL from 9th July 2008 to 8th July 2010.

LAURELS & DISTINCTIONS:

Dr. Santi Mohan Mandal, Technical Assistant, CRF, has been awarded Jr. Scientist of the Year 2007 in December 2007 at the XXth Annual Conference of the National Environmental Science Academy, New Delhi. Dr. Mandal is at present in the Department of Neurology, University of Texas Medical Branch (UTMB), Galveston, USA as a Research Fellow and he is on EOL from 9th July 2008 to 8th July 2010.
CENTRAL LIBRARY

CHAIRMAN: Professor Sadananda Sahu

Librarian

Deputy Librarian:
Ratnasamy, M. M.L.I.S., P.G.D.C.A.

Assistant Librarian:
Shankar, Uma M.Lib.I.Sc., M.A.
Mazumdar, Kamal M.Lib.I.Sc., B.A., B.Com., CPDA
Mohapatra, P. K. M.Lib.I.Sc, M.A.

APPOINTMENT, PROMOTION, RETIREMENT, RE-EMPLOYMENT AND RESIGNATION
Retirement:
Mr. M. M. Jana Junior Technician
Mr. T. K. Chakraborty Senior Mechanic

The Central Library is one of the biggest technical libraries in Asia and its web site address is
http://www.library.iitkgp.ernet.in

PRINT DOCUMENTS ADDED DURING THE YEAR 2008-2009
The Central Library acquired 1909 general books and 3492 text books. It also added 4013 bound volumes of periodicals, 480 Theses, besides reprints and annual reports of other universities.

NEW E-RESOURCES ADDRED DURING THE YEAR 2008-2009
500 online journals from different publishers
7000 Springer E-books collection copyright years 2008-2009
Online Database: LexisNexis (Law)

CIRCULATION
The books circulation activities are fully automated and serve the users consisting of the faculty, research scholars, students and staff. The books circulation service is kept open for 50 hours a week. On the average, the monthly circulation transactions are about 10000. About 60 copies of documents were obtained through Inter-Library Loan.

DIGITAL LIBRARY
The Digital Library provides access to the following e-resources:
Full-text databases: Access to 10000 full-text journals from the following databases.

BIBLIOGRAPHIC DATABASES
SciFinder Scholar, ISI Web of Science, MathSciNet, J-Gate Custom Content for Consortia and SCOPUS.
E-BOOKS
Ebrary (30,000 e-books database)
Springer E-Books (all Springer e-books copy right years 2005-2009)
800 CRC Press Hand Books (CRCnetBASE)

The digital library also provides access to Video-Courses which contained the lectures delivered by our faculty members. Twice a week the Digital Library organizes User Education Programme so as to train the students to use our digital resources effectively.

INDEST-AICTE CONSORTIUM DATABASES
The Central Library IIT, Kharagpur is a core member of the INDEST Consortium. INDEST membership facilitates the users to access the full text of about 10000 online journals and 5 bibliographic databases.

INSTITUTIONAL DIGITAL REPOSITORY
Central Library, IIT Kharagpur has setup an Institutional Digital Repository using open source software 'D-Space'. At present the Institutional Digital Repository has 2000 articles, several question papers, books and theses.

RENOVATION WORK
Hall No. 1 and 2 at Central Library of IIT Kharagpur have been renovated.

CIRCULATION COUNTER
New Circulation Counter has been made for the users.

HELP DESK SERVICE
New help Desk service has been introduced.

NEW EQUIPMENT AND FURNITURE
The following equipment and furniture have been acquired for the users:

1. Mail Server
2. 100 reading chairs
3. 20 reading tables

The Console room has been upgraded with high-end mail server. The main reading halls and circulation counter have been renovated.

EXTENDED LIBRARY HOURS
Central Library hours has been extended up to 12 midnight throughout the year except Institute's holidays.

DEGREE ACQUIRED
Mr. Samrat Guha Roy, SLIA, has been acquired B.Lib.I.Sc., from Annamalai University.

INVITED LECTURES
Dr. B. Sutradhar  
Invited lecture delivered on “Access Management of e-resources” as Guest of Honour in one day Workshop on User Awareness Programme on Access to E-resources under UGC INFONET Digital Library Consortium held on 25 March 2009 at North Bengal University.

Dr. B. Sutradhar  
Invited lecture delivered on “Electronic resource management” at 2-day training workshop on Access to E-resources under UGC-INFONET Digital Library Consortium during February 2-3, 2009 organized by University of Kalyani, West Bengal.
Dr. B. Sutradhar Invited lecture delivered on “Building Digital Libraries: A practical approach” at 2 days Workshop on Capacity Building for College and University Libraries on 13 January 2009 organized by Sambalpur University, Orissas.

Dr. B. Sutradhar Invited lecture delivered on “Subscription and Management of E-Resources” on 30 July 2008 at UGC sponsored refresher course on Management of Electronic Information organized by Jadavpur University, Kolkata.

Dr. B. Sutradhar Participated in panel discussion on USER-PUBLISHING INDUSTRY-LIBRARIAN as panelist at 23rd IASLIC National Seminar at Bose Institute, Kolkata during 10-13 December, 2008.

Mr. P. K. Mohapatra Invited lecture delivered on “Natural Disaster and its impact on Indian Economy” in a National Level Seminar sponsored by UGC and organized by Dept. of Economics, U N College, Soro in joint collaboration with Khaira College, Khaira on 25th & 26th Feb., 2009.

PARTICIPATION IN CONFERENCE / WORKSHOPS

Dr. B Sutradhar Attended INDEST-AICTE Workshop and Sixth Annual Meet at IIT Bombay during 7-9 January.

Dr. B Sutradhar Attended 23rd IASLIC National Seminar at Bose Institute, Kolkata during 10-13 December, 2008.

Mr. P. K. Mohapatra Attended the NCSI IDRC Workshop on 'Integrated Library Automation Packages' from January 05-09, 2009 at NCSI, IISc, Bangalore.

Mr. D. N Mandal Attended the NCSI IDRC Workshop on 'Integrated Library Automation Packages' from January 05-09, 2009 at NCSI, IISc, Bangalore.

INTERNATIONAL AWARD

The 2nd best International Research Paper by ASIST (American Society for Information, Science & Technology on 23 July, 2008 awarded to Dr. S. K. Pathak for following paper:


VISITS ABROAD

Professor S. Sahu, Chairman, Central Library visited:

2. Central Library of Nanyang Technological University, Singapore in May 2008.
The Central Workshop And Instruments Service Section (CWISS), a unique service centre at IIT Kharagpur was established in 1965 to cater to the fabrication of custom made instruments to sustain the postgraduate and research activity in the Institute.

It is one of the major service sections of the Institute having following units:

1. Mechanical
2. Glass Blowing
3. Carpentry
4. Electronics
5. Audio Visual

Apart from executing work orders from various Departments / Centers / Sections of the Institute, CWISS also undertakes work orders from outside on cost basis.

(1) **MECHANICAL SECTION**

Mechanical Section in CWISS comprises Mechanical Fabrication, Mechanical Instrument and Glass Blowing Section.

(a) **Mechanical Fabrication Section**

It is equipped with various types of machines like CNC Lathe, EDM, Milling, Conventional Lathe, Bench Lathe, Watch Maker’s Lathe, Drilling, Shaping Machine, Bench Drill, Bench Shaper, Grinding Machines (Surface, Cylindrical, Pedestal, Belt and Hand operated), Jig Boring, and Pantograph Machine, Power Saw, Shearing Machine, Polishing, Press, Arc Welding, Brazing and Soldering, etc. This year we have designed and fabricated on prototype ship for the project, Meval PMC Centre, Jamnagar.

The Mechanical Fabrication Section caters the service to almost all the departments in IIT for any type of Precision and complicated mechanical fabrication or repair with various types of metals.

During the year 2008-2009 the Mechanical Section has performed jobs of about 90 work orders, comprising of

i) Fabrication of different types of Wave Guides
ii) Fabrication of Die-Punches of different sizes
iii) Fabrication of different sizes tensile, Charpy specimens of different materials
iv) Fabrication of sample holder for wear test
v) Fabrication of different types of flanges. Studs etc.
vi) Fabrication of Rack, Pinion & Gears
vii) Fabrication of Sample for, XRD, X-ray, SEM, test
viii) Fabrication of different attachment for leaser operation
ix) Fabrication of Micro-channel
x) Fabrication of Mould with different materials
xi) Fabrication of different types of adopters
xii) Fabrication of CBM set-up
xiii) Flat Pannel Bio-reactor
xiv) Heat sink.

(b) **Mechanical Instruments Section**

Different types of precision mechanical instruments are repaired in this section. Some typical examples include different types of stopwatches, gauges, valve regulators,
balances, vacuum pumps, gear pumps, husk cutter, water flow meter, gas flow meter, dial indicator, dial gauge, micrometer, gas regulator, pressure gauge, autoclave, viscometer, various types of equipments & machines used in our Hospital, etc. Fabrication of sample holders of SEM & XRD, fabrication of very precision items etc.

(2) GLASS BLOWING SECTION
This section is equipped with glass blowing lathe, glasscutter, glass grinder, glass annealing chamber, etc. Mainly glass work of Borosilicate glass is done here with the help oxygen & LPG for Departments, like Chemistry, Bio-Technology, Chemical, Cryogenic, Mechanical, Material Science, Metallurgical Engineering, Agriculture & Food Engineering & Aquaculture, Physics & Meteorology, etc. The main fabrication jobs of this section include different type of condensers, Dewars, different volume capacity FB, RB, Flusk with neck joints, manometer, U&S Tubes, glass bubbler, glass coil for oil bath, gas collector, etc. The fabrication of glassware items are done as per drawing and design of the equipments. This year this Section has finished about 80 work orders.

(3) CARPENTRY SECTION
Housed in the workshop complex behind Chemical Engineering and Automobile Section, This Section has Auto Planner, Joints Nature's machinery, Vertical Band Saw and Multipurpose Machine. Apart from carpentry jobs, it does undertake construction of Frames, Hand painting, Spray painting, Polishing of leather painting, writing of name Plates, display board and upholstery jobs as students projects. This section also meets the major requirements of furniture of the Institute. During the year 2008-2009, this section has completed 130 work orders. Details of some of the Work done during period:

i) Faculty Table -- 14 Nos.
ii) Office Table -- 16 Nos.
iii) Computer Table -- 10 Nos.
iv) Laboratory Table -- 16 Nos.
v) Working Table -- 22 Nos.
vii) Book Shelf -- 06 Nos.
vii) Sign Board -- 19 Nos.
viii) Wall Partion -- 04 Nos.
ix) Model for Students -- 04 Nos.
x) Notice / Key Board -- 13 Nos.
xii) Box as per design / Packing -- 12 Nos.
xiii) Wooden Desk -- 05 Nos.
xiv) Wooden blocks -- 36 Nos.
xv) Name Plate -- 45 Nos.
xvi) Repair of old Table and Chair -- 18 Nos.
xvii) No parking board -- 13 Nos.
xviii) Structures / Arena -- 09 Nos.
xx) Both side reading table for library -- 20 Nos.

(4) ELECTRONICS SECTION
Electronics plays a major part in the design of almost all the machines and equipments. With the advent of microprocessor technology the design has become more sophisticated. Electronics section of CWISS looks after the breakdown maintenance of such machines which are spread all
over the institute. It has also a LPKF PCB Prototyping machine which can produce double sided PCBs with PTH facility as per require design.

**Lists of some of the equipments repaired by the Section are :**

1. Microprocessor based Controller  
   Chemical Engineering
2. Lemo pre-amplifire  
   Mechanical Engineering
3. Gauss meter  
   Physics & Meteorology
4. UPS (2 Nos.)  
   Chemical Engineering, Materials Science
5. Voltage Stabilizer (4 Nos.)  
   Chemistry, Biotechnology
6. Electronics Microscope (2)  
   Chemical Engineering, Chemistry
7. 500 KW Motor's control panel  
   Ocean Engineering & Naval Architecture
8. Dual channel battery charger  
   Agricultural & Food Engineering
9. Plotter  
   Metallurgical & Materials Engineering
10. WIRE EDM Machine  
    Mechanical Engineering
11. Lamination machine  
    Academic Section
12. Balance (3 Nos.)  
    Chemistry, Agricultural & Food Engineering, Ocean Engineering & Naval Architecture
13. Astro furnace (2 Nos.)  
    Metallurgical & Materials Engineering
14. Precision Weighting balance  
    Mechanical Engineering
15. Ultrasonic machine  
    B. C. Roy Technology Hospital
16. Temperature Controller (2 Nos.)  
    Metallurgical & Materials Engineering, Physics & Meteorology
17. CORTEST Machine  
    Metallurgical & Materials Engineering
18. ND-YAG laser  
    Mechanical Engineering
19. Electro Phoresis Power supply  
    Chemistry
20. Water bath of rotary evaporator  
    Chemistry
21. Gas-leak detector  
    Chemistry
22. Digital mv / ma source cum meter  
    Physics & Meteorology
23. Oscilloscope  
    Physics & Meteorology
24. Chilled water bath  
    Chemistry
25. CORTEST Machine control panel  
    Metallurgical & Materials Engineering
26. UV Visible detector  
    Chemistry
27. Suction machine  
    B. C. Roy Technology Hospital
28. SMPS  
    Chemistry
29. Polishing machine  
    Metallurgical & Materials Engineering
30. Indo therm Digital temperature Controller  
    Physics & Meteorology
31. Digital counter  
    Civil Engineering
32. D. C. Power supply  
    Mining Engineering
33. Specto photometer  
    Agricultural & Food Engineering
34. Scanning poten tiostart  
    Metallurgical & Materials Engineering
35. Gel Rocker  
    Biotechnology
36. Microscope for X-Ray machine  
    Chemistry
37. Rock compression machine  
    Mining Engineering

(5) **AUDIO VISUAL SECTION**

Audio Visual Cell is primarily involved in providing audio visual support for conducting regular classes at different lecture halls (approximately 150 classes per week). AV Cell also provides support to various student activities like Quiz, Plays, Spring festival, Kshitij, Inter Hall competitions and T&P activities. It also helps in various other academic activities like Convocation, Senate Meeting, National & International seminars, Conferences and Workshops and also to JEE & GATE units.

FACULTY ASSOCIATED

Pal, Sudebkumar Prasant  B.Tech. (Hons.), M.Tech., Ph.D. (IISc Bangalore), (Computer Science & Engineering) Computational geometry, Design and analysis of algorithms


Ghatak, S. K.  Ph.D. (Calcutta University), (Physics & Meteorology) Condensed Matter Physics

Taraphder, A.  M.Sc., Ph.D (IISc Bangalore), (Physics & Meteorology) Theoretical Condensed Matter Physics

Bharadwarj, Somnath  M.Sc., Ph.D. (IISc Bangalore), (Physics & Meteorology) Theoretical Astrophysics and Cosmology

Kar, Sayan  M.Sc., Ph.D. (IIT Kanpur), (Physics & Meteorology) Relativity and High Energy Physics

Khastgir, S. Pratik  M.Sc., Ph.D. (IOP, Bhubaneswar), (Physics & Meteorology) Mathematical Physics and Integral Models

DasGupta, Anirvan  B.Tech., M.Tech., Ph.D. (Kanpur), (Mechanical Engineering) Dynamics, Control and Robotics

Chattaraj, P. K.  M.Sc., Ph.D. (IIT Bombay), (Chemistry) Theoretical Chemistry, Quantum Chaos

Bandyopadhyay, Sanjoy  M.Sc., Ph.D. (IISc Bangalore), (Chemistry) Computational Chemistry, Molecular Modelling

Kumar, Somesh  M.Sc., Ph.D. (IIT Kanpur), (Mathematics) Statistical Decision Theory and Inference, Quantum Computing


Choudhary, R. N. P.  Ph.D. (Edinburgh University), (Physics & Meteorology) Condensed Matter Physics (Expt.)

Staff :

Halder, Ujal  Post Diploma in Computer Application, Diploma in Electrical Engineering (Computer Science & Engineering) Administration, Networking, Web development, Trouble shooting etc.

Project Staff :

Nandan, Hemwati  KFD, SRF, 3 years
Guha Sarkar, Tapamoy  JRF, MRT, 3 years
Das Adhikari, Samaresh  ENV, JRF, 3 years
Panda, Subhasish  CSIR, JRF, 2 years
Ghosh, Tatan  CSIR, JRF, 2 years
RESEARCH AND DEVELOPMENT

Brief Descriptions on-going activities:

Research is carried out in CTS on the following areas:

1. Astrophysics, Cosmology and Relativity
   (i) Magnetic fields of strange stars and neutron stars
   (ii) Large scale structure formation in the Universe
   (iii) Bulk-brane dynamics

2. Dynamics and control
   (i) Nonlinear dynamics: Bifurcation Theory and Chaos
   (ii) Control theory
   (iii) Vibrations

3. Mathematics, Mathematical physics and Theoretical Computer Science
   (i) Integrable models
   (ii) Computational and combinatorial geometry
   (iii) Pure and applied mathematics
   (iv) Quantum computation and quantum information
   (v) Graph and Hypergraph Theory

4. Theoretical Condensed Matter Physics
   (i) Computational Condensed Matter and Statistical Physics
   (ii) Superconductivity

5. Theoretical Chemistry
   (i) Large scale simulations of complex systems
   (ii) Density functional theory, quantum chaos

Thrust Areas:

1. Astrophysics, Cosmology & Relativity
2. Nonlinear Sciences
3. Mathematics, Mathematical physics and Theoretical Computer Science
4. Theoretical Condensed matter Physics
5. Theoretical Chemistry

ACTIVITIES

Courses and Graduate Programme:

1. CTS is offering new advanced post-graduate courses which are relevant across departments through involvement of faculty from various departments. These courses are:
   (i) Methods in molecular simulations (TS70001)
   (ii) Advanced dynamics (TS70002)
   (iii) Wave propagation in continuous media (TS70003)
   (iv) Advanced Mathematical techniques (TS70004)
   (v) Advanced quantum theory (TS70005)
   (vi) Quantum mechanics and quantum computing (TS70006)

2. TS 70001 and TS 70002 have been offered and has run in Spring 2008-2009.

3. CTS is also admitting PhD students through sponsored projects and fellowships (CSIR) under Advanced Technology Development Center. Currently three such students are enrolled.
ON-GOING RESEARCH PROJECTS

Sponsored Projects:

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Effects of non-linearity and viscoelasticity of blood and wall tissues and magnetohydrodynamic effects on the flow field in arteries in normal and pathological states</td>
<td>CSIR, New Delhi</td>
<td>2006-2009</td>
</tr>
<tr>
<td>3.</td>
<td>Measuring the HI power spectrum with the GMRT</td>
<td>BRNS, DAE, Mumbai</td>
<td>2007-2010</td>
</tr>
</tbody>
</table>

FACILITIES

i) A Computer Lab with 11 Pentiums, 2 Quad core server and a Linux Cluster from CDC
ii) HP Laser printer, HP Laserjet duplex network printer, HP Colour Deskjet Printers, Scanner, Multimedia Projector
iii) Software (Mathematica, Matlab, Maple, Scilab, IDL, etc.)
iv) CTS library
v) Visitor's Hall for the Visitors visiting the Institute under CTS Visitors Programme

AIMS & OBJECTIVES

i) To generate and nucleate theoretical research
ii) To organize seminars on diverse topics
iii) To organize Conferences / Workshops
iv) To provide research facilities to students / faculties from within and outside IIT Kharagpur
v) To offer postgraduate level elective courses

The Centre for Theoretical Studies (CTS) at the Indian Institute of Technology, Kharagpur (IIT KGP) has been in existence since 1998 and is located in the first floor of the Sahid Bhavan (Old Institute Building) at the Eastern end of the IIT campus. Its primary goal is to generate and nucleate theoretical research on fundamental aspects of basic and engineering sciences. The role of the CTS in the academic framework of IIT KGP is to bring together people of similar interests under a common umbrella. The CTS, apart from acting as a facility for research in theoretical studies in science and engineering, also trains graduate students and provide opportunities to post-doctoral workers and researchers from outside IIT KGP. Additionally, the CTS has an active visitors programme of both short and long-term visitors. The CTS also organizes seminars, workshops on a regular basis on diverse topics. An important component of CTS workshops and seminars is to motivate young students (both undergraduates from IIT KGP and graduate students from within and outside IIT KGP) to actively pursue theoretical research in front-line areas of science and engineering. Finally, besides promoting research on specialized topics within a given subfield, the CTS hopes to cultivate inter-disciplinary theoretical research as a major goal, tapping the diversity available in the academic population of an Institute like IIT Kharagpur.

VISITORS PROGRAMME

Objective
To provide facilities to faculty members, postdoctoral fellows and students from academic and research institutions in India and abroad to conduct research on theoretical problems in science and engineering in collaboration with faculty members of IIT Kharagpur.

COLLABORATIVE EFFORTS

The Center for Theoretical Studies has very active collaborative research programmes in the broad areas of Astrophysics and Cosmology. The research carried out under this collaboration is focused mainly on Cosmology. The collaboration with NCRA, TIFR, Pune is through a sponsored project funded by BRNS, DAE, Mumbai. This focuses on the possibility of using low-frequency radio wave observations to study a variety of astrophysical processes through the 21 cm neutral hydrogen radiation, including turbulence in the interstellar medium and the early universe.
## VISITORS DURING 2008-2009

<table>
<thead>
<tr>
<th>#</th>
<th>Name of the Visitor</th>
<th>Institute / University</th>
<th>Associated Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Md. Nurujjaman</td>
<td>Research Fellow</td>
<td>Prof. S. Banerjee</td>
</tr>
<tr>
<td></td>
<td>SINF, Kolkata</td>
<td></td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>2</td>
<td>Dr. Motahar Reza</td>
<td>Assistant Professor</td>
<td>Prof. S. Chakraborty</td>
</tr>
<tr>
<td></td>
<td>NIST, Berhampur</td>
<td></td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>3</td>
<td>Dr. Arindam Chakraborty</td>
<td>Assistant Teacher</td>
<td>Prof. P. K. Chattaraj</td>
</tr>
<tr>
<td></td>
<td>JPHS, Kolkata</td>
<td></td>
<td>Chemistry</td>
</tr>
<tr>
<td>4</td>
<td>Dr. Nilabja Haldar</td>
<td>Teacher</td>
<td>Prof. S. Kar</td>
</tr>
<tr>
<td></td>
<td>RMRC, Narendrapur</td>
<td></td>
<td>Physics &amp; Meteorology</td>
</tr>
<tr>
<td>5</td>
<td>Dr. Dilip Kr. Maity</td>
<td>Lecturer</td>
<td>Prof. S. Bhattacharyya</td>
</tr>
<tr>
<td></td>
<td>BITS, Pilani</td>
<td></td>
<td>Dept. of Mathematics</td>
</tr>
<tr>
<td>6</td>
<td>Dr. Sanjay K Pandey</td>
<td>Reader</td>
<td>Prof. S. Bharadwaj</td>
</tr>
<tr>
<td></td>
<td>LBS Clooege, Gonda</td>
<td></td>
<td>Physics &amp; Meteorology</td>
</tr>
<tr>
<td>7</td>
<td>Mr. R.Vijayaraj</td>
<td>Sr. Research Fellow</td>
<td>Prof. P.K.Chattaraj</td>
</tr>
<tr>
<td></td>
<td>CLRI, Chennai</td>
<td></td>
<td>Dept. of Chemistry</td>
</tr>
<tr>
<td>8</td>
<td>Miss. Ruchi Gupta</td>
<td>M.Sc. Student</td>
<td>Prof. S.Chakraborty</td>
</tr>
<tr>
<td></td>
<td>Laxmi Bai Nagar, New Delhi</td>
<td></td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>9</td>
<td>Dr. Sujit kumar Bose</td>
<td>Professor [Retd.],</td>
<td>Prof. S.Dey</td>
</tr>
<tr>
<td></td>
<td>SNBNCBS, Kolkata</td>
<td></td>
<td>Civil Engineering</td>
</tr>
<tr>
<td>10</td>
<td>Dr. Sanjay Gupta</td>
<td>Lecturer</td>
<td>Prof. A. Taraphder</td>
</tr>
<tr>
<td></td>
<td>BIT Mesra, Ranchi</td>
<td></td>
<td>Physics &amp; Meteorology</td>
</tr>
<tr>
<td>11</td>
<td>Dr. Akhilesh Ranjan</td>
<td>PhD. Student</td>
<td>Prof. P. K. Raina</td>
</tr>
<tr>
<td></td>
<td>IIT Kanpur</td>
<td></td>
<td>Physics &amp; Meteorology</td>
</tr>
<tr>
<td>12</td>
<td>Dr. Umananda Dev Goswami</td>
<td>Post Doc</td>
<td>Prof. P. K. Raina</td>
</tr>
<tr>
<td></td>
<td>TIFR, Mumbai</td>
<td></td>
<td>Physics &amp; Meteorology</td>
</tr>
<tr>
<td>13</td>
<td>Dr. Tanima Banerjee</td>
<td>Lecturer</td>
<td>Prof. S. Majumder</td>
</tr>
<tr>
<td></td>
<td>MIT, Manipal</td>
<td></td>
<td>Physics &amp; Meteorology</td>
</tr>
<tr>
<td>14</td>
<td>Mr. Debabrata Parihari</td>
<td>Ph.D. Student</td>
<td>Prof. A. Taraphder</td>
</tr>
<tr>
<td></td>
<td>JNCASR, Bangalore</td>
<td></td>
<td>Physics &amp; Meteorology</td>
</tr>
</tbody>
</table>

## LECTURE BY VISITING EXPERT

<table>
<thead>
<tr>
<th>#</th>
<th>Visitor Name</th>
<th>Title / Description</th>
<th>Institution / Location</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prof. Naresh Dadhich</td>
<td>Title : On gravitational dynamics</td>
<td>IUCAA, Pune</td>
<td>March 18, 2009</td>
</tr>
<tr>
<td>2</td>
<td>Prof. A. Basu</td>
<td>Title : Reinforcement Learning in Games</td>
<td>Indian Institute of Management Bangalore</td>
<td>March 16, 2009</td>
</tr>
<tr>
<td>3</td>
<td>Prof. J. L. Vigneresse</td>
<td>Title : Early earth</td>
<td>Fac de Sciences, Nancy-Université France</td>
<td>March 9, 2009</td>
</tr>
<tr>
<td>4</td>
<td>Prof. S. R. Gadre, FNA, FASc</td>
<td>Title : Treating large molecular clusters by ab initio methods</td>
<td>Pune University</td>
<td>February 25, 2009</td>
</tr>
<tr>
<td>5</td>
<td>Prof. Joseph Samuel</td>
<td>Title : Ricci Flows and General Relativity</td>
<td>Raman Research Institute Bangalore</td>
<td>February 19, 2009</td>
</tr>
<tr>
<td>6</td>
<td>Prof. S. Ramasesha</td>
<td>Title : Chemistry and physics of correlated electrons</td>
<td>Indian Institute of Science Bangalore</td>
<td>February 04, 2009</td>
</tr>
<tr>
<td>7</td>
<td>Prof. M. K. Harbola</td>
<td>Title : Time independent density functional theory for excited state: formalism and applications</td>
<td>IIT, Kanpur</td>
<td>February 04, 2009</td>
</tr>
<tr>
<td>8</td>
<td>Prof. Ranjit Biswas</td>
<td>Title : Dynamics in Room Temperature Ionic Liquids : Theory and Experiments</td>
<td>S. N. Bose National Centre for Basic Sciences, Kolkata</td>
<td>November 20, 2008</td>
</tr>
</tbody>
</table>
9. Dr. Pijush K Ghosh  
Department of Physics  
Visva Bharati, Shantiniketan  
Title: Is (Dirac)-Hermiticity necessary in Quantum Physics  
Date: October 21, 2008

10. Dr. Satrajit Adhikari  
IACS, Kolkata  
Title: A Quantum - Classical Approach to the Photo absorption spectrum of Pyrazine, Butatriene and Benzene Cation  
Date: September 15, 2008

11. Prof. Ramesh Krishnamurti  
School of Computing Science  
Simon Fraser University  
Title: The Capacitated Max-k-cut Problem  
Date: April 04, 2008

LAURELS & DISTINCTIONS

1. Dr. Somesh Kumar  
Executive Editor, International Journal of Mathematics and Computation
2. Dr. Somesh Kumar  
Editor, International Journal of Applied Mathematics and Statistics
3. Dr. Somesh Kumar  
Editor, Bulletin of Statistics and Economics
4. Dr. Somesh Kumar  
Associate Editor, J. Indian Society for Probability and Statistics

SEMINARS / WORKSHOPS / CONFERENCES / SYMPOSIA / SHORT TERM COURSES ORGANIZED

1. 12th Young Astronomers' Meet (YAM-2009)  
March 14-16, 2009
2. One-day Symposium on Chemistry and Physics of Materials and Fluids  
February 04, 2009
3. 9th International Conference on Vibration Problems (ICoVP-2009)  
January 19-22, 2009
INFORMATION CELL

PROFESSOR-IN-CHARGE : Professor Balbir Kumar Mathur

The Information Cell has been the hub of academic information service of the Institute all round the year. In the past year, the Cell has renovated the web sites of the Institute and Online Notice-Board. The Cell also created and hosted sites of about forty conferences, seminars, workshops and short-term courses held during the past year and to be held in the next academic year. In addition to regular updating information on departmental pages, academic programmes, profiles of all faculty, halls of residences and administrative positions in the Institute, the Cell also published information books like Communication Directory and Pocket Guide. The Cell participated in preparation of Press Releases and Institute Information Notes as and when required from time to time.

The Cell also developed additional information modules for in-house application and they can be used in any other academic organization as well. These are : on-line Faculty Self Appraisal Package, Departmental Report Package, Online Voting System, Guest House Booking Package, Extension of on-line Message Board facility to the Academic Section, Training and Placement Section and the Technology Students Gymkhana. The Cell has made available the basic information about all Institute Staff on the LAN. The Cell has also developed software for various service sections for online filling of complaints.

In a major developed work being carried out in the Cell, distributed academic databases of the Institute are going to be linked to create a one-point information access system. It will make easy availability of information as well as provide a strong decision making support to the Institute.
The development programme of the Institute Campus involving infrastructure and new facilities have been taken up in view of increase in student population, faculty strength and staff strength. The programme includes construction of new hostel building, extension of existing students’ hall of residence, class room complex, residential flats for faculty and staff members etc.

(i) Students’ Accommodation
Arrangements have been made for the construction of 2 (two) nos. of 2000 capacity 3 (three) seater Boys’ hostel. Construction work of new students’ blocks of R.P. and R.K. Hall of Residence is in progress to accommodate 288 students in each block. Construction of one additional floor for each of existing Azad, Nehru and Patel Halls of Residence is also going on.

(ii) J. C. Ghosh Science Block & P. C. Roy Laboratory Block
Arrangements have been made for the construction of J. C. Ghosh Science Block and P. C. Roy Laboratory Block for Chemistry Department and Rubber Technology Centre.

(iii) Guest House
The construction of 100 roomed guest house is on the verge of completion. Provision for both standard rooms and VIP suites has been made.

(iv) Residential Apartments for Faculty and Staff
The construction works for 63 nos. of A-type flats and 81 nos. of B-type flats are going on for the faculty housing.
Arrangements have been made for the construction of 64 nos. of 2-BR type and 80 Nos. of 1-BR type of flats for staff housing.

(v) Project Staff Accommodation
The extension programme for the Vikram Sarabhai Residential Complex is in the process. M/s. GKKSSA has been entrusted with the job for the development of Campus Master Plan. Several infrastructural development programmes have been undertaken in view of the increasing student population in the Campus. These include students’ amenity centre, centralised food court, several food chains, library building, convention centre etc.
INSTITUTE ELECTRICAL WORKS

PROFESSOR-IN-CHARGE: Professor Debapriya Das

Officer

Ghosh, Sabyasachi Executive Engineer (Electrical)
Kumar, Mahesh Executive Engineer (Electrical)
Chakrabarty, Dipak Kumar Executive Engineer (Electrical)

Brief description of major activities and ongoing projects

Keeping in pace with increased strength of the students, different measures have been taken by this Section for augmentation of power supply system and revamping the distribution system.

i) Augmentation of the 33kV substation to 17.6MVA.
ii) Contractual demand with WBSEDCL has been enhanced upto 13MVA in steps in the next five years.
iii) The capacities of all distribution substations have been doubled.
iv) All Power lines have been converted to underground cables.
v) Fire detection and alarm technique being introduced in the library and class rooms in the main building.
vi) All the 11kV Bulk oil circuit breakers have been retrofitted to 11kV Vacuum circuit breakers.
vii) A new set of capacitor banks of 1542 kVAR capacity (for full load condition) and one 850 kVAR capacity (for light load condition) has been installed to lower the active power consumption.
viii) Construction of a new 250kVA substation at Balarampur is going on.
ix) All low voltage switchgears in the substations have been modernized with state-of-the-art technology.
x) All substations in the residential area have been interlinked with a ring main at 415V to improve reliability and faster restoration under emergency.
xii) Installation and commissioning of auto synchronization cum AMF panel for the DG sets at the service centre of new academic complex.
xii) Augmentation of power supply with higher size power cables from substation / feeder pillars to different departments and replacement of most of old distribution panels by MCCB controlled cubical panels with suitable metering and protection system have been completed.
xiii) Renovation of Institute Committee room, most of the laboratories and class rooms was done with energy saving luminaries and MCB controlled distribution boxes.
xiv) Power connection for Air Conditioners have been provided to 60% of the faculty rooms and Energy saving measures have been implemented in different Departments / academic buildings, commercial establishments, and residential complexes by replacing analog energy meters with digital / static energy meters.
Officer
Biswa, Shyamal Kumar

Engineer

To meet the additional water demand from the increased student and faculty strength, Water Works Section of the Institute has taken up several new water related works. They are in different stages of progress.

Works completed:
The following works have been just completed:
1. Installation of flow meters at water sources.
2. Construction of new deep tubewells at Anicut Pumphouse, Bharatsangha area, Balarampur Pumphouse
3. Providing additional water tanks at various Halls of Residence
4. Providing water connection to Steel Technology Centre
5. Surging of existing tubewells
6. Providing kitchen sink at C-type Qrts.

On-going works:
The following new projects are being implemented:
1. Providing additional water tanks at single storied C, & B type qrts.
2. Installation of flow meter at Underground Pumphouse

Works in the pipe line:
1. Laying of 250 mm dia main water pipe line between Underground Pump house and Hall area
2. Construction of iron removal plant for deepwell near B.C. Roy Technology Hospital
CHAIRMAN: Professor Somnath Sengupta

FACULTY

Professor

Sengupta, Somnath Ph.D., Image & Video Processing
Sarkar, B. K. Ph.D., RF & Microwave Engineering
Chakrabarty, Ajay Ph.D., Microwave circuits & Antennas & EMI/EMC
Sen, S. Ph.D., MEMS
Patra, Amit Ph.D., Power System & VLSI Design
Das, S. K. Ph.D., Control System
Rajakumar, R. V. Ph.D., Communication & Signal Processing
Sanyal, S. Ph.D., RF & Microwave Engineering
Chakraborti, S. Ph.D., Communication
Biswas, P. K. Ph.D., Image Processing
Bandyopadhyay, S. S. Ph.D., Cryogenic Engineering
Chowdhury, K. Ph.D., Cryogenic Engineering
Bandyopadhyay, K. Ph.D., Satellite Communication
Manna, I. Ph.D., Material
Ray, G. Ph.D., Control System
Sengupta, I. Ph.D., Mobile Communication, VLSI

Associate Professor:

Saha, G. Ph.D., Communication
Chakrabarty, C. Ph.D., Control System
Sant, S. B. Ph.D., Material

Assistant Professor:

Nandi, T. K. Ph.D., Cryogenic Engineering
Sinha, M. Ph.D., Aerospace Engineering
Mukhopadhyay, S. Ph.D., Video Image & Processing
Bhattacharya, A. Ph.D., RF & Microwave Engineering
Das, S. Ph.D., MEMS & Microsystems
Chakraborty, P. K. Ph.D., Solid-state Science and Technology
Ghosh, B. Ph.D., RF & Microwave Engineering
Bhattacharya, T. K. Ph.D., RF MEMS

Chair Professor:

Sarkar, B. K. Ph.D., RF & Microwave Engineering

Visiting / Adjunct Faculty:

Bose, A. M.E., Mechanical Engineering
Dasgupta, S. Ph.D., Control System
Das, B. B. Ph.D., Control System

Officer:

Sahoo, G. Ph.D., EMI / EMC, Microwave, Waveguide Slot Antenna and Mining Electronics
Gucchait, P. K. M.Tech., Polymers Science & Engineering
Ghosh, Saswati Ph.D., EMI / EMC, RF Microwave Circuit & Antenna
RESEARCH AND DEVELOPMENT

Brief descriptions of on-going activities:

Space Technology Cell, IIT Kharagpur was renamed as Kalpana Chawla Space Technology Cell and was formally inaugurated by Chairman ISRO on 17th November 2004. This cell has been functioning under the supervision of the Chairman of Space Technology Cell since June 1998. The cell is being funded by ISRO, DRDO, CMPDIL, Ranchi, etc. During the period under report, the following highlights of sponsored research activities in this inside KCSTC and in different departments of IIT:

1. Dual Mode Ring Resonator Bandpass Filter with wide stopband
2. Design of Wide-band, Sharp-rejection Bandpass Filters with Parallel coupled Lines
3. Compact Bandpass Filters with Wide Controllable Fractional Bandwidth
4. Analysis of linear tapered waveguide by two approaches
5. Compact Sharp cutoff wide stopband low-pass filter using defected ground structure and spurline
6. Size Reduction and Harmonic Suppression of Microstrip Branch Line Coupler Using Defected Ground Structure
7. On An Algorithm for Boundary Estimation of Commonly Occurring Heart Value Diseases in Time Domain
8. Log Gabor Wavelet and Maximum a Posteriori Estimation in Speaker Identification
9. A Robust Heart Sound Segmentation Algorithm for Commonly Occurring Heart Value Diseases
10. An object based coding scheme for frontal surface of defective fluted ingots
11. A Hierarchical Framework for Generic Sports Video Classification
12. Texture Classification Using a Novel, Soft-Set Theory Based Classification Algorithm
13. Performance of high rate data in wideband CDMA with correlated interferers
15. Effects of correlated interferers on packet data in presence of voice in cellular CDMA
16. Resource allocation for data in presence of voice in cellular CDMA with correlated interferers
17. Estimation of Antenna Factor of Wire Antenna as EMI Sensor Fusion
18. An Evolutionary Algorithm based approach to Automated Design of Analog and RF circuits using Adaptive Normalized Cost Functions
19. Image based classification of Defects in Frontal Surface of Fluted Ingot
20. Impedance Calculation of Broadwall Longitudinal Slot on Rectangular Waveguide
21. Harmonic Suppression and Miniaturization of Microstrip Branch Line Couplers
22. Method of Moment Analysis of Arbitrary Length Longitudinal Slot on Broadwall of Rectangular Waveguides
23. Analysis of Longitudinal Slot Antennas in the Broadwall of Standard and Non-standard Rectangular Waveguides
24. Planar Compact, Wideband Bandpass Filters with Wide Upper Stopband
25. Estimation of EMI from Waveguide Joints and Analysis of Thick Rectangular windows and Open-end of a Rectangular waveguide as EMI Sensors
26. Compact Bandpass Filter for Ultra Wide Band Communication
27. U-Shaped microstrip structure to decrease DGS resonance frequency
28. Analysis of Wire Antennas as an Element in Reflect Array Antennas
29. Theoretical Investigation of Phase Control Using Variable Length Dipole and Loaded Dipole in Reflectarray Antenna
30. Monopole Antenna Loaded with Dielectric Resonator as EMI Sensor
32. Detection of Water Layer within the Earth Surface & underground Coal Mines using Electromagnetic Wave
33. Imaging of Water Layer and buried object using Electromagnetic wave
34. Compact Wideband Bandpass Filters with Extended Upper Stopband
35. Harmonic Suppression and Size Reduction of Planar Branch Line Couplers
36. Method of Moment Analysis and Impedance Calculation of Broadwall Longitudinal Slot on Rectangular Waveguides

37. Compact Highpass Filter using Complementary Split Ring Resonator

38. Switched Beam Array Antenna for Sectorized Optimum Power Distribution into Discrete Localities of Rural Area


40. Multiple Beamforming using Switched Beam Array Antenna

41. Application of Multiple Cavity Modeling Technique for Accurate Analysis of Waveguide Fed Thick Rectangular Window

42. Comparison of IE3D and CST-Microwave Studio Simulator for Planar Microwave Filter design

43. Study on the Effect of Different Shapes of Defective Ground Structures Using Finite-Difference Time-Domain Technique

44. The role of GTD in the analysis and design of Antennas on shipboard platforms

45. A Wide-band Lumped Element Compact CAD Model of Si-Based Planar Spiral Inductor for RFIC

46. Design of a 1 V Low Power 900 MHz QVCO, 19th IEEE/ACM International Conference on VLSI Design

47. High Level Synthesis of Linear Analog Systems, International Conference on Emerging Applications of IT (EAIT 2006)

48. AGC of a Hydrothermal System with Thyristor Controlled Phase Shifter in the Tie-Line

49. Texture Classification Using a Novel, Soft-Set Theory Based Classification Algorithm

50. TEM Characterization of Polyester Urethane Clay (3 Weight%) nanocomposite

**Multimedia and Video Processing**

An FPGA based state of the art video codec is being developed. The system under development finds its usage in Digital Video Broadcasting (DVB) system and performs real time encoding of colour videos of CIF frames size (352×288 pixels) at 30 frames/sec

**Radiation patterns of antennas on satellite**

Radiation due antennas in free space can be readily computed and measured. However, when the antenna platform, that is the satellite structure need to be accounted for, then it becomes impractical to measured even in the most modern Anechoic Chambers of the world. Also, numerical techniques fail to predict the effect of the large structure on antenna radiation due to the limitations of computer memory and speed, even in today's world. Hence, analytical techniques like STD needs to be developed for this purpose. This has been the field of study for the present investigator.

**Monopulse Comparator**

Design of highly compact comparator for monopulse radar application using reduced height Ku-band waveguided.

**DRA**

Design, Simulation and fabrication of CPW feed DRA on the narrow band application.

**IRA**

Impulse Radiating Antenna. Design Simulation and fabrication of USB IRSA

**MPCA**

Miniaturized Printed Circuit Antenna Design, Simulation and fabrication, Testing of Antenna for different Applications like Mobile, UMTS, etc.

**RFID**

Radio frequency Identification- Design Implementation of Tracking Algorithm and the simulation of the Antenna
MTMs
Gain Enhancement of eclectically small antennas using Metamaterials:- Design and Simulation of an electrically small antenna surrounded by Metamaterial shell / sphere

MOM
Method of Moment (MOM) analysis, design, fabrication and testing of various types of waveguide slot excited Dielectric resonator Antennas (DRAs)

Electromagnetic Modeling of high frequency electronic systems to estimate EMC
Electromagnetic interference is becoming a crucial issue in the design of modern high frequency electronic systems. In the conventional design methodology, EMC issues are addressed only after a prototype is built. However, this process has a potentially significant impact on the cost and time-to-market of the products. This needs to develop an accurate and efficient electromagnetic analysis and modeling to analyze the performance of high frequency electronic circuits for verifying the design against all sorts of electromagnetic interference before fabrication. This has been taken up as the present work. Different conducting and dielectric bodies have been modeled using Method of Moments and the radiation and reception characteristic have been studied.

GPS
Global positioning system (GPS), Adaptive Equalizer, Adaptive Array Antenna (Smart Antenna), Digital Signal Processing, Microwave Communication, Image processing & Numerical Techniques in Electromagnetic.

Antenna Design
Project title : Reduction of Mutual Coupling between microstrip antennas.
Use Software : HFSS, CST

Impulse Radiating Antenna (IRA)
CST MS software is being used to design and simulate an Ultra wideband Impulse Radiating Antenna (IRA), a TEM horn antenna (sensor), a 50 to 100 ohm impedance transformer and a splitter (50 ohm to 100 ohm coaxial cable) for differential feed to a full (4 arm) IRA.

Site Specific Propagation Channel Modeling
Our goal is to develop deterministic propagation channel model for micro and Pico cell scenario. Now a days, industry are using statistical channel modeling to characterize the wireless channel but following the reduction in call size, accurate characterization of channel becomes of vital significance. This leads to further investigation into the model which is accurate, deterministic and amenable to industry requirement.

Thrust Areas :
1) Micromachining (MEMS)
2) Cryogenics
3) Propulsion and Engines
4) EMI / EMC
5) Sensors
6) RF and Microwave Planar Circuits
7) Digital Communication
8) Embedded Software Solutions
9) Antennas
10) Control Systems
11) Microelectronics
12) IP Core Design
13) Life Support Engineering

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14) Smart Materials & Exotic Materials
15) Power Electronics
16) Space Education
17) Electronic devices

New Acquisitions:
1) CST Software Microwave studio, version 5.
2) IE3D - version 9 by Zeland Software Inc.
3) WIPL-D
4) HFSS
5) VCO Model No. ZOS 1025, Freq. Range - 685-1025MHz
6) LNA
   (i) Model - ZEL 0812 LM, Freq. Range - 800-1200 MHz
   (ii) Model ZHL - 0812 HLN, Freq. Range -800-1200MHz
   (iii) Model ZHL-2HAD, Freq. Range -50-1000 MHz
   (iv) Model - ZFL 1000VH2, Freq. Range - 10-1000MHz
7) Filters
   LOW PASS FILTER : Model No. BLP 550, Freq. Range DC-520
   HIGH PASS FILTER : Model No. NHP-1000, Freq. Range - DC-550
8) Mixers
   (i) Model.No. - ZLW 2, Freq. Range - 685-1025MHz
   (ii) Model No. ZEM - 4300, Freq. Range - 300-4300MHz

ON-GOING RESEARCH PROJECTS
Sponsored Projects

# Title of the Project                                  Sponsor(s)
1. Electromagnetic Modeling of High Frequency Electronic Systems to Estimate Electromagnetic Compatibility DST, New Delhi
3. Feasibility Study of Anti-Jam GPS Receiver for GPS Guided Weapons ARMREB, New Delhi
4. FPGA based design and development of H-264 Codec ISRO- IIT Kharagpur Cell
5. Development of RF MEMS Capacitive Shunt Switch in Application as Phase Shifters for Satellite Communication System ISRO- IIT Kharagpur Cell
7. Contoured beam synthesis for array antenna to obtain efficient footprint pattern with gain optimization ISRO- IIT Kharagpur Cell
10. Development of Software Packages for Waveguide-based Microwave Circuits ISRO- IIT Kharagpur Cell
11. Gigahertz Transverse Electromagnetic Cell Army Technology Board
12. Simulation on Electromagnetic Battlespace in a corps zone Army Technology Board
13. FPGA based design and development of H - 264 codec ISRO- IIT Kharagpur Cell
14. Maritime location based service ISRO- IIT Kharagpur Cell
15. Ka Band Propagation Experiments over Indian Tropical Region for Improvement of Ka Band Satellite Communication ISRO- IIT Kharagpur Cell
17. Study of CDMA codes for Satellite Navigation ISRO- IIT Kharagpur Cell
18. Error resilient scheme for Satellite TV system ISRO- IIT Kharagpur Cell

Consultancy Projects :

<table>
<thead>
<tr>
<th>#</th>
<th>Title of the Project</th>
<th>Sponsor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preparation of Vision/theme and feasibility report</td>
<td>Tirupati Assets Pvt. Ltd., Kolkata</td>
</tr>
<tr>
<td>2</td>
<td>Development of Educational Complex</td>
<td>Tirupati Assets Pvt. Ltd., Kolkata</td>
</tr>
<tr>
<td>3</td>
<td>RF Fundamentals for Wireless Network</td>
<td>WMNetServ Ltd., Bangalore</td>
</tr>
<tr>
<td>4</td>
<td>Mast clamp current probe antenna</td>
<td>Naval EMC Centre, Mumbai</td>
</tr>
</tbody>
</table>

INVITED LECTURES BY FACULTY MEMBERS

1. Prof. Ajay Chakrabarty Lecture on “EMI / EMC” on September 23-24, 2008 at Ambedkar Institute of Technology, Delhi
2. Prof. Ajay Chakrabarty Lecture on “EMI / EMC” on December 8-10, 2008 at Andhra University College of Engineering, Visakhapatnam, AP
3. Prof. Ajay Chakrabarty Lecture on “EMI / EMC” on April 24, 2008 at NSEC, Kolkata
4. Prof. Ajay Chakrabarty Lecture on “EMI / EMC” on May 30, 2008 at National Institute of Technology, Warangal
5. Prof. Ajay Chakrabarty Lecture on “EMI / EMC” on May 21-23, 2008 at DEAL, Dehradun
6. Prof. Ajay Chakrabarty Lecture on “EMI / EMC” on July 17, 2008 at MNIT, Jaipur
7. Prof. Somnath Sengupta "Neural Networks” on June 20-21, 2008 at Srinidhi Institute of Science and Technology, Hyderabad, Andhra Pradesh
8. Prof. Somnath Sengupta "Advances in Video Processing" on November 26, 2008 at the Department of Electronics and Communication Engineering, Yeshwantrao Chavan College of Engineering, Nagpur
10. Prof. Subrata Sanyal GTD Techniques and its applications to problems in antennas and propagation
11. Prof. B. K. Sarkar “Radar and its applications” (invited) at the state level workshop on “Advanced Microwave Technology” on April 08, 2006 at the University Institute of Technology, Barkatullah University, Bhopal
19. Prof. A. Bhattacharya KITS University, Bhubaneswar, “Wireless Channel Characterisation”, August 6, 2008
20. Prof. A. Bhattacharya Army Centre for Electromagnetics, Mhow, “Emerging Technologies and their spectrum requirements”, August 12, 2008
22. Prof. A. Bhattacharya CEM, Kolaghat, “Confluence of Hardware & Software in present day Technologies”, October 23, 2008
23. Prof. Soumen Das “Nanoelectronics : Science, nanotechnology, engineering and applications”, IIT Kharagpur, Participants : 40
24. Prof. Soumen Das “3D bioengineering”, IIT Bombay, Participants : 25
25. Prof. Soumen Das “Nanobioengineering and family welfare”, IIT Kharagpur, Participants : 30

THESES (Doctoral and MS)

# Name of Scholar Title of Thesis
1. S. Das Design & Analysis of Microwave Antennas and Passive Components for Wireless Communication
2. Priyanka Mandal Some Studies on Global Positioning System Anti Jamming Technique for GPS and Smart Antennas
3. Mainak Mukhopadhyay Constant Aperture Antenna
4. Abdulla P. Plannar Antenna
5. Debendra Panda Study on Dielectric Materials
6. Yatendra Singh The Feasibility Study For Missile-Borne Phased Array Radar To Detect Small RCS Targets Using Commercial Of The Shelf (Cots) Components
7. Anindya Kundu Adaptive Beamforming for Anti-Jam Global Positioning System Receiver

SEMINARS / WORKSHOPS / CONFERENCES / SYMPOSIA / SHORT TERM COURSES ORGANIZED

5. ISRO IIT workshop November 27, 2008
7. “An Introduction to RF Techniques for Modern Communication System” July 01-06, 2008, KCSTC, IIT Kharagpur

11. “Satellite Communications Technology and Its Applications” March 16-21, 2009 at IIT Kharagpur Kolkata Extension Centre, Kolkata
NATIONAL CADET CORPS (NCC)

COMMANDING OFFICER: Wg. Cdr. V. K. Gupta

AIMS & OBJECTIVES

(i) To develop qualities of character, courage, comradeship, discipline, leadership, secular outlook, spirit of adventure & sportsmanship and the ideas of selfless service among the youth to make them useful citizens.

(ii) To create a human resource of organized, trained and motivated youth, to provide leadership in all walks of life including the Armed Forces and be always available for the service of the nation.

(iii) To create suitable environment to motivate the youth to take up a career in the Armed Forces.

MAJOR ACTIVITIES

During the training year 2008-2009, 227 cadets of 1st year and 2nd year of engineering were trained as NCC cadets. One Service Officer, one Associated NCC Officer and 11 service personnel were involved in imparting NCC training to the IIT students.

LECTURES BY VISITING EXPERTS

Cadets got a chance to visit AF Station Kalaikunda, have an explore with all military equipments and the Air Force environments. Experts were invited from Air Force Station Kalaikunda to deliver lectures to the cadets regarding Fire Extinguisher & First Aid.

SEMINARS / WORKSHOPS / CONFERENCES / SYMPOSIA / SHORT TERM COURSES ORGANIZED

1. A Combined Annual Training Camp was conducted for all 1st year NCC cadets at Gangadhar Academy, Belda, West Midnapur, organized by the Unit. The cadets were made to experience the military field conditions. Drill practice, Physical training, Games, Debates, Quiz competition and cultural programs kept the cadets glued with thrill and excitement. Group Commander of NCC GP HQ also paid visit to the camp.
STUDENTS ACTIVITIES RELATED TO NSS

The National Service Scheme (NSS) Unit of the Institute registered 606 students of 1st year and 2nd year at undergraduate level during the session. It took up several service oriented activities in the fringe villages of IIT Kharagpur campus under the direct guidance and supervision of eight faculty Program Officers and five faculty volunteers besides the Head, NSS and the Coordinator, EAA. The important activities it performed during the session include, providing basic education (3Rs) to the 36 illiterate children working in the shops, stalls, canteens etc. in the locality, special coaching to about 83 school going and dropouts; plantation and up keeping of more than 600 forest plants under environment protection programme; preparation and demonstration of scientific and technological models with Nehru S & T Museum at the Institute; conducting health and nutrition survey in the villages, organizing health awareness campaigning programme, etc. The NSS unit has successfully completed the Annual Camping programme during November 26th to December 5th, 2008 with 200 volunteers in the villages of Sonamukhi, Balarampur, Saraswatipur, Chitripur, Kashijora, Gholegharia villages centering at Balarampur Abhoy Ashram. The NSS volunteers have developed a website (http://teamvivek.50.webs.com) to share their works.
RAJBHASHA VIBHAG

CHAIRMAN : Professor Parmeshwary Dayal Srivastava

Rajbhasha Vibhag earlier known as 'Hindi Cell' was attached with the Department of Humanities & Social Sciences. Its main activities were limited to translate Institute's Annual Report and Annual Accounts from English to Hindi for sending them to Ministry for their placement in the Parliament. Later, it was felt that Institute has to play greater role in the implementation of Official Language Policy of the Government of India. As a result, Rajbhasha Vibhag was separated from the Department of Humanities & Social Science in the Academic year 2006-2007. Since then it functions as an independent entity in its new office situated at old building.

It has a well established setup with fullfledged Library of more than 600 Hindi books. It has latest bi-lingual software for preparation of documents in bi-lingual form. It has been assigned with the responsibility of implementation of Official Language at IIT Kharagpur. Its activities include translation of Annual Reports, Annual Accounts, Audit Reports, different nameplates & stamps, preparation of Degrees / Diplomas in Hindi and publication of a monthly Hindi e-magazine "Jharokha". A three day programme celebrating "Hindi Divas" was organised during 12-14 September 2008 in which several competitions were held for both Hindi and non-Hindi speaking employees as well as for the students of nearby schools. Two guest speakers, Dr. P K Srivastava, CDRI, Lucknow, world famous scientoonist and Dr. Madhusudan Saha a well known Hindi writer, delivered informative and interesting talks. Dr. Srivastava's presentation showed the noble method of popularisation of science through science cartoons while Dr. Saha depicted the harmony among different Indian languages. Cash prizes were given to successful participants.

A Five days Translation Training programme (May 13-17, 2008) were organized. Approximately 100 employees from various departments are benefited by these programmes. Most of the Resource Persons for these programmes are directly related to Rajbhasha Vibhag, Delhi, Bangalore and Kolkata. A Hindi Classes under Hindi Teaching Scheme were organized for employees in month of June 2008 in which 23 participants had completed their training and successfully passed their examination with 100 percent result.

Two meetings of the Town Official Language Implementation Committee (TOLIC) were held on 26th August 2008 and 28th January 2009 in which decision was taken for implementing of Official Language policy in each of the organisation connected with TOLIC. It was decided that stamps used by each TOLIC members should be made bilingually with the help of Rajbhasha Vibhag, IIT Kharagpur.
SPONSORED RESEARCH & INDUSTRIAL CONSULTANCY

DEAN : Professor Partha Pratim Chakrabarti

Since our founding in 1952, the Indian Institute of Technology Kharagpur has focused on some of our nation's most challenging problems. The various departments, centers, schools and research programs work across traditional academic boundaries to promote research and teaching that is interdisciplinary, collaborative and groundbreaking. Our researchers and educators find innovative answers to society's needs, focusing particularly on energy and environment, health and well-being, infrastructure and information management. IIT Kharagpur benefits greatly from the Institute's longstanding ties with government agencies, foundations and corporate partners. Research at IIT Kharagpur is committed to knowledge transfer and engages in technology transfer and economic development activities that benefit local, national, and international constituents.

The scientific and technical themes that are changing the world computation and information technology, life sciences and biotechnology, nanotechnology, Infrastructure, energy and the environment are at the center of IIT Kharagpur’s research focus.

During the year 2008-2009 the Institute received from the Government, private and international funding agencies / enterprises 167 research projects for a total value of Rs. 158.39 crores (31.35 million USD) and 142 consultancy projects worth Rs. 12.87 (2.55 million USD) crores aggregating a total of 309 projects for Rs.171.25 crores (33.9 million USD) for the year 2008-2009.

Over the years IIT Kharagpur has gained special expertise in advanced chip design and CAD for VLSI and MEMS including in areas like formal verification where it works hand in hand with international organizations. The areas of software development, planning, management, ERP are core capabilities of the institute. The large gamut of specialized software technologies include power management software (used by Power Grid Corporation), telemedicine software (currently used in several remote sites in several states), communication empowerment software for physically challenged, software for medical measurements and tools for security and biometric authentication. Other important software developed include a specialized bond-graph based technology that is used in a variety of areas for analysis of dynamics by companies within and outside the country, a biomechanics simulator that is now deployed in industry and a fluid mechanics and ocean dynamics based software for storm surge measurements that has been deployed in several countries. ERP software has been developed and deployed in Coal India, Neyveli Lignite Corporation and other organizations. Research work is also going on development of MEMS based accelerometers for aerospace applications and design automation of analog VLSI. A Mission Project for development of Virtual Labs involving premier Institutes of the nation has been initiated this year.

The Institute has a long-standing focus on Life Sciences research with special emphasis in medical science and technology. Artificial heart development program is undergoing phase II, a unique male contraceptive, RISUG is undergoing third phase of trials and research work on development of a medical expert system is also undergoing. Interdisciplinary research is being carried out in areas of, non-invasive measurements, advanced image processing, medical implants, protein structure analysis and drug design, orthopedic biomechanics and brain research. Green technology routes have produced unique protocols for insect resistant cotton, jute, bio-hydrogen, separation and purification of anti-carcinogenic components from green tea leaves, etc. Research in biotechnology has resulted in a number of high quality enzymatic processes for a variety of food technologies. Research work is being carried out on high pressure processing on high value perishable commodities, development of novel nano-biocomposite osteogenic matrices for cell based bone tissue engineering, production of pure variety disease free potato seeds through in-vitro culture technique and design & development of non-invasive blood glucose measuring system.

The major research initiatives in nanotechnology and nano-materials include unique microstructures prepared from gelcast ceramics, nano-composites, nano-wires, semiconductors and metal alloys. The MEMS group has made significant contributions to national research programs of ISRO and DRDO by development of advanced accelerometers, gyros, micro-valves, etc. The area of micro-fluidics and bio-nanomems has developed new techniques for DNA hybridization and micro-scale cooling for electronic components. The institute has special expertise in advanced plasma technologies and plasma based materials that are being used for advanced research for industrial, strategic and biomedical areas. The institute has been recognized with a special research program in microfabrication and fabrication with support from Indo-US Science & Technology Forum.

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The vibrant energy research programs at IIT Kharagpur include fuel cell based systems and energy materials, production of renewable hydrogen combined with CO₂ capture to address global warming and energy production. The current ongoing research activities in mechanical sciences include thermal engineering, CFD, motion and vibration dynamics, robotics and robot development, etc. The institute has developed state-of-the-art cutting tools comparable to the best available worldwide. Prototype vehicle development activities include development of a large autonomous underwater vehicle, fault-tolerant micro-aero vehicle, hovercraft and electric vehicles as well as development of aircraft.

Industry academia partnership at IIT Khargpur is thriving with industries forming partnerships in joint research projects, acquiring technologies developed in the institute and seeking consultancy supports from the Institute. Some of the major research initiatives in recent years include Steel Technology Center, major R&D Centers in Energy Sector in collaboration with DVC, Tea Engineering Research Center, Vodafone-Essar-IIT Kharagpur Centre of Excellence in Telecommunications, National Program in Marine Hydrodynamics, Santech - IIT Kharagpur Research Initiative in Telecommunication, Centre of Excellence in Information Assurance, National facilities for EPMA, General Motors Collaborative Research Laboratory in Electronics Controls and Software (ECS) and a Regional Center for Rural Technology Action Group (RUTAG) are some of the recent such successful initiatives.

The Intellectual Property Rights and Industrial Relations (IPR & IR) Cell under SRIC is responsible for the licensing and the transfer of technologies developed by faculty members, students and other researchers at IIT Kharagpur to the commercial sector. The technologies developed at IIT Kharagpur are showcased to an audience of small and medium scale industries (SME) during IndAc 2009 in Kolkata during March 2009 culminating in a number of technology transfers and licensing. IIT Kharagpur has a long tradition of protecting inventions and has received numerous patents (103 in number) over the years.
SCIENCE & TECHNOLOGY ENTREPRENEURS’ PARK

MANAGING DIRECTOR : Professor Dhrubes Biswas

MAJOR IMPROVEMENTS IN STEP IIT Kharagpur Main Campus

1. The development infrastructural facilities have been made in accordance with the requirement of the office space as well as other important necessities.
   i) Remodeling of the STEP office seating space
   ii) Creation of additional seating capacity (to accommodate Entrepreneurs including Students, Faculties & General Public)
   iii) Purchase of PCs for improvement of accounting & computing infrastructure
   iv) Maintenance of existing PCs with new software tools to facilitate finance & accounts
   v) Construction of a new office cabin
   vi) The Guest House of STEP has been renovated to provide three star facilities
   vii) A new glow sign-board at the main gate for STEP has been put up.

2. Appointment of experienced professionals for reorganization and proper working of the new projects of STEP.

3. The security system has been started and realigned at the STEP main premise. The security personnel have also been given proper uniform at the expense of STEP as a priority in consonance with our vision to bring a level of security within the STEP boundaries.

4. The garden and landscaping of STEP is being maintained by its own employees. The seasonal gardening is also being taken care with the help of existing entrepreneurs.

5. Infrastructural development of the old building of STEP for proper facilitation of the incubatees.
   i) Some of the rooms have been redesigned to meet the needs of the incubatees
   ii) Creation of a new space for a bio-technical laboratory
   iii) Construction of a new lavatory including the toilet and bath facilities for incubatees
   iv) Construction of a pharmaceutical based lab for facilitating an incubatee who will work for the bulk production of male contraceptive to meet the Family Welfare Programme needs
   v) A generator room has been provided on demand to one of the incubatees to meet the urgent needs of its company. The facility is scalable for other incubatees as per the requirement

BRIEF DESCRIPTIONS OF ON-GOING ENTREPRENEURIAL ACTIVITIES

(i) At STEP IIT Kharagpur premises

<table>
<thead>
<tr>
<th>#</th>
<th>Companies under incubation of STEP</th>
<th>Major entrepreneurial activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sankalp Semiconductors</td>
<td>Analog / Mixed Signal / RF semiconductors service provider with a mission to serve worldwide customer with benchmark quality. There are about twenty employees for the R&amp;D purpose of the company. Sankalp's endeavor is an effort towards creating a value-based organization where the values and culture are embedded deep into the sub-conscience of the individuals and where they are nurtured into becoming world leaders and entrepreneurs with conscience</td>
</tr>
</tbody>
</table>

2. P2 Power Solutions Pvt. Ltd. | Work in the domain of Power Quality enhancement at distribution level helping industries strengthen their power assets through avant-garde technology and technical expertise. In today’s highly competitive environment, poor Power Quality and inefficient usage of power |
can significantly erode net earnings due to high operating costs. Installation of P2 power products reduces operating costs by improving the efficiency of the power supply system and almost eliminating failures and trips due to inefficient and poor Power Quality.

3. DataResolve Systems

DataResolve Systems offers the most innovative product and services for information and data security. All the products and services of the company revolve around the issue of securing different forms of electronic data in the form of files, archives of a corporate firm lying unprotected anywhere in the world which is potentially prone to theft. The product named U-Hook has been launched and steps are being taken to market it worldwide.

4. ElectroSoft Consultants

Involved in several sponsored and consultancy projects dedicated towards empowerment of physically challenged people, automation and control systems, to preparation of Vision and Theme papers.

5. Centre for Advanced Communication

Interactive Software Integrated Learning System (ISILS) is the heart beat, nerve centre, brain, driving force of our overall system.

6. Integrated Chemical Industries

Integrated chemical Industries provides for manufacturing leather chemical and specialty chemicals for industrial use.


Software Development and consultancy

8. National Institute of Science and Technology.

It works in the field of software technology in consultancy mode.

9. Hydrodyne

Work in the arena of Sophisticated Naval Architecture and design. Already constructed two hovercrafts which are undertaking comprehensive test run and trial to suit the long term needs of the Indian Navy.

10. High tech consultants

Modeling, simulation, Control, Fault Detection and Isolation

11. Focus R&D

Software Research

12. Sparsh Learning

Works in the area of software and research.

13. Intellisys

Works in the area of video conferencing.

14. Softlore Solutions

Training programs on various new software technologies.

15. Capillary Technologies

Mobile based marketing and advertisement software.

16. RISUG

The company has opened its R & D lab here in consonance with the Family Welfare

17. Intinno Technologies Pvt.Ltd.

The firm is committed to Hi-tech Research and Development in Education/Learning technologies, web2.0, Data Mining, Information Retrieval and software development; the first three fields being latest. The company also has a long-term initiative to improve the quality of education through its endeavor.

18. Greenhat Technologies

Product for educational platform for delivery of industry relevant content with efficient performance assessment and analytics module.
It has already been noted that STEP has become an independent entity. Furthermore, it has also initiated the canteen facility in consonance with the long term vision to make STEP, IIT KGP to be recognized for serving the employees of incubatees as well as staff at its best.

There are other 12 companies under the incubation of TIETS as well.

The Established TePP Centre at STEP has been declared the Regional Centre for its activities covering the states of Orissa, West Bengal, Bihar and entire of North East. There are 16 innovators who have already been sanctioned the angle funding.

The TBI VLSI purchase of Equipments has already been sanctioned.

(ii) At STEP Gopali

<table>
<thead>
<tr>
<th>#</th>
<th>Companies under incubation of STEP</th>
<th>Major entrepreneurial activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Raghunath Fertilizers</td>
<td>Creating Vermi-compost.</td>
</tr>
<tr>
<td>2.</td>
<td>Sri Balaji Mushroom</td>
<td>Organic mushroom cultivation</td>
</tr>
<tr>
<td>3.</td>
<td>Raghunath &amp; Company</td>
<td>Works in the area of bio-fertilizer</td>
</tr>
<tr>
<td>5.</td>
<td>Electro Thermal Insulation</td>
<td>In the field of Insulation wires and polymer insulations</td>
</tr>
<tr>
<td>6.</td>
<td>Sandhya Glass works</td>
<td>Glass cutting work. Design of glass mirrors</td>
</tr>
<tr>
<td>7.</td>
<td>Gulton Rubber works</td>
<td>Making of Rice husk rollers</td>
</tr>
</tbody>
</table>

Present activities being undertaken at STEP-Gopali are as under:

1. The security pattern has been redesigned
2. Light Pruning operation of the Tea garden
3. Redesigning of the irrigation system to meet the demand of water for all the vegetation as well as to save the water resource
4. Repairing of the boundary walls to provide strong security to the incubatees
5. Managing director keeps in touch with the day to day activities at STEP-Gopali by weekly and daily appraisal reports sent to him in accordance
6. The MD makes sure to visit the place for timely meetings and discussions with the entrepreneurs.

MAJOR THRUST AREAS

1. VLSI for Technology Business Incubation and high technology incubation.
2. Agro-based products at Gopali
3. Management Process for launching and sustaining Startups
4. Organic fertilizer through vermi-composting & its training Programs
5. Product focus in Energy, Environment, Education & Health.

MISSION PROJECTS

1. The proposal for the starting of Small and Medium Scale Industries' Business Incubator has been accepted and the MD has been invited to take the SME Incubation.
2. Technology Refinement and Marketing Plan (TREMAP) proposal has been submitted for filling of the gap of commercialization for TePP innovators.
3. Proposal for the Health Partnership plan between India and Finland has been submitted to the Department of Biotechnology, Ministry of Science & Technology.

NEW ORGANIZATIONS INCUBATING

<table>
<thead>
<tr>
<th>#</th>
<th>Name of Company / Proprietor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sparsh Learning Technologies</td>
</tr>
<tr>
<td>2.</td>
<td>RISUG</td>
</tr>
<tr>
<td>3.</td>
<td>Intinno Technologies</td>
</tr>
</tbody>
</table>
COLLABORATIVE EFFORTS

International collaborations
We have been played as a host to eminent dignitaries from around the world. We have been honored to have with us some eminent luminaries from.

i) Jyvaskyla University, Finland
ii) University of California, Berkeley
iii) Georgia Institute of Technology, Atlanta, Georgia, United States

As part of our wider effort to bridge common ground having entrepreneurship as a common platform, Prof. Biswas visited JYU (Jyvaskyla, University of Finland) and participated as well as conducted various entrepreneurship sessions with the students.

Global Venture Lab
The lab is an effort to create practice based entrepreneurship with the collaborative gains from three recognized universities namely,

i) IIT Kharagpur, India
ii) University of Jyvaskyla, Finland
iii) University of Berkeley, California

The lab has already been inaugurated on 8th of January 2009 at STEP, IIT Kharagpur in the presence of the four Finnish delegates and the director of the institute. GVL-Finland has been inaugurated on 23rd March 2009 in the presence of Prof. Biswas and Prof. Ikhlaq Sidhu at Finland.

LECTURE BY VISITING EXPERT

i) Prof. Marko Seppa University of Jyvaskyla, Finland, visited STEP IIT Kharagpur on January 2009. He lectured about the global partnership and told about his visions of transferring knowledge to capital. He addressed the E Cell students and grass-root entrepreneurs at STEP.

ii) Dr. Mari Suoranta University of Jyvaskyla, Finland addressed the students of IIT Kharagpur and grass-root entrepreneurs at STEP during the visit for inauguration of GVL in the month of January. She talked about the entrepreneurial marketing and ways to create innovation in marketing.

iii) Prof. Joy Lashkar Georgia Institute of Technology, Atlanta, Georgia visited STEP in the month of November 2008 and motivated the students in business plan and technology transfer.

iv) Prof. Partha S. Ghosh, Boston Massachusetts, USA, Lectures the grass-root Entrepreneurs on motivation and leadership during the month of December 2008.

ON-GOING TRAINING PROGRAMS

(i) Technology Entrepreneurship Development Program (TEDP)
The TEDP program has been reengineered for grass root entrepreneurship relevant to semi urban and rural poor people. This time we have scaled up our TEDP to conduct 4 such programs
for the grassroots entrepreneurs in the domains of EEEH (energy environment education and health) utilizing the vibrant ecosystem at STEP IIT KGP. This effort is in consonance with the vision of local solutions to be provided to the local people by training the grass-root people in these four domains. The students are trained to serve themselves as entrepreneurs as well as these grass-root entrepreneurs are exposed to the environment of IIT for 6 weeks. This gives them self confidence to establish themselves. The efforts are being given to create health based entrepreneurs.

(ii) **SiDBI Skill up gradation programme for Grass-root Entrepreneurs**

The programme was conducted in collaboration with the SiDBI programme of IIT Kharagpur. It was attended by 50 entrepreneurs. They were provided comprehensive skill up gradation and visits to create awareness of new technologies among them.

(iii) **Faculty Development Program (FDP)**

A two weeks' program positioned towards training faculties from other engineering colleges in the local area including IIT Kharagpur was sent and it was accepted by Department of Science &Technology. FDP is aimed at the faculties of the entire northeastern, eastern region of India as well as South India for the purpose of advancing the entrepreneurial culture in and around their region. Forty three faculties from various places such as Jharkhand, Bihar, West Bengal, Manipur and Tamil Nadu had come to participate in the program. The approach is towards training the faculties so that they in return are able to train the students back home and create an entrepreneurial ecosystem. The FDP was received with admiration and was able to meet its desired objective of entrepreneurial knowledge propagation.

(iv) **Training Programme in Production & Processing of Tea**

A two day's training programme was conducted by STEP on the latest methods of tea production and processing. This programme was appreciated by the participants and requested for further similar programmes of such agro based trainings.
TRAINING & PLACEMENT SECTION

PROFESSOR-IN-CHARGE : Professor Balbir Kumar Mathur

PLACEMENT DETAILS

The Training and Placement Section is responsible for arranging practical training for 3rd year students and job placement of final year students graduating from the Institute. The Section is actively engaged in forging synergistic relationships between the Institute and various industries and user systems of technical and scientific manpower. Based on these interactions, the T&P Section gives feedback to the Institute on the academic programmes.

135 companies / organizations visited and the campus for recruitment in 2008-2009. 14 others preferred to have telephonic interview, videoconference and call the students for interviews to their offices. The details of number of students who had interested for placement and those actually placed through campus interviews as on 20.04.2009 are as follows:

<table>
<thead>
<tr>
<th>Course/Degree</th>
<th>No. of students interested</th>
<th>No. of students placed</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Tech. (Hons.)</td>
<td>359</td>
<td>300</td>
</tr>
<tr>
<td>B.Arch. (Hons.)</td>
<td>011</td>
<td>009</td>
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<td>M.Sc.</td>
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<td>068</td>
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<td>Dual Degree M.Tech.</td>
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<td>M.Tech. / MCP</td>
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<td>DIPLOMA (LAW)</td>
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<td>004</td>
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<td>M.B.M.</td>
<td>112</td>
<td>093</td>
</tr>
<tr>
<td>Ph.D. / MS</td>
<td>006</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1320</strong></td>
<td><strong>828</strong></td>
</tr>
</tbody>
</table>

SUMMER TRAINING

Eight weeks of Summer Practical Training at the end of 3rd year B.Tech. / Dual Degree is a compulsory part of the B.Tech.(Hons.) / Dual Degree curriculum at IIT Kharagpur, carrying 2 credits. All efforts are made to place the concerned students in the best of organizations in India and abroad, for summer training. An emergent trend is that more and more students are seeking summer training abroad.

A total of 1430 companies / organizations in India were contacted for training facilities for the last summer vacations in May-July 2009. Among these 103 in India had offered training facilities, out of which 48 organizations had extended out-of-pocket allowances (covering 204 students) and many other extended subsidized transport, subsidized canteen and/or subsidized accommodation for our students. The highest out-of-pocket allowance of Rs. 25,000 per month was paid by HUL, Yahoo and six organizations extended Rs.15, 000/-per month, (ITC Ltd., Microsoft, Barclay Capital, Rd. Reddy's Lab, IBM, Tata Steel, L&T and Goldman Sach ). Ten companies offered stipend in the range Rs. 10,000/- per month to 14,000/- per month and twenty organizations offered out of pocket allowance in the range Rs.5000/- to Rs.8,000/- per month and rest of the organizations offered below Rs.5000/-.

400 students (all years) will take up summer training in organizations abroad during the summer 2009. During summer 2009, a total of 635 third year B.Tech.(Hons.) / Dual Degree students were placed for summer training. The Department of Mining Engineering handled the placements of their students for summer training separately. A number of 2nd year B.Tech.(Hons.) / Dual Degree and M.Sc. students were also placed for optional training.

STUDENT PARTICIPATION

To harness the student power, a formal system of student participation in the process had been initiated during 2005-2006. This has evolved and the 2008-2009 placement saw students participating in running placement process. In fact, through this participation it was possible to run up to seven / eight companies per day and round the clock. Students take active part in calling up companies and managing the logistics of placement.
NEW PLANNING

i) Laying cable to VSRC to give emergency telephones at each block. Work Order has been issued by Store and Purchase Section and work is about to start.

ii) Planning to lay the underground cable to each independent Quarter (B & C1 type) in Dandakaranya Area to minimize the maintenance problem. Price bid has been opened and process is going on to award the tender.

iii) Planning to install Satellite Exchange at New Guest House. A request was made to the PIC, Civil Works for providing a room at the guest house in this regard to install the Satellite Exchange.

iv) A plan for installing WiMAX network connectivity is made and expression of interest and quotation was called for.

NEW CONNECTIONS

i) Three Security help line numbers are given.

ii) Three hospital emergency help line numbers are given.

iii) Apart from the above, nearly 40 Nos. of New connections have been given to New faculties and new Labs.

ROUTINE MAINTENANCE

i) The complaint can be lodged in person, over phone and online through Institute Website.
TECHNOLOGY STUDENTS' GYMKHANA

PRESIDENT: Professor Manish Bhattacharjee

ACTIVITIES

Inter IIT Sports Meet

The 44th Inter IIT Sports Meet began with the Inter IIT Aquatic Meet held during October 6-9, 2008, at IIT Madras. IIT Kharagpur secured overall 3rd position in Swimming. Extraordinary performance in swimming by Chirag Fialoke, a second year UG student, was the highlight of the meet. He created two new meet records in 200m free style and 1500m freestyle. He also won 3 gold and two silver medals. The second phase, which includes all other games, started during December 11-17, 2008. IIT Kharagpur secured Silver Medals in Badminton (M), Athletics, Basketball (M), Table Tennis (M) and Bronze Medals in Hockey and Table Tennis (W). The IIT Kharagpur Inter IIT contingent stood at the 3rd place in the meet, behind only IIT Bombay and IIT Madras.

Inter Hall Competitions in Sports & Games

During the Autumn Semester, Inter Hall competitions started with the Inter Hall Aquatic competitions in the month of August 2008. Chirag Fialoke of RP Hall won the Individual Championship. Inter Hall Athletics Meet was held during November 14-15, 2008.

In the Spring Semester, the second phase of inter hall competitions in cricket, football, hockey, basketball, volleyball, badminton, table tennis, tennis and weight lifting were held. The Inter Hall Competitions among the girl's hostels were conducted in table tennis, badminton, swimming and basketball.

Inter Hall Competitions in Social & Culture Events

As usual the Inter Hall competitions in various social & culture events are organized. The traditional Inter Hall Illumination & Rangoli competition was organized on non-competitive basis because of time constraints.

Inter Hall Competitions in Technology

Inter Hall competitions in Technology are held in various categories.

MAJOR EVENTS ORGANISED

Shaurya'08

This year, Technology Students' Gymkhana organized SHAURYA, an Inter-College Sports Meet, from 31st October to 3rd November 2008. Basketball, Tennis, Volleyball, Hockey and Table Tennis were held. Five colleges, namely, St. Xaviers, Ranchi, KIIT Bhubaneswar, Marine Engineering College, Kolkata, NIIT Rourkela and IIT Kharagpur, took part.

Spring Fest'09

The Annual Social Cultural Festival Spring Fest'09 celebrated its golden jubilee during January 22-25, 2009. Spring Fest Kavi Sammelan organized during Alumni meet was largely applauded. This year Spring Fest witnessed overwhelming participation from various prestigious colleges across the country and even international participation from New Zealand, Belgium, Netherlands, Tunisia, Brazil and Poland where students took part in a complete new genre of competitive events like Youth Flick Quiz, Fusion Fiesta, SF Karaoke and Twisted Grades. Maestros like Krishna Kumar, Pt. Chitresh Das, Grammy Awards winner Jason Samuels in Tap Dance, Pdt. Vakil's Rhythm Riders and Led Zepplica (Southern California based rock band) captivated the huge audience. The Hasya Kavi Sammelan as usual delighted TOAT-full audience.
Kshitiz'09

Kshitij The annual Techno management fest was organized from 29th January to 1st February 2009. Around 5000 participants from various colleges of India and abroad took part in various competitive events like Business Plan, Advertisement Designing, Case Studies to Paper Presentations, Computer Programming and Robotics. Societies of International repute gave their support to events in Kshitij. ACM, ASHRAE, ASME and IMeche endowed KSHITIJ with their prized certifications. Students came up with innovative designs for the Kharagpur Railway Station, as a part of the event, 'The Grand Central'. Prizes money awarded was worth Rs. 45.00 lacs. The B-Plan Incubation this year was Rs. 25.00 lacs. Presence of stalwarts from scientific, technical and managerial domains like Mr. Prahlad Kakkar, Mr. Philip Emeagwali, the Father of Internet, Nobel Laureate Kurt Wuthrich, Prof. Chandra Lalwani from Hull University, Pioneer S. K. Shivkumar, Prof. Chandra Wickramasinghe, Emmy Award winner Jeremy Bristow NASA's Christopher McKay were attractions of the fest. Technical Exhibitions and Workshops like Forensic Sciences, Financial Risk Management, Mind Reading Machines and Solar Robotics laid the foundation for the learning aspect of the fest.

OUTSIDE PARTICIPATIONS

The Cricket Team of IIT Kharagpur participated in the Ajay Ghosh Memorial Trophy Limited over cricket tournament organized by the Cricket Association of Bengal at Malda. They also participated in the Inter University Day-and-Night T-20 Cricket tournament organized by KIIT, Bhubaneswar.

Ramachandra Memorial Tennis Tournament

The Tennis team of IIT Kharagpur participated in the Ramachandra Memorial Tennis Tournament organized by Midnapore District.

DEVELOPMENTS

i) Two Turf Wickets in Tata Steel Sports Complex
ii) Jogging track in Tata Steel Sports Complex

FACILITIES

i) Modern Gymnasium
ii) Billiards
iii) Athletics Stadium with modern training facilities
iv) Two Cricket Fields with two turf wickets.
v) Jogging track along with modern practice facilities in Tata Steel Sports Complex
vi) Six Tennis Courts including two flood lit courts
vii) Two flood lit Volleyball Courts
viii) Two flood lit Basketball Courts
ix) One wooden Badminton Court
x) Table Tennis room with two tables
xi) Yoga room
xii) Standard Swimming Pool

ANNUAL PRIZE DISTRIBUTION CEREMONY AND FAREWELL PROGRAMME FOR FINAL YEARS

The Prize distribution ceremony and farewell to final years was held on 15th April, 2009. Acting Director Prof. M. Chakraborthy presided over the function. Eight Institute Blues in Sports & Games, Five Order of Merit in Soc. & Cult and in Technology are awarded to final years for their outstanding achievements in respective fields. Mr. Robin Anil received the Prof. G. S. Sanyal Cup for his all-round performance in Technology. Mr. Bipul Kumar and Mr. Chirag Fialoke received the Alumni Trophy jointly for their all round performance in sports & games.
EXTRA ORDINARY ACHIEVEMENTS BY THE STUDENTS

i) ETDS (English Technology Dramatics Society) won the 1st prize in the National level Dramatics competition hosted by National Law School, Bangalore from 29th October to 2nd November 2008, beating teams from prestigious institutions from across the country.

ii) A team from the IIT KGP Quiz Club participated in the MNNIT Allahabad’s quiz fest, Gnosiomania. The team was represented by Ankit Sethi, Neeraj Goswami and Aditya Mani Jha. The team stood 1st in the general and entertainment quizzes, and 2nd in IT and corporate quiz, making them the Best Team of the fest.

iii) Balgovind Tewari represented West Bengal in the National Powerlifting championship held in Noida.

iv) Prateek Bumb and Aniruddha Sharma won the "Creme-de-la-Creme Business Plan Conclave" held during PAN-IIT 2008, during December 19-21, 2008. They presented their Business Plan "CODE GREEN". They have been invited to San Francisco to present their technology to lead researchers (from Stanford, UC Berkeley & MIT) and industry experts at the CLEANTECH FORUM between 23rd and 25th February 2009.
PART - III

STATISTICAL INFORMATION
Table : A-1

ADMISSION TO UNDERGRADUATE (B.TECH. / B.ARCH. / M.SC. / DUAL DEGREE) COURSES IN THE SESSION 2008-2009

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<tr>
<th>#</th>
<th>Course</th>
<th>SANCTIONED STRENGTH</th>
<th>ADMISSION OFFERED</th>
<th>ACTUALLY REGISTERED</th>
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<td>GN</td>
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<tr>
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<td>3</td>
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<td>3</td>
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<td>8</td>
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<td>3</td>
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<tr>
<td>9</td>
<td>Industrial Engg.</td>
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<td>14</td>
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<td>3</td>
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<tr>
<td>15</td>
<td>Ocean Engg. &amp; N.A.</td>
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(B) B.ARCH. 5-YEAR

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(C) M.Sc. INTEGRATED 5-YEAR

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<td>Economics</td>
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<td>Maths. &amp; Computing</td>
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<td>Total (C)</td>
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### Table A-1 (Contd.)

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<td>Met. &amp; Mat. Engg./Met. Engg.</td>
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<td>Mining Engg.</td>
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<td>1</td>
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<td>14</td>
<td>Mining Engg. / Safety Engg. &amp; Disaster Mgt. in Mines</td>
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<td>Ocean Engg. &amp; naval Arch.</td>
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<td>Total (A + B + C + D)</td>
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* Under PD category a maximum of one seat in each course is reserved subject to 3% of total seats i.e. 30 seats.

** Including preparatory and re-admission.
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<td>TOTAL</td>
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Table: A-3

DISCIPLINE-WISE BREAK-UP OF STUDENTS AWARDED M.C.M. SCHOLARSHIP 2007-2008

Rate of Scholarship: Rs.1000/- p.m. plus Free-tuitionship

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| (C) M.Sc. Integrated 5-Year          | Applied Geology                | 06      | 03      | -       | 02      | 02     | 13     |
| 1  | Economics                              | 04      | 02      | 04      | -       | -      | 10     |
| 2  | Expl. Geophysics                       | 02      | 03      | -       | 05      | 03     | 13     |
| 3  | Industrial Chemistry                   | 02      | 01      | 02      | 02      | 01     | 08     |
| 4  | Maths. & Computing                     | 02      | 06      | 05      | 05      | 04     | 22     |
| 5  | Physics                                | 02      | 03      | -       | 01      | 04     | 10     |
| 6  | Statistics & Informatics               | 06      | 05      | 05      | -       | -      | 16     |

| (D) M.Sc. 2-Year                    | Chemistry                      | 04      | 14      | -       |         | 18     |
| 1  | Geophysics                             | 03      | 03      | -       |         | 06     |
| 2  | Geological Sciences                    | 07      | 07      | -       |         | 14     |
| 3  | Mathematics                            | 03      | 07      | -       |         | 10     |
| 4  | Physics                                | 08      | 13      | -       |         | 21     |
| 5  | Statistics & Informatics               | 01      | 05      | 06      |         | 06     |

| (E) Dual Degree 5-Year              | Aerospace Engg.               | 03      | 02      | 01      | 04      | -      | 10     |
| 1  | Ag. & F. E. / Water Res. Dev. &       | 03      | 01      | -       | 04      | -      | 08     |
| 2  | Manuf. Sc. & Engg. / Metallurgical    | 02      | 03      | 02      | 03      | -      | 10     |
| 3  | Chemical Engg.                         | 04      | 05      | 06      | 01      | -      | 16     |
| 4  | Civil Engg. /Struct. Engg.             | 05      | 03      | 04      | -       | -      | 12     |
| 5  | Computer Sc. & Engg./Comp.             | 04      | 06      | 02      | 06      | -      | 17     |
| 6  | Electrical Engg./Instrumentation Engg. | 04      | 03      | -       | 04      | -      | 11     |
| 7  | E & ECE/Automation & Comp. Vision     | 04      | 08      | 05      | 01      | -      | 18     |
| 8  | Industrial Engg./IEM.                 | 07      | 02      | 02      | 03      | -      | 14     |
| 9  | Manuf. Sc. & Engg./IEM.               | 02      | 03      | 02      | 02      | -      | 09     |
| 10 | M.E. /M.S. Engg.                      | 04      | 04      | 04      | 06      | -      | 18     |
| 12 | Met. & Mat. Engg. / Metallurgical Engg. | -      | 02      | 02      | 01      | -      | 05     |
| 13 | Mining Engineering                    | 07      | 05      | 10      | 02      | -      | 24     |
| 14 | Mining Engg./Safety Engg. & Disaster Mgt. in Mines |          |         |         |         |       |
| 15 | Ocean Engg. & N.A.                    | 01      | 01      | 04      | 03      | -      | 09     |
| 16 | Total:                                  | 216     | 209     | 172     | 136     | 17     | 750    |

ANNUAL REPORT
2008-2009
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ANNUAL REPORT
2008-2009
[290]
## Table: A-5
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Rate: Pocket Allowance Rs.250/- p.m. plus Free Messing

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<td>23</td>
<td>H. P. Bhadury Memorial Prize</td>
<td>Shrenik Kothari</td>
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<td>24</td>
<td>John Von Neuman Award</td>
<td>Anvesh Komuravelli</td>
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<tr>
<td>25</td>
<td>Prof. S. K. Nandi Memorial Prize</td>
<td>Himanshu Yadav</td>
<td>05CH1033</td>
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<td>26</td>
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<td>Amit Agarwal</td>
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<td>27</td>
<td>Class Of 1970 Alumni (US) Association Prize</td>
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<td>29</td>
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<td>32</td>
<td>K. Rama Rao Endowment Prize</td>
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<td>33</td>
<td>Smt. Ava Sanyal Memorial Prize</td>
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<td>Shivani Pal (female)</td>
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<td>Aritra Chatterjee</td>
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<td>36</td>
<td>Prof. Sudhir Ranjan Sengupta Memorial Prize</td>
<td>Priyanka Thamma</td>
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<td>37</td>
<td>Best B.Tech. Project Thesis Award By Mr. Mitrajit Mukhopadhyay</td>
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<td>2nd Richa</td>
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<td>3rd Vivek Kumar</td>
<td>04CH1024</td>
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<td>41</td>
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<td>Kedar Nath Singh Memorial Prize</td>
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2. J. C. GOSH MEMORIAL PRIZES:

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<th>Inst. Roll No.</th>
<th>Amount Rs.</th>
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<td>3</td>
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<td>05BT3013</td>
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<td>4</td>
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<td>05CH1033</td>
<td>2000.00</td>
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<td>5</td>
<td>Civil Engineering</td>
<td>Puneet Kumar Patra</td>
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<td>Apte Chinmay Raghunath</td>
<td>05EG1013</td>
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<td>Kartikeya K Sharma</td>
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<td>2000.00</td>
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<td>14</td>
<td>Metallurgical &amp; Materials Engineering</td>
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<td>15</td>
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<td>05MI3004</td>
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<tr>
<td>16</td>
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<td>17</td>
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<td>19</td>
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3. BEST PROJECT AWARD:

(a) 4-YEAR B. TECH.(HONS.) COURSES:

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<tr>
<th>#</th>
<th>Name of Prize</th>
<th>Name of the winner</th>
<th>Inst. Roll No.</th>
<th>Amount Rs.</th>
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<td>4</td>
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<td>5</td>
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<td>14</td>
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<td>Sudhanshu Shekhar Singh</td>
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<td>15</td>
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<td>16</td>
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### (b) 5-YEAR DUAL DEGREE COURSES:

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<td>Saurav Bandopadhyay, Kaushik Dasgupta</td>
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### (c) 5-YEAR M. SC. COURSES:

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### (d) 2-YEAR M. SC. COURSES:

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<td>Rasha Eqbal, 07CS1039</td>
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<td>Soumya Shaw, 07HS2008</td>
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<td>b) Naveen Kumar, 07CS1008</td>
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<td>c) Sumit Sinha, 07CS1009</td>
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<td>b) Vinu Rajashekar, 05CS3025</td>
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<td>c) Prateek, 06CS1006</td>
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#### STUDENTS ON ROLL UNDERGRADUATE (B.TECH. / B.Arch. / M.SC. / DUAL DEGREE) COURSES AT THE BEGINNING OF THE SESSION 2008-2009

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| Total | 782 | 576 | 146 | 14 | 46 | 480 | 115 | 52 | 3 | 132 | 682 | 100 |

ANNUAL REPORT 2008-2009 [302]
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Table: C-1
NUMBER OF RESEARCH SCHOLARS ENROLLED FOR THE PH.D. DEGREE DURING 2008-2009
(01/07/2008 TO 30/06/2009)
### Table : C-2
**NUMBER OF MS STUDENTS ENROLLED DURING 2008-2009**
*(01/07/2008 TO 30/06/2009)*

<table>
<thead>
<tr>
<th>Department / Centre / School</th>
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### Table : C-3
**NUMBER OF POST DOCTORAL FELLOWS ENROLLED DURING: 2008-2009**
*(01/07/2008 TO 30/06/2009)*

<table>
<thead>
<tr>
<th>Department / Centre / School</th>
<th>Total</th>
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<th>SC</th>
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### Table : C-4
**UGC SCHOLARS ENROLLED DURING 2008-2009**
*(01/07/2008 TO 30/06/2009)*

<table>
<thead>
<tr>
<th>Department / Centre / School</th>
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<tbody>
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<td>-</td>
<td>-</td>
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<tr>
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### Table : C-5
**NUMBER OF RESEARCH SCHOLARS FROM OTHER COUNTRIES**
*(01/07/2008 TO 30/06/2009)*

NIL
## NAMES OF THE PH.D. DEGREE RECIPIENTS

<table>
<thead>
<tr>
<th>Department / Centre / School</th>
<th>Name of the Degree Recipients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace Engineering</td>
<td>Rajesh Kumar, Santanu Mitra, Udar Ratnakar Shankarrao</td>
</tr>
<tr>
<td>Architecture and Regional Planning</td>
<td>Basina Uma Sankar, Joydeep Dutta, Susmita Sen, Haimanti Banerji</td>
</tr>
<tr>
<td>Biotechnology</td>
<td>Dipanjan Ghosh, Devrani Mitra, Rashmi Shrivastava, Hari Har Surya Kumar Potula, Sampurna Sattar</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>Ujjal K Ghosh, Srikanta Dinda, Tapas Kumar Mandal, Harir Har Surya Kumar Potula, Sampurna Sattar, Pinakpani Biswas, Pankaj Vijay Mathure, Chandan Das</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>A. Mani, Navneet Pratap Singh, S. Ayooob, Puspendu Bhunia, Priyaranjan Pal</td>
</tr>
<tr>
<td>Cryogenic Engineering</td>
<td>Soma Das</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>Leena G., Suvaite Mukherjee, H.N. Nagaraja, Suvarun Dalapati, Rajesh Joseph Abraham</td>
</tr>
<tr>
<td>Electronics and Electrical</td>
<td>Paramesha, Sushrut Das, Rajarshi Mahapatra, Benuh Dar Sahu,</td>
</tr>
<tr>
<td>Communication Engineering</td>
<td>Mrinal Kanti Mandal, C. B. Ashesh, Nandedkar Abhijeet Vijay, Aruna Tripathy, Vustikayala Sivakumar Reddy</td>
</tr>
<tr>
<td>Geology and Geophysics</td>
<td>Rashmi, Vikas Chand Baranwal, Suman Das, Rajesh Kumar Naik, Saikat Sengupta, Swapneendu Goon</td>
</tr>
<tr>
<td>Humanities and Social Sciences</td>
<td>Sudeep Budhaditya Deb, Vanich Archna, Balvada Pavan Kumar, Shalini Diksh, Ujjwal Jana</td>
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<tr>
<td>Industrial Engineering and Management</td>
<td>Shivashankaragouda V. Patil, Ashutosh Sarkar, Subhash Chandra Panja, Asit Baran Bera, Chinmata Murali Krishna, Preethi Upamaka</td>
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<tr>
<td>Information Technology</td>
<td>Sushanta Kumar Mandal</td>
</tr>
<tr>
<td>Materials Science</td>
<td>Suparna Sarkar, Aparna Gupta, Somnath Biswas, Kunal Pal, Partha Pratim Sengupta, Samik Pal, Hiranmayee Satapathy, Sanjoy Sadhukhan, Tanya Das</td>
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### Table: C-6 (Contd.)

<table>
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<tr>
<th>Department / Centre / School</th>
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<tbody>
<tr>
<td>Metallurgical and Materials Engineering</td>
<td>Subhrangshu Moitra, Golap Mohammad Chowdhury, Animesh Mandal, Mervin A. Herbert, Kausik Chattopadhyay, T. Gnanadurai, V.M. Sreekumar</td>
</tr>
<tr>
<td>Medical Science and Technology</td>
<td>Sunil Kumar</td>
</tr>
<tr>
<td>Mining Engineering</td>
<td>Gyan Prakash Singh, Devi Prasad Mishra</td>
</tr>
<tr>
<td>Ocean Engineering and Naval Architecture</td>
<td>Joydip Bhattacharjee, Sanjay Pratap Singh, P. Suresh Kumar, Rajiv Sharma</td>
</tr>
<tr>
<td>Physics and Meteorology</td>
<td>Tarun Kumar Jha, Piyush Ranjan Das, Xavier V.F., Gourishetty Anil Kumar, Sanjay Kumar Mandal, Puja Dey, Dillip Kumar Pradhan, Rama Ghosh</td>
</tr>
<tr>
<td>Reliability Engineering</td>
<td>Naga Srinivasa Rao Pulimi</td>
</tr>
<tr>
<td>Rubber Technology</td>
<td>Madhuchhanda Maiti, Anirban Ganguly, Samik Gupta, Sambhu Bhadra</td>
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<tr>
<td>Vinod Gupta School of Management</td>
<td>Rajesh Kumar B., Uttam Kumar Chatterjee, Madhurima Deb</td>
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# NAMES OF THE MS DEGREE RECIPIENTS

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<th>Department / Centre / School</th>
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<tr>
<td>Chemical Engineering</td>
<td>Rajaram Vijayan, Parama Ghoshal</td>
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<tr>
<td>Electrical Engineering</td>
<td>Prabir Kumar Saha, Papiya Dutta, Rajarshi Paul, Samrat Ray</td>
</tr>
<tr>
<td>Electronics and Electrical Communication Engineering</td>
<td>Rajarshi Bhattacharya, Debasis Paul, Pralay Mandal, Manabendra Maji, Sanjoy Kumar Dey, Anirban Das, Anindrajit Ghosh, Ravi Shankar Prasad, Debasis Mandal</td>
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<tr>
<td>G. S. Sanyal School of Telecommunications</td>
<td>Debasish Bera, Sujay Deb, Md. Safiullah</td>
</tr>
<tr>
<td>Information Technology</td>
<td>Manoj Paul, Debasis Kundu, Somnath Dey, Ranjan Maity, Aditi Roy, Vinay Kumar Vishwakarma</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Anil Kumar Lenka</td>
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<tr>
<td>Mining Engineering</td>
<td>Swapan Kumar Khatua</td>
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### RECEIPT AND PAYMENT ACCOUNT FOR THE YEAR ENDED 2008–2009

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<th>RECEIPTS</th>
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<th>#</th>
<th>PAYMENTS</th>
<th>AMOUNT (Rs.)</th>
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<td>I</td>
<td>EXPENSES</td>
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<td>a) Establishment Expenses</td>
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<td>b) In Deposit accounts</td>
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<td>b) Administrative Expenses</td>
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<td></td>
<td>c) In Savings accounts</td>
<td>553344.00</td>
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<tr>
<td>II</td>
<td>Grants Received</td>
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<td></td>
<td>Investments and deposits made</td>
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</tr>
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<td>From Government of India</td>
<td></td>
<td></td>
<td>a) Out of Earmarked /</td>
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<td>a) Non-Recurring (Plan)</td>
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<td>Endowment Funds</td>
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<td>b) Recurring (Non-Plan)</td>
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<td>b) Out of Institute Development Fund</td>
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<td>c) OSC-PLAN</td>
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<td>c) Out of Own Funds &amp; Others</td>
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<td>Income on Investments from</td>
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<td>Expenditure on Fixed Assets</td>
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<td>62582950.00</td>
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<td>&amp; Capital Work-in-progress</td>
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<td>b) Institute Development Fund</td>
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<td>c) Own Funds</td>
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<td>IV</td>
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<td>Other Payments</td>
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<td>a) On Bank deposits</td>
<td>375245.00</td>
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<td>b) Recoverable Advances</td>
<td>4347467.00</td>
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<td>V</td>
<td>Other Income</td>
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<td>a) In current accounts</td>
<td></td>
<td></td>
<td>a) In current accounts</td>
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<td></td>
<td>b) In savings accounts</td>
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<td>b) In savings accounts</td>
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<td>VI</td>
<td>Amount Borrowed</td>
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<td>Other Receipts</td>
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</table>
RESEARCH PUBLICATIONS
DEPARTMENT OF AEROSPACE ENGINEERING

RESEARCH PUBLICATIONS

Journals :


7. Closed-Loop Active Vibration Control of A Typical Nose Landing Gear With Torsional Mr Fluid Based Damper By B. Sateesh and D. K. Maiti Structural Engineering And Mechanics, An International Journal 31 (1), 39-56 (2009)


32. Vibration control of FGM thick shells using higher order shear deformation theory By Narendra, K. and Pradhan S. C. JOURNAL OF AEROSPACE SCIENCES AND TECHNOLOGIES (2009)

33. Vibration suppression analysis of FGM shells with higher order shear deformation theory, By Pradhan S. C., JOURNAL OF MECHANICS OF MATERIALS AND STRUCTURES (2009)

Seminars / Workshops / Conferences :


4. Analysis of laminated sandwich plates based on an improved higher order zigzag theory, By Mihir K. Pandit, Abdul H. Sheikh and Bhrigu N. Singh, 8th International Conference on Sandwich Structures (ICSS8), Porto, Portugal, (2008)


6. “Large-eddy Simulation of Turbulent Flow over Bluff Bodies in Wind Tunnel”, By Ajoy Kumar Das and Navtej Singh, 10th Annual CFD Symposium: CFD Division of Ae.SI held on NAL, Bangalore held on 11th -12th August, 2008, NAL, Bangalore, (0)


22. Mixed joints for Aircraft Structural Repair, By Saji D Byjji Varughese and Pradhan, S.C., *ISAMPE National Conference on Composites (INCCOM-7)*, Bangalore, (0)


RESEARCH PUBLICATIONS

Departments:


23. Design, development, testing and comparative evaluation of betel leaf oil extractor By Guha, P. *Agricultural Mechanization in Asia, Africa and Latin America* Communicated (2008)
34. Effect of screw speed and plasticizer on the torque requirement in single screw extrusion of starch based plastics and their mechanical properties. By Madhusweta Das *Indian Journal of Chemical Technology* 15, 555-559 (2008)
37. Enrichment of phenolics and free radical scavenging property of wheat koji prepared with two filamentous fungi By Bhanja T, Kumari A and Banerjee R Bioresource Technology doi/10/1016/j (2009)
46. Food Technology to Meet the Changing Needs of the Urban People By Mishra H N and Sinija V R Comprehensive Reviews in Food Science and Food Safety 7: 358 368 (2008)
47. FTNIR spectro-photometric method for determination of moisture content in green tea granules By Sinija V R and Mishra H N Food and Bioprocess Technology Available online (2008)
48. FTNIR spectroscopy for determination of caffeine in green instant tea powder and tea granules By Sinija VR and Mishra HN LWT-Food science and technology 42:998-1002 (2009)
49. Fuzzy analysis of sensory data for quality evaluation and ranking of instant green tea powder and granules By Sinija V R and Mishra H N Food and Bioprocess Technology Available online (2008)
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
<th>Journal/Media</th>
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</table>


Seminars / Workshops / Conferences :


33. MCU.ease - A simplified decision support system to estimate the monthly consumptive use with minimum meteorological observations, By Pandey A.C. and A. Mishra, 43rd Annual Convention and Symposium of the Indian Society of Agricultural Engineers, BAU Ranchi, India, (2009)


37. Moisture diffusivity and drying kinetics of button mushrooms under microwave vacuum drying, By Giri, S. K. and Prasad, Suresh, 43rd ISAE Annual Convention and Symposium, Birsa Agricultural University, Ranchi, (2009)


46. **Prediction of groundwater level in Kathajodi River basin using artificial neural network approach**, By Mohanty, S., Jha, M.K., Kumar, A., James, B.K. and Jena, S.K., *Technical Annual, the Institution of Engineers (India)*, Orissa State Center, Bhubaneswar, Bhubaneswar, Orissa, (2009)


RESEARCH PUBLICATIONS

Journals:

5. Rising car ownership and parking infrastructure By Taraknath Mazumder, Sandip chakrabarti ABACUS Vol. 3 No 2 (2008)
6. SYSTEMATIC APPROACH TO COST EFFECTIVENESS IN RESIDENTIAL PROJECTS; SOME THOUGHTS By Abraham George Veedu- A publication of Malayala Manorama April (2009)

Seminars / Workshops / Conferences:

1. A Systems Approach to frame Holistic Studies on Culture and Philosophy of science in India, By Joy Sen (2009), Culture and Philosophy of Science in India, RMIC Kolkata in April 4 2009, (2009)


12. Temporal changes in surface fluxes in the metropolitan region of Kolkata, By Saikat Kr. Paul; R.N. Dutta, 18th International Conference of Biometereology, Tokyo, Japan, (2008)

RESEARCH PUBLICATIONS

Journals:


12. Cell proliferation and migration in silk fibroin 3D scaffolds By Mandal BB and Kundu SC. *Biomaterials* 30, 2956-2965 (2009)


40. Non-bioengineered silk gland fibroin protein micromolded matrices to study cell-surface interactions By Mandal BB, T Das, Kundu SC. *Biomedical Microdevices* 11, 467-476 (2009)

41. Non-bioengineered silk gland fibroin protein: characterization and evaluation of matrices for potential tissue engineering applications By Mandal BB, Kundu SC. *Biotechnology and Bioengineering* (Cover page article). 100 (6) 1237-50 (2008)

42. Non-mulberry silk gland fibroin protein 3D scaffold for enhanced differentiation of human mesenchymal stem cells into osteocytes. By Mandal BB and Kundu SC. *Acta Biomaterialia* Online (2009)


RESEARCH PUBLICATIONS

Journals:


8. Application of external electric field to enhance the permeate flux during micellar enhanced ultrafiltration By B. Sarkar, S. DasGupta and S. De Separation and Purification Technology 66 (2), 263-27 (2009)


18. Determination of thermodynamic parameters for the cloud point extraction of different dyes using TX-100 and TX-114 By M. K. Purkait, S. DasGupta and S. De Desalination 244, 130-138 (2009)


30. Linear Stability Analysis of high and low-dimensional models for describing mixing-limited pattern formation in Homogeneous Autocatalytic Reactions By A. Gupta and Saikat Chakraborty Chemical Engineering Journal 145 (3), 399-411 (2009)


33. Maximization of bioconversion of castor oil into ricinoleic acid by response surface methodology By Debajyoti Goswami, Ramkrishna Sen, Jayanta Kumar Basu, Sirshendu De Bioresource Technology Accepted (2008)


45. Pulsed-electric field enhanced ultrafiltration of synthetic and fruit juice By B. Sarkar, S. De and S. DasGupta Separation and Purification Technology 63, 582-591 (2008)


60. Utilisation of Tea Waste Carbon for Copper Removal from water By Jayanta Kumar Basu, Sonali Sengupta, Sirshendu De and Vijay Chandra *Int. J. Environ. And Waste Management* accepted (2008)


Seminars / Workshops / Conferences :


RESEARCH PUBLICATIONS

Journals:

3. A Direct Observation of Solvation Dynamics in Aqueous Reverse Micellar System Containing Silver Nanoparticle in the Reverse Micellar Core By P. Setua, R. Pramanik, S. Sarkar, D. Seth and N. Sarkar J. Physical Chemistry B (Letter) ASAP (0)


28. Controlled Interparticle Spacing for Surface-Modified Gold Nanoparticle Aggregates By Basu, Soumen; Pande, Surojit; Jana, Subhra; Bolisetty, Sreenath; Pal, Tarasankar Langmuir 24, 5562 (2008)


32. Design and Synthesis of Bissulfones and Their Reactivity under Basic Condition By S. Das and A. Basak Bioorganic & Medicinal Chemistry Letters 19, 000 (2009)


37. Dynamics of solvent and rotational relaxation of Coumarin 153 in a room temperature ionic liquid Butyl-3-methylimidazolium octyl sulfate forming micellar structure By D. Seth, S. Sarkar, N. Sarkar 

38. Dynamics of water in the hydration layer of a partially unfolded structure of the protein HP-36 By S. Chakraborty and S. Bandyopadhyay 

*Polymer Composites* 29, 443-450 (2008)

40. Effect of microwaves on synthesis of MoS2 and WS2 By J. Ouerfelli, S.K. Srivastava, J.C. Bermede, S.Belgacem, 
*Vacuum* 83, 308-312 (2008)

41. Effect of unfolding on the thickness of the hydration layer of a protein By S. K. Sinha, S. Chakraborty and S. Bandyopadhyay 
*Ind. J. Phys.* 83; 49-64 (2009)

42. Electrocatalytic applications of nanosized Pt particles self-assembled on sol-gel derived three-dimensional silicate network By B.K. Jena and C.R. Raj 

43. Electrochemical functionalization of gold electrode with redox active self-assembled monolayer for electroanalytical application By Susmita Behera, S. Sampath and C. R. Raj 

44. Electrochemistry of surface wired redox protein: Axial ligation and control of redox potential By S. Behera and C.R. Raj 

45. Electrophilicity 
By P. K. Chattaraj 

46. Electrophilicity index within a conceptual DFT framework By P. K. Chattaraj and S. Giri 

47. Enantioselective enzymatic desymmetrization and kinetic resolution of prochiral 1,3-diols based on 1-tetralone and related multifunctional scaffolds By Tridib Mahapatra, Tapas das and Samik Nanda 

*Polymer Engineering and Science* 49, 585-591 (2009)

49. Ethylene vinyl acetate/Mg-Al LDH nanocomposites by solution blending By T. Kuila, H. Acharya, S. K. Srivastava and Anil K Bhowmick 
*Polymer Composites* 30, 497-502 (2009)

50. Exploration of Electrostatic Field Force in Surface-Enhanced Raman Scattering: An Experimental Investigation Aided by Density Functional Calculations By Sarkar, Sougata; Pande, Surojit; Jana, Subhra; Sinha, Arun Kumar; Pradhan, Mukul; Basu, Minmoyee; Chowdhury, Joydeep; Pal, Tarasankar 
*Journal of Physical Chemistry C* 112, 17862 (2008)

51. First synthesis of 9,10-dimethoxy-2-methyl-1,4-anthraquinone, a naturally occurring unusual anthraquinone By D. Mal and S. Ray 


53. Free Energies of Supercritical Solvation from Molecular Dynamics Simulation and Integral Equation Studies By Tapas Ranjan Kunor and Srabani Taraphder 

54. Gold nanoelectrode ensembles for the simultaneous electrochemical detection of ultratrace arsenic, mercury and copper By B.K. Jena and C.R. Raj 
*Analytical Chemistry* 80, 4836-4844 (2008)

55. Gram level synthesis of lead-free solder in the nanometer length scale obtained from tin and silver compounds using silicone oil By Pande, Surojit; Sarkar, Achintya Kumar; Basu, Minmoyee; Jana, Subhra; Sinha, Arun Kumar; Sarkar, Sougata; Pradhan, Mukul; Saha, Sandip; Pal, Anjali; Pal, Tarasankar 


62. pH-Responsive and Thermoreversible Hydrogels of N-(2-hydroxyalkyl)-L-valine Amphiphiles By A. Ghosh and J. Dey Langmuir 25, 0000-0000 (2009)


64. Microwave-assisted synthesis of WS2 nanowires through tetrathiotungstate precursors By Pravas Kumar Panigrahi and Amita Pathak WS2 and Technology of Advanced Materials 9, 045008 (2008)


67. Nanoparticle-Catalyzed Clock Reaction By Pande, Surojit; Jana, Subhra; Basu, Soumen; Sinha, Arun Kumar; Datta, Ayan; Pal, Tarasankar Journal of Physical Chemistry C 112, 3619 (2008)

68. Novel and rapid palladium assisted 6o electrocyclic reaction affording 9,10-dihydrophenanthrene and its analogues By Jana, Rathin; Chatterjee, Indranil; Samanta, Shubhankar; Ray*,Jayanta K.Organic Letters 10 ,4795 (2008)


Preparation of nano-sized ABi2Nb2O9 (A = Ca2+, Sr2+, Ba2+) ferroelectric ceramics by soluble Nb(V) tartarate precursor and their dielectric characteristics after sintering By Debasis Dhak, Prasanta Dhak, Tanmay Ghorig, Soumya K. Biswas, Panchanan Pramanik Journal of Material Science: Material Electronics 19, 448456 (2008)


Reactivity of IrCl(PPh3)3 with Diphenylacetylene: A Direct Route to 1-Iridaindene By Joyanta Choudhury, Sanjay Pratihar, Arnab Kumar Maity, and Sujit Roy Canadian Journal of Chemistry 87, 183-187 (2009)

Resin-Immobilized CuO and Cu Nanocomposites for Alcohol Oxidation By Pande, Surojit; Sahai, Arindam; Jana, Subhra; Sarkar, Sougata; Basu, Mrinmoyee; Pradhan, Mukul; Sinha, Arun Kumar; Sahai, Sandip; Pal, Anjali; Pal, Tarasankar Organic Letters 10, 5179 (2008)

Room Temperature Ferromagnetic Ni Nanocrystals: An Efficient Transition Metal Platform for Manifestation of Surface-Enhanced Raman Scattering By Sarkar, Sougata; Pande, Surojit; Jana, Subhra; Sinha, Arun Kumar; Pradhan, Mukul; Basu, Mrinmoyee; Sahai, Sandip; Yusuf, S. M.; Pal, Tarasankar Journal of Physical Chemistry 113 (2009)


Short Glas Fiber Filled Waste Plastic Composites ; Studies on Thermal and Mechanical properties By A. Nag, J. Jose, S. Sathpathy and G. B. Nando RAPRA 167-171 (2008)


92. Studies of structural and electrical properties of Ca$_{1-x}$Bi$_2+y$Nb$_2$O$_9$ [0.0 = x = 0.4; 0.000 = y = 0.266] ferroelectric ceramics prepared by organic precursor decomposition method By Dhak Prasanta, Dhak Debasis, Pramanik Kausikisankar, Pramanik Panchanan Solid State Sciences 10 (12), 1936-46 (2008)


109. Tin/indium nanobundle formation from aggregation or growth of nanoparticles By Jiang, Hongjin; Moon, Kyoung-sik; Sun, Yangyang; Wong, C. P.; Hua, Fay; Pal, Tarasankar; Pal, Anjali Journal of Nanoparticle Research 10, 41 (2008)


111. Variation in aromaticity and bonding patterns in a reaction cycle involving Be3(2-) and Mg3(2-) dianions By P. K. Chattaraj and S. Giri J. Mol. Struc.(Theochem) 53, 865 (2008)

Seminars / Workshops / Conferences :
RESEARCH PUBLICATIONS

Journals:


37. Low Cost Equipment for Evaluating Rutting Characteristics of Bituminous Mixes By I.S.reddy, Amaranatha Reddy M *Indian Roads Congress* Under Review (0)

Seminars / Workshops / Conferences :

1. A Novel Procedure for Determination of Hydrodynamic Pressure along Upstream Face of Dams due to Earthquakes, By Indrani Gogoi and Damodar Maity, 14th World Conference on Earthquake Engineering (14WCEE), Beijing, China, (2008)


23. Free vibration and stability behavior of functionally graded hyperbol shells, By Mr. S.Pradyumna and Professor J.N.Bandyopadhyay, Asian Conference on Mechanics of Functional Materials and Structures, Shimane University, Japan, (2008)
24. Influence of Material Nonlinearity of Foundation in the Dam Foundation Interaction Analysis, By A. Burman, D. Chakravarty and Damodar Maiti, 14th World Conference on Earthquake Engineering (14WCEE), Beijing, China, (2008)


38. Seismic Analysis of Concrete Gravity Dams Considering Foundation Flexibility and Nonlinearity", By A. Burman, B. V. Reddy and Damodar Maity, 2th International Conference of International Association for Computer Methods and Advances in Geomechanics (IACMAG), Goa, India, (2008)


42. Studies on Fly Ash and Silica Fume Based Self-Compacting Concrete, By Abhijit Kumar and S.V. Barai, XXXVI IAHS World Congress on Housing National Housing Programmes New Visions, Kolkata, (2008)


Seminars / Workshops / Conferences:

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
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<th>Conference/Event</th>
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<td>Bio-inspired Search and Distributed Memory Formation on Power-law Networks</td>
<td>Tathagata Das, Subrata Nandi, Andreas Deutsch, Niloy Ganguly</td>
<td>PPSN, Technische Universität Dortmund, Germany</td>
<td>2008</td>
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<tr>
<td>22</td>
<td>Color Enhancement in the Compressed Domain</td>
<td>J. Mukherjee and S.K. Mitra</td>
<td>Int. Conf. on Image Proc. (ICIP-2008), San Diego, USA</td>
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<tr>
<td>23</td>
<td>Community Formation and Search in P2P: A Robust and Self-Adjusting Algorithm</td>
<td>Tathagata Das, Subrata Nandi, Niloy Ganguly</td>
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<td>Elliptic Curve Based Multi-signature Scheme for Multi-server Systems</td>
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<td>IEEE TENCON 2008, Hyderabad, India</td>
<td>2008</td>
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<td>Enhancing Solution Quality of the Biobjective Graph Coloring Problem Using Hybridization of EA</td>
<td>Rajeev Kumar, Paresh Tolay and Siddharth Tiwary</td>
<td>ACM Genetic and Evolutionary Computation Conference (GECCO-2008), Atlanta USA</td>
<td>2008</td>
</tr>
<tr>
<td>28</td>
<td>Evolution of Hyperheuristics for the Biobjective 0/1 Knapsack Problem by Multiobjective Genetic Programming</td>
<td>Rajeev Kumar, Ashwin Joshi, Krishna Banka and Peter Rockett</td>
<td>ACM Genetic and Evolutionary Computation Conference (GECCO-2008), Atlanta USA</td>
<td>2008</td>
</tr>
<tr>
<td>29</td>
<td>Hardware implementation of the Trivium Stream Cipher</td>
<td>Dhiman Saha, S. Karmakar, D. Mukhopadhyay and D. Roy Chowdhury</td>
<td>National Workshop on Cryptology, Hyderabad</td>
<td>2008</td>
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<td>31</td>
<td>High Speed Compact Elliptic Curve Cryptoprocessor for FPGA Platforms</td>
<td>Chester Rebeiro, Debdeep Mukhopadhyay</td>
<td>9th International Conference on Cryptology in India, Kharagpur</td>
<td>2008</td>
</tr>
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<td>32</td>
<td>HPC5: An Efficient Topology Generation Mechanism for Gnutella Networks</td>
<td>Santosh Shaw, Joydeep Chandra, Niloy Ganguly</td>
<td>ICDCN 2009, Hyderabad</td>
<td>2009</td>
</tr>
<tr>
<td>33</td>
<td>Hybrid analysis of executables to detect security vulnerabilities</td>
<td>Pranith Kumar D., Anchal Nema and Rajeev Kumar</td>
<td>2nd India Software Engineering Conference (ISEC), Pune India</td>
<td>2009</td>
</tr>
<tr>
<td>34</td>
<td>Hybrid code analysis of executables to detect security vulnerabilities</td>
<td>Pranith Kumar D., Anchal Nema and Rajeev Kumar</td>
<td>3rd Hackers Workshop, Kanpur</td>
<td>2009</td>
</tr>
<tr>
<td>35</td>
<td>ICam: Maximizes Viewers Attention on Intended Objects</td>
<td>R. Pal, P. Mitra and J. Mukhopadhyay</td>
<td>Pacific Rim Conf. on Multimedia (PCM 2008), Tainan, Taiwan</td>
<td>2008</td>
</tr>
</tbody>
</table>
56. Word Clustering and Word Selection Based Feature Reduction for MaxEnt Based Hindi NER, By Sujan Kumar Saha, Pabitra Mitra, Sudeshna Sarkar, *ACL-08: HLT, 46th Annual Meeting of the Association for Computational Linguistics (ACL)*, Columbus, OH, USA, (2008)
DEPARTMENT OF ELECTRICAL ENGINEERING

RESEARCH PUBLICATIONS

Journals:


Seminars / Workshops / Conferences :

1. 3-D Reconstruction and Automatic Fusion of Edge Maps from Different Modalities of an Object, By Umesh C. Pati, Aditya Mod, Pranab K. Dutta and Alok Barua, IEEE Symposium on Computational Intelligence for Image Processing, Nashville, Tennessee USA, (2009)


15. ANN (Adaline) based harmonic compensation for shunt active power filter with capacitive voltage based predictive technique, By A.Bhattacharya and C.Chakraborty, ICII 2008, IIT Kharagpur, (0)


ANNUAL REPORT
2008-2009


RESEARCH PUBLICATIONS

Journals:

25. Genetic algorithm-based FSM synthesis with area-power trade-offs By S. Chaudhury, K.T. Sistla, S. Chattopadhyay Integration, the VLSI Journal In Press (0)
31. Investigating Long Range Correlation Properties in EEG during Complex Cognitive Tasks By S. Karkare, G. Saha and J. Bhattacharya Chaos, Solitons and Fractals Accepted (0)


Seminars / Workshops / Conferences :


38. Improving Speaker Identification via Singular Value Decomposition Based Feature Transformer, By B. P. Mishra, S. Chakraborty and G. Saha, TENCON, Hyderabad, India, (0)


40. Innovation around Institutes of Higher education as basis of economic development through entrepreneurial ventures in developing nations, By P. Saurabh, Amrita, S. Jagannathan, and D. Biswas, 8th biennial conference on Contemporary issues on Entrepreneurship Research, Ahmadabad, (2009)


43. Leakage Aware Synthesis of Multi-level Logic Circuits based on BDD Manipulation and Output Phase Selection, By Saurabh Chaudhury and Santanu Chattopadhyay, IEEE VLSI Design and Test Symposium, India, (2008)

44. Local Business Enterprise Development through Local Business Solutions of Local Entrepreneurial Problem by Locally Trained Entrepreneurs as a Distributed Solution, By Amrita, P. Saurabh, S. Jagannathan and D. Biswas, 8th biennial conference on Contemporary issues on Entrepreneurship Research, Ahmadabad, (2009)

45. MEMS Accelerometer driven fuel control system for Automobile applications, By Mukhiya, S. Gangopadhyay, B. Guha, TK Bhattacharyya, A. Boni and SK Lahiri, Smart Structures, Devices, and Systems IV, Melbourne, Australia, (2008)


DEPARTMENT OF GEOLOGY & GEOPHYSICS

RESEARCH PUBLICATIONS

Journals:


25. Marine to continental transition in Himalayan foreland By M.K. Bera, A. Sarkar, P.P. Chakraborty, R.S. Loyal, P. Sanyal *Marine to continental transition in Himalayan foreland* v.120, p.1214-1232 (2008)


Seminars / Workshops / Conferences :


12. The role of geological parameters on the ambient gamma radiation and radon flux from the rock formation near Singhbhum Shear Zone, near Jaduguda, Eastern India, By Kailas Sekhar Banerjee, 28th IARP National Conference on Management of Nuclear & Radiological Emergencies, DEfence Laboratory, Jodhpur, Rajasthan, (2008)


DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

RESEARCH PUBLICATIONS

Journals :

9.  Exploring the relationships of organizational communication, organizational climate, and organizational commitment By Kumar, B.P., & Giri, V. N. Management Stream 1,17-23 (2008)
Seminars / Workshops / Conferences:

5. Economic Potential for Jatropha Based Products in North Eastern India, By Kishor Goswami, Agricultural Engineering Inputs for the Development of the NE Region, Assam University, Silchar, (2008)
6. Economic Transition and Employment Generation in Indian Economy: Role of Market, Policy and Institutions, By Pulak Mishra and Bagirath Behera, International Conference on Employment Opportunities and Public Employment Policy in Globalizing India, Centre for Development Studies, Kerala, (0)
11. Impact of FDI in India: State-Wise Analysis in a Panel Data Framework, By Vani Archana, P Basu and N C Nayak, The 66th International Atlantic Economic Conference, Montréal, Quebec Canada, (0)
16. Research Trends and Opportunities in Natural Resource Economics w.r.t. Forest Resources in India, By Behera, B, Partnership Development Meet, Centre for Economic and Social Studies,, (2008)
Department of Industrial Engineering & Management

Research Publications

Journals:


6. An efficient hybrid evolutionary heuristic using genetic algorithm and simulated annealing algorithm to solve machine loading problem in FMS By M. Yogeswaran; S. G. Ponnambalam, and M. K. Tiwari International Journal of Production Research (0)


15. GA Guided Cluster Based Fuzzy Decision Tree for Reactive Ion Etching Modeling: A Data Mining Approach By Sanjay Kumar Shukla and M. K. Tiwari IEEE Transactions on Semiconductor Engineering(Accepted for Publication). (0)


18. Incorporating Dynamism in Traditional Machine Loading Problem: An AI Based Optimization Approach By Santosh Kumar Mandal, Mayank Kumar Pandey and M. K. Tiwari International Journal of Production Research (IJPRI) (Accepted for Publication) (0)


22. Minimization of Supply Chain Cost with Embedded Risk using Computational Intelligence Approaches By Sri Krishna Kumar, M. K. Tiwari and Radu F. Babiceanu International Journal of Production Research (IJPR) (Accepted for Publication) (0)

23. Multi-objective resource assignment problem in a product-driven supply chain using a Taguchi-based DNA algorithm By M. Bachlaus, M.K.Tiwari and F.T.S. Chan International Journal of Production Research (IJPR) (Accepted for Publication) (0)

24. Multiobjective Particle Swarm Algorithm with Fuzzy Clustering for Electrical Power Dispatch By Shubham Agrawal, B.K. Panigrahi, and M.K. Tiwari IEEE Transaction on Evolutionary Computations (Accepted for Publication) (0)


35. Real world Disassembly Modelling and Sequencing Problem: Optimization by Algorithm of Self Guided Ants (ASGA) By Mukul Tripathi, Shubham Agrawal, Mayank Kumar Pandey, Ravi Shankar, M. K. Tiwari *Robotics and Computer Integrated Manufacturing* (Accepted for Publication) (0)

36. Role of Corporate Memory (CM) in Global Supply Chain Environment By Anoop Prakash and M.K. Tiwari *International Journal of Production Research (IJPR)* (0)


38. Simultaneous Optimization of Parts and Operations Sequences in SSMS: A Chaos Embedded Taguchi Particle Swarm Optimization Approach By V.V. Kumar, M.K.Pandey, M.K.Tiwari and D. Ben-Arieh, *Journal of Intelligent Manufacturing (JIM)* (Accepted for Publication) (0)


41. Soft decision trees: A genetically optimized cluster oriented approach By Sanjay Kumar Shukla and M.K. Tiwari *Expert Systems with Applications* (Accepted for Publication) (0)

42. Three stage supply chain coordination under capacity bottleneck environment By S P Sarmah *International Journal of Logistics Systems and Management* Accepted (2009)

43. Three stage supply chain coordination under price sensitive demand environment By S Sinha, S P Sarmah *International Journal of Operational Research* Accepted (2009)

**Seminars / Workshops / Conferences :**


2. Anticipating Performance of Work Stations in MMPs at Sensor Breakdowns, By F. T. S. Chan, and M. K. Tiwari, *The 4th IEEE International Conference on Management of Innovation and Technology (ICMIT08-P-0002)*, Bangkok, Thailand,, (0)


RESEARCH PUBLICATIONS

Journals:


3. A personalised information support system for searching portals and e-resources By B.S.Sirisha,V.K.J.Jeevan,R.V.Raja Kumar,A. Goswami Electronic Library and Information Systems Vol. 43, No.1,77-93 (2009)


47. On the fine spectrum of the generalized difference operator \( ^n \) over the sequence space C-0 By P.D.Srivastava & Sudhansu Kumar Communications in Mathematical Analysis Vol. 6 (1), pp8-21 (2009)


61. The Cayley Transform and the Unit Cycle in the Parabolic Case. By Debapriya Biswas to appear in the *Journal of the Indian Academy of Mathematics (JIAM)* (0)


63. The Introduction of Projective Coordinates and Compactification for the three EPH Cases. By Debapriya Biswas to appear in *International Journal of Mathematical Sciences (IJMS)* (0)


Seminars / Workshops / Conferences:


RESEARCH PUBLICATIONS

Journals:


10. A Scheme for Robust Trajectory Control of Space Robots By P. M. Pathak, R. Prashanta Kumar, A. Mukherjee, A. Dasgupta Simulation Modelling Practice and Theory (SIMPRA) Vol.16 pp 1337-1349 (2008)


31. Capillary Filling in Centrifugally Actuated Microfluidic Devices with Dynamically Evolving Contact Line Motion By D. Chakraborty, R. Gorkin, M. Madou, L. Kulinsky, S. Chakraborty Journal of Applied Physics accepted (0)

32. Carbon dioxide as secondary fluid in natural circulation loops By Kiran Kumar, K, Ram Gopal M. Journal of Process Mechanical Engineering In Press (0)


46. DSMC Simulations of gas flows through 180 degree hairpin bends in circular micro-ducts By A. Sarkar, S. Chakraborty *International Journal of Micro and Nano Systems* accepted (0)

47. Effect of coolant pressure, nozzle diameter, impingement angle and spot distance in high pressure cooling with neat oil in turning Ti-6Al-4V By A.K. Nandy and S Paul *Machining Science and Technology* 12(4), 445-473 (2008)


58. Effect of three-dimensional melt pool convection on process characteristics during laser cladding By A Kumar, S Roy Computational Materials Science In Press (2009)


65. Formation of WC-iron silicide (Fe5Si3) composite clad layer on AISI 316L stainless steel by high power (CO2) laser By A. Viswanathan, D. Sastikumar, Harish Kumar, A.K. Nath Surface & Coatings Technology 203, 1618-1623 (2009)


76. Induced pressure gradients due to entrance and exit effects in electroosmotically driven flows through nanopores within the continuum regime By S. Chakraborty, S. Padhy *Journal of Physics D: Applied Physics* vol. 41, pp. 065502 (2008)


78. Influence of ply sequence and thermoelastic stress field on asymmetric delamination growth behaviour emanating from elliptical holes in laminated FRP composites By Pradhan, B. and Babu, P. R. *ASME- Jouv. of Engineering Materials and Technology* 130(1) (2007)


81. Irreversibility minimization of heat exchangers for transcritical CO2 systems By Sarkar J, Bhattacharyya S, Ram Gopal M *Int. J. of Thermal Systems* In Press (0)


89. Micro-Scale Thermo-Fluidic Transport in Two Immiscible Liquid Layers Subject to Combined Electro-Osmotic and Pressure-Driven Transport By A. Garai and S. Chakraborty *International Journal of Heat and Mass Transfer* in press (0)


95. Modeling of temperature distribution within a dental profile on account of laser irradiation By J. Mukherjee and S. Chakraborty International Journal of Biomedical Engineering and Technology accepted (0)


98. Modelling and Control of Bio-inspired microgripper By G.Benu Madhab, C.S.Kumar, P.K.Mishra International Journal of Manufacturing technology Management Accepted and in pres (0)


109. On the non-linear phenomena due to source loading in rotormotor systems By A.K. Samantaray

110. On the rationale behind constant fuel utilization control of solid oxide fuel cells By P. Vijay, A.K.
Samantaray, A. Mukherjee Proc. IMechE Part I: Journal of Systems and Control Engineering
223(2):229-252 (2009)

111. Onset and growth of adhesion failure and delamination induced damages in double lap joint of
326-336 (2008)

112. Optimization of recompression S-CO2 power cycle with reheating By Sarkar, J., Bhattacharyya,
S. Energy Conv and Mgmt (2009)

113. Order parameter description of electro-chemical-hydrodynamic interactions in nanochannels By

114. Parametric study of capillary tube-suction line heat exchanger in transcritical CO2 heat pump
cycle By Neeraj Agrawal and Souvik Bhattacharyya Energy Conv & Mgmt 49(11), 2979-2985
(2008)

115. Performance and Optimum Dimensions of Flat Fins for Tube-and-Fin Heat Exchangers: A
available online (2008)

116. Prediction of contact temperature rise between rough sliding bodies: An artificial neural network
approach By Sudipto Ray and S.K. Roy Chowdhury Wear Volume 266,1029-1038 (2009)

117. Prediction of polymer wear - an analytical model and experimental validation By S. K. Roy
Chowdhury and Prasun Chakraborti Tribology Transactions 51: 796-809 (2008)

118. Processing and Characterisation of Thermally Sprayed Ti-Cr-Si-O Coatings By P P.
Bandyopadhyay, Mousab Hadad, Christian Jaeggi and St Siegmann, Surface and Coating
Technology 203;35-45 (2008)

119. Rapid Macromolecular Synthesis in Microfluidic Channels with Oscillating Flaps By R. A.
Lambert, S. Das, M. Madou, S. Chakraborty, R. H. Rangel International Journal of Heat and Mass
Transfer vol51, 4367-4378 (2008)

120. Reply to the Comment on “A generalized langevin formalism of complete DNA melting transition
By T. Das and S. Chakraborty Europhysics Letters accepted (0)

121. Review of oil water core annular flow By Ghosh S. Mondal , T.K., Das G., Das P.K. Renewable
and Sustainable Energy Reviews Available online (2009)

122. Rewetting analysis of hot surfaces with internal heat source by the heat balance integral method

123. Rewetting analysis of hot surfaces with internal heat source by the heat balance integral method

124. Semi-Analytical Solution of the Extended Graetz Problem for Combined Electroosmotically and
Pressure driven Microchannel Flows with Step-change in Wall Temperature By A. Sharma and S.

125. Sensor based weld bead geometry prediction in pulsed metal inert gas welding process through

126. Smart Damping of Nonlinear Vibrations of Functionally Graded Laminated Composite Plates
Using Piezoelectric Fiber Reinforced Composite By S. Panda and M. C. Ray Journal of Sound
and Vibration to appear (2009)

127. Smart Damping of Nonlinear Vibrations of Functionally Graded Plates Using Vertically/Obliquely
Reinforced 1-3 Piezoelectric Composite By S. Panda and M. C. Ray AIAA Journal to appear (2009)


130. Squeeze-flow electroosmotic pumping between charged parallel plates by S. Talapatra and S. Chakraborty International Journal of Fluid Mechanics Research accepted (0)


132. Steady state analysis of CO2 based natural circulation loops with end heat exchangers by Kiran Kumar K, Ram Gopal, M. Applied Thermal Engineering In Press (0)


143. Thermal transport in fluids containing homogeneous microstructures by D. Chakraborty, S. Chakraborty International Journal of Thermal Sciences in press (0)


147. Thermoelastic effects on mixed mode delamination growth emanating from circular holes in laminated FRP composites By Babu, P. R. and Pradhan, B. Composite Structures 82(1), pp. 50-60. (2008)


Seminars / Workshops / Conferences :


DEPARTMENT OF METALLURGICAL & MATERIALS ENGINEERING

RESEARCH PUBLICATIONS

Journals:

10. Application of Genetic Algorithm (GA) to estimate the rate parameters for solid state reduction of iron ore in presence of graphite By Golap Md. Chowdhury, Gour G. Roy Computational Materials Science 45(1), 176-180 (2009)


22. DFT based calculation on solid electrolyte formation mechanism on graphite anode in presence of ethylene and propylene carbonate, manuscript Submitted By Kundu T.K., A. Patra., Chemical Physics Letter (0)


25. Direct Laser Cladding of SiC Dispersed AISI 316L Stainless Steel By J. Dutta Majumdar, Ajit Kumar and Lin Li Tribology International 42 750-753 (2009)


38. Genetic algorithms based multi-objective optimization of an iron making rotary kiln, By N. Chakraborti, D Mohanty and A Chandra Computational Materials Science 45, 181 (2009)


46. Laser and Plasma Assisted Surface Engineering of Steel By J. Dutta Majumdar and I. Manna Steel Tech 2, October issue (1008)


82. Short fatigue crack growth behaviour in ferrite-bainite dual-phase steels By Ashok kumar, Shiv Brat Singh and Kalyan Kumar Ray ISIJ International 48 (9), 1285-1292 (2008)


91. Studies on laser surface melting of Al-11% Si alloy By A. Biswas, B. L. Mordike, I. Manna, J. Dutta Majumdar Lasers in Engineering 18, 95-105 (2008)


Seminars / Workshops / Conferences:


2. Current Problems and Prospects of Magnesium Metal base Systems as Storage Medium for Hydrogen, By B. K. Dhindaw, Indo-French Workshop on Metal Hydrides, Jaipur, (0)


12. Magnetic and transport properties of chemically synthesized (La1-xEux)0.67Ca0.33MnO3 (x = 0.1) nanoplatelets., By D. De, S. Ram, and S. K. Roy, International conference on Magnetic Materials & Their applications for 21st Century, NPL, New Delhi, (2008)


ANNUAL REPORT
2008-2009
<table>
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<tr>
<th></th>
<th>Title</th>
<th>Authors</th>
<th>Conference/Event</th>
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</tr>
</thead>
</table>
RESEARCH PUBLICATIONS

Journals:


37. Study of advanced global and local thresholding techniques to rock images for fragment determination By Dr D Chakravarty, S K Khatua, S K Ghosh Mining Engineering Journal of the Institution of Engineers 167, pp 244-250 (2008)


Seminars / Workshops / Conferences :
1. A Linear Goal PRogramming Model for Project Selection of Indian Coal Mines, By Barik, SK; Biswal, MP; Chakravarty, D, 41st annual convention, Tirupati, (2008)


18. GPS measured Land subsidence records, By D Chakravarty, Conference on Emerging Trends in Mining and Allied Industries, Department of Mining Engineering,NIT RKL, (2008)


22. Numerical Analysis of the Interaction between Hydraulic Support and Surrounding Rock Strata at Indian Longwall Faces, By Verma A.K. and D. Deb, 12th Int. Conf. of International Association for Computer Methods and Advances in Geomechanics (IACMAG), 1-6 Oct, , Goa, India, (2008)


Journals:


Seminars / Workshops / Conferences :


Journals:


20. Effect of nanometric grain size on electronic-transport, magneto-transport and magnetic properties of La0.7Ba0.3MnO3 nanoparticles By S. K. Mandal, T. K. Nath and V. V. Rao *Journal of Physics: Condensed Matter* 20, 385203/1 - 12 (2008)


39. Generation of Entanglement Between Spin of an Electron and Polarization of a Photon By N.
   Chandra and R. Ghosh Quantum Information and Computation 09, 36-61 (2009)
40. Growth and photoluminescence characteristics of ZnO tripods By S. Mandal, A. Dhar, S. K. Ray,
41. Impact of 3DVAR assimilation of Doppler Weather Radar wind data observation for the prediction
   of a tropical cyclone By M. Govindankutty, A. Chandrasekar, and Devendra Pradhan International
   Journal of Remote Sensing (accepted for publication) (2009)
42. Impact of Land Surface Representation and Surface Data Assimilation on the Simulation of an
   Off-Shore Trough over the Arabian Sea By Vinodkumar, A.Chandrasekar, Dev Niyogi and K.
43. Impedance spectroscopy analysis of (Pb₀.₉₃Gd₀.₀₇)(Sn₀.₄₅Tι₀.₅₅)₁₀.₉₈₂₅ O₃ ferroelectrics. By
   Das, B. P.; Choudhary, R. N. P.; Mahapatra, P. K. Indian Journal of Engineering & Materials
44. Impedance spectroscopy of (Na₀.₅Bi₀.₅)(Zr₀.₂₅Tι₀.₇₅)O₃ lead-free ceramic By Lily Kumari, K.,
45. In vitro evaluation of UV opacity potential of Aloe vera L. gel from different germplasms By M.
46. Inner-Shell Ionization of Rotating Linear Molecules In the Presence of Spin-Dependent
   Interactions: Entanglement Between the Spins of a Photoelectron and an Auger Electron By R.
47. Interfacial and electrical properties of SrBi₂Ta₂O₉/ZrO₂/Si heterostructures for ferroelectric
48. Low temperature ferroelectric behaviour of PVDF based composites. By Shukla, Namrata;
   Shukla, Archana; Thakur, Awalendra K.; Choudhary, R. N. P Indian Journal of Engineering &
49. Magnetic and electrical properties of oxygen stabilized nickel nanofibers prepared by borohydride
   reduction method By V. Srinivas, S.K. Banik, Bhaskarjyoti Bodo, Debjani Karmakar and T. V.
50. Magnetic and optical properties of Zn₁₋ₓFeₓO (x = 0.05 and 0.10) diluted magnetic
   semiconducting nanoparticle By S. K. Mondal, T. K. Nath and D. Karmakar Philosophical
51. Magnetic Circular Dichroism Spectroscopy in Epitaxial La₀.₇Sr₀.₃MnO₃ Thin Films By T. K.
52. Magnetic semiconducting diode of p-Ge₁₋ₓMnx/n-Ge layers on silicon substrate By S. Majumdar,
53. Magnetic, Electronic- and Magneto-Transport Properties of Nanocrystalline Nd₀.₆Sr₀.₄MnO₃ Manganites By Sourav Kundu and Tapan Kumar Nath Advanced Materials Research (Special
54. Magnetohydrodynamic turbulence in supernova remnants By Roy, Nirupam; Bharadwaj,
   Somnath; Dutta, Prasun; Chengalur, Jayaram N. Monthly Notices of the Royal Astronomical
   Society 393L, 26 (2009)
55. Magnetoresistance in hot press Co-C granular compounds By Guruprasad Mandal, V.V.Rao,
   (2008)
57. Memory Characteristics of Nickel Nanocrystals with High-k Dielectric Tunneling Barriers By D.

58. Microstructural, magnetic, magneto-transport and complex impedance spectroscopy of x
La_{0.7}Sr_{0.3}MnO_3 \times ErMnO_3_3 \times \text{multiferroic} \ (0 < x < 1) \text{ composites} \ By \ P. Dey, T. K. Nath, S.

59. Microstructure and magnetic properties of melt-spun Cu0.95Co0.05 granular alloy By S.
B : Condensed Matter Physics* In Print (2009)

60. Microstructure and magnetic properties of nanocrystalline Fe-Mn-Zr alloy By A. Perumal, V.
(2008)

61. Model for modulated and chaotic waves in zero-Prandtl-number rotating convection By Alaka Das


63. Nonlinearly coupled, gain-switched Nd:YAG second harmonic laser with variable pulse width By

64. Nuclear deformation and neutrinoless double-beta decay 94,96Zr,98,100Mo,104Ru,
110Pd,128,130Te and 150Nd nuclei in mass mechanism By K. Chaturvedi, R. Chandra, P. K.

65. On the question of percolation threshold in polyvinyledenefluoride/nanocrystalline nickel composites

66. Pairing in disordered s-wave superconductors and the effect of their coupling By B. Chatterjee
and A. Taraphder *Solid State Communications* 148, 582 (2008)

67. Particle creation in the presence of a warped extra dimension By S. Ghosh and S. Kar *Journal of
Cosmology and Astroparticle Physics* 0808,001 (2008)

68. Phase Inhomogeneity and Electrical Characteristics of Nickel Silicide Schottky Contacts Formed

69. Phase transition in Sr modified Pb(Mn1/2Nb1/2)O3 system. By Sen, Shrabane; Choudhary, R. N. P.

70. Phonon assisted photoluminscence and surface optical mode of Zn embeded ZnO nano
(2009)

71. Preparation and Analysis of Single-Phase Pb(Mn1/2Nb1/2)O3 By R. K. Mishra, R. N. P.

72. Presence of dielectric anomaly and spontaneous magnetization in Pb(Mn1/2Nb1/2)O3. By Mishra
R. K., Choudhary R. N. P., Banerjee A. *Journal of Physics: Condensed Matter* 20,345212/1-
345212/4 (2008)

73. Quantum interference effects and magnetic scattering in the electrical resistivity of Ni
nanocrystallites in TiN matrix By P. Khatua, T. K. Nath, Mitali Banerjee and A. K. Majumdar

74. Relativistic ab initio spectroscopy study of forbidden lines of singly ionized Zn By G. Dixit, B. K.

75. Reply to Comments on "Theoretical spectroscopic studies of the atomic transitions and life times
of low-lying states of Ti IV" By Gopal Dixit and Sonjoy Majumder *Journal of Physics B* 42 (2009)

76. Role of Salt Concentration on Conductivity Optimization and Structural Phase Separation in
a Solid Polymer Electrolyte based on PMMALiClO4. By Namrata Shukla and Awalendra K. Thakur
*ionics, Available Online (0)


82. Simulating the impact of HI fluctuations on matched filter search for ionized bubbles in redshifted 21-cm maps By Datta, Kanan K.; Majumdar, Suman; Bharadwaj, Somnath; Choudhury, T. Roy Monthly Notices of the Royal Astronomical Society 291, 1900 (2008)


106. Temperature dependence of phonon modes in nanocrystalline La0.67Ca0.33MnO3 as observed by infrared spectroscopy By T.N. sairam, P. Dey, G. Mangamma, T. K. Nath and C.S. Sundar *Journal of Nanoscience and Nanotechnology* in press (2009)


114. The impacts of indirect soil moisture assimilation and direct surface temperature and humidity assimilation on a mesoscale model simulation of a Indian monsoon depression By Vinodkumar, A.Chandrasekar, K. Alapaty and Dev Niyogi *Journal of Applied Meteorology and Climatology* 47, 1393-1412. (2008)

Seminars / Workshops / Conferences:
3. Correlated electrons through Hubbard model (Invited), By A. Taraphder, National workshop on correlated electrons and bosons, Goa University, (2009)
9. Disappearance of Charge Ordering and Emergence of Ferromagnetism in Nanoparticles of La0.5Ca0.5MnO3, By S. K. Giri and T. K. Nath, Magnetic Nanomaterials and Applications (MNTA - 2009), SN Bose Centr for Basic Sciences,Kolkata, (2008)
12. Effect of grain size on magnetic electronic and magneto transport properties of Ndo.8sr0.2Mno3, By S. Kundu and T. K. Nath, 20th Annual General Meeting, Material Research Society of India, Saha Institute of Nuclear Physics, Kolkata, (2009)


16. Effect of nanometric grain size on electronic and magneto transport properties of Nd0.7-xGdxSr0.3 MnO3 (x=0,0.1,0.2 and 0.3), By Sorav Kundu and Tapan Kumar Nath, National Seminar on Advanced Nanomaterials and its Applications, Jadavpur University, Kolkata, (2008)

17. Effect of Nd substitution on impedance behavior of ferroelectric Pb1-xNd(xFe0.5Nb0.5)1-x/4O3., By N.Kumar, M.P.K Sahoo, R.N.P Choudhary, 15th National seminar on ferroelectrics and dielectrics, Pithia, punjab, (2008)


22. Effect of Ti doping on structural and electrical properties of Ba(Fe0.5Nb0.5)O3 ceramics., By Sudhir Kumar, Banarji Behera, R.N.P Choudhary, International Workshop On Mesoscopic, Nanoscopic and Microscopic Materials., Bhubaneswar, (2008)

23. Effect of vanadium substitution structural and electrical properties of Pb(Fe0.5Nb0.5)O3 ceramics., By Subhadarsani sahoo, R.N.P Choudhary, B.K Mathur, International Workshop On Mesoscopic, Nanoscopic and Microscopic Materials., Bhubaneswar, (2008)


29. Ferromagnetic metallic state beyond Mott limit (Invited), By A. Taraphder, Correlated systems conference, JNU, (2009)

31. First observation of highly deformed band in 125I, By Purnima Singh et al., DAE-BRNS Symp. of Nuclear Physics, Roorkee, (2008)


33. Generation and Characterization in a Laboratory of C(2)*C(d) States with Negative or Positive Partial Transpose Possessing Free or Bound Entanglement, By N. Chandra and S. Parida, 8th Asian Conference on Quantum Information Science, KIAS, Seoul, Korea, (2008)


41. Large low field magnetoresistance in La0.7-xgdxSr0.3MnO3 (00.3) bulk and nanometric CMR manganites, By S. K. Giri and T. K. Nath, 20th Annual General Meeting, Material Research Society of India, Saha Institute ofNuclear Physics,Kolkata, (2009)

42. Laser deposition of La1-xSr0.3MnO3 thin films for multiferroic memory devices, By S. Maliy, A. Dhar, S. K. Ray and D. Bhattacharya, NADPA-2008, IIT Roorkee, India, (2008)


47. Monte Carlo simulation of HPGe detector, By Ranjita andal et al, DAE-BRNS Symp. of Nuclear Physics, Roorkee, (2008)

49. Nano dimension effect on magnetic and electrical properties of Pr0.8Sr0.2MnO3 ferromagnetic insulating manganite., By S. Mandal, A. Taraphder and T. K. Nath, NADPA - 2008, IIT Roorkee, (2008)


53. On the measurement of imaginary part of second order optical nonlinearity, By P K Datta and S M Saltiel, Indo-Japan Workshop, Tokyo Institute of Technology, Tokyo, (2008)


55. Optical bistability in a vertical cavity semiconductor saturable absorber and its possible application as a passive communication component, By P K Datta, C Porzi, M.Guina1, L. Mishra2, A. Bogoni and L. Poti, IConTOP, Calcutta University, (2009)

56. Optical hysterisis behaviour of a vertical cavity semiconductor saturable absorber and its possible application as a passive communication component, By P K Datta, C Porzi, M.Guina1, L. Mishra2, A. Bogoni and L. Poti, Indo-Japan Workshop, Jadavpur University, Kolkata, (2008)


63. Spin-Current Induced Switching in Nano Spin Valve Pillars, By S. Murugesh, M. Lakshmanan, National conference on Nonlinear Systems and Dynamics-2009, Saha Institute of Nuclear Physics., (0)

64. Split-step bidirectional model for predicting the steady-state characteristics of a bulk semiconductor optical amplifier, By Hussain, M Presi, G Contestabile, P K Datta and E Ciaramella, Indo-Japan Research Collaboration Forum Meeting, Tokyo Institute of Technology, Tokyo, (2008)

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
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<td>68</td>
<td>Studies of dielectric and electrical properties of Bi2TiO5 ceramics</td>
<td>By Yogendra kumar yadav, R.N.P choudhary</td>
<td>15th National seminar on ferroelectrics and dielectrics</td>
<td>Patiala, Punjab, (2008)</td>
</tr>
<tr>
<td>69</td>
<td>Studies on Structural and Storage Characteristics of LiFe1/2Co1/2PO4 as a Cathode</td>
<td>By D. K. Tiwari and Awalendra K. Thakur</td>
<td>11th Asian Conference on Solid State Ionics</td>
<td>Bharathiar University, Coimbatore, (2008)</td>
</tr>
<tr>
<td>70</td>
<td>Study of effect of Ce and Mn substitution on structural, dielectric and electrical properties of Pb(Zr0.65Ti0.35)O3 ceramics</td>
<td>By Balgovind Tiwari, R.N.P Choudhary</td>
<td>International Workshop On Mesoscopic, Nanoscopic and Microscopic Materials</td>
<td>Bhubaneswar, (2008)</td>
</tr>
<tr>
<td>72</td>
<td>The effective Einstein equations on the brane: a review</td>
<td>By S. Kar</td>
<td>Physics of warped extra dimensions</td>
<td>IIT Kharagpur, (2009)</td>
</tr>
<tr>
<td>73</td>
<td>The impact of assimilation of MODIS observations using WRF-VAR for the prediction of a monsoon depression during September2006</td>
<td>By M Govindankutty and A Chandrasekar</td>
<td>International Conference on &quot;Progress in Weather and Climate Modeling over the Indian Region, NCMRWF, Noida, (2008)</td>
<td></td>
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RESEARCH PUBLICATIONS

Journals:


CENTRE FOR OCEANS, RIVERS, ATMOSPHERE AND LAND SCIENCES

RESEARCH PUBLICATIONS

Journals:


Seminars / Workshops / Conferences:


3. Interannual Variability of Heat Content in Bay of Bengal, By Bishnu Kumar and Arun Chakraborty, *Ocean Society of India Conference (OSICON 09)*, Andhra University, Visakhapatnam, (2009)


6. Seasonal Variations of Dissolved Oxygen in Bay-of-Bengal (This paper adjudged as the Third best Student Poster at OSICON 09 and received Certificate and Momento), By Saswati Deb and Arun Chakraborty, Ocean Society of India Conference (OSICON 09), Andhra University, Visakhapatnam, (2009)


8. Upwelling and Downwelling Features in Bay-of-Bengal, By Sourav Sil and Arun Chakraborty, Ocean Society of India Conference (OSICON 09), Andhra University, Visakhapatnam, (2009)


RESEARCH PUBLICATIONS

Journals:


2. Angular dependence of spin-wave resonance and relaxation in half-metallic Sr2FeMoO6 films By Tetiana Nosach, Gabriella Mullady, Steven Greenbaum, Adyam Venimadhav, Qi Li, Yuhang Ren J. Appl. Phys 103 07E311 (2008)

3. Electronic Transport in Heusler-type Fe2VAL1-x (M=Bi, In, Si) alloys By M. Vasundhara, V. Srinivas, V. V. Rao Physical Review B 78, 064401 (2008)


11. Structural and thermoelectric properties of of Bi2Sr2Co2Oy thin films on LaAlO3 (100) and fused silica substrates By 1. Shufang Wang, A. Venimadhav, Shengming Guo, Ke Chen, Qi Li, A. Soukiasian, Darrell G. Schlim, Michael B. Katz, X. Q. Pan, Winnie Wong-Ng, Mark D. Vaudin, and X. X. Xi, Appl. Phys. Lett 94 022110 (2009)

12. Time-resolved optical studies of spin and quasiparticle dynamics in colossal magnetoresistance materials: La0.67Ca0.33MnO3, La0.67Sr0.33MnO3 and Sr2FeMoO6 By Y.H. Ren, M. Ebrahim, H.B. Zhao, G. Läupke, Z.A. Xu, V. Adyam, Qi Li Phy. rev. B 78 014408 (2008)

Seminars / Workshops / Conferences:


RESEARCH PUBLICATIONS

Journals:

1. A comparative study of the synthesis of carbon nanotubes using Ni and Fe as catalyst
   By J. Sengupta, S. K. Panda and C. Jacob
   *Advanced Materials Research*
   Accepted (2008)

2. Amine functional chloroaniline acetaldehyde condensate-modified epoxy networks
   By T. Maity, B. C. Samanta and A. K. Banthia
   110(6), 3717-26 (2008)

3. Annealing effect of evaporated Mn thin films on GaAs
   By A. Chanda, H. P. Lenka, C. Jacob
   *Journal of Superconductivity and Novel Magnetism*
   22(4), 401 (2009)

4. Carbon nanotube synthesis from propane decomposition on a pre-treate Ni overlayer
   By J. Sengupta, S. K. Panda and C. Jacob
   *Bulletin of Materials Science*
   Accepted (2008)

5. Catalytic synthesis of ZnO nanorods on patterned silicon wafer - an optimum material for gas sensor
   By S. K. Panda and C. Jacob
   *Bulletin of Materials Science*
   Accepted (2008)

6. Characteristics of Al/SrBi2Ta2O9/HfO2/Si structure using HfO2 as buffer layer for ferroelectric memory application
   By A. Roy, A. Dhar, D. Bhattacharya and S. K. Ray
   41, 095408 (2008)

7. Characterization of sulfuric acid doped conducting poly-(m-aminophenol)
   By Pradip Kar, Narayan C. Pradhan and Basudam Adhikari,
   *Journal of Polymer Materials*
   28(3)295-304 (2008)

8. Controlled synthesis of lead telluride nanocrystals
   By B. Paul and P. Banerji
   *Advanced Materials Research*
   67, 251 (2009)

9. Development of Core-Shell structure aided by SiC-coated MWNT in ABS/LCP
   By S. Bose, M. Mukherjee, K. Pal, N. Ganesh and C. K. Das
   *Polymers for Advance Technologies*
   In Press (2009)

10. Development of NBR-Nanoclay Composites with Epoxidized natural rubber as Compatibilizer
   By R. Rajasekar, Kaushik Pal, Gert Heinrich, Amit Das, C.K. Das
   *Materials & Design*
   In press (2009)

11. Direct fluorination of Twaron fiber and preparation of PP/Twaron fiber composites using MA-g-PP as a compatibilizer
    By J. Maity, C. Jacob S. Alam and R. P. Singh
    *Journal of Composite Materials*
    DOI available (2009)

12. Effect of clay platelet dispersion as affected by the manufacturing techniques on thermal and mechanical properties of PMMA-clay nanocomposites
    By A. K. Dhibar, S. Mallick, T. Rath and B. B. Khatua
    *Journal of Applied Polymer Science*
    Accepted (2009)

13. Effect of Compatibilizers on the Morphological Properties of ABS and LCP Blends
    By T. Das, K. Pal, B. Adhikari and C. K. Das
    *Research Letters in Materials Science*

14. Effect of epoxidized natural rubber in high styrene rubber - nanoclay compounds in presence and absence of carbon black
    By R. Rajasekar, K. Pal and C. K. Das
    *International Journal of Polymer and Technologies*
    accepted (0)

15. Effect of heat treatment of starch on the properties of starch hydrogels
    By K. Pal, A. K. Banthia and D. K. Majumdar
    *Materials Letters*

16. Effect of Li incorporation on the structural and optical properties of ZnO
    By S. Majumdar and P. Banerji
    *Superlattices and Microstructures* 45, 583 (2009)

17. Effect of Modified MWCNT and Polyphosphazene Elastomer on the Properties of PES/LCP Blend System
    By S. Bose, M. Mukherjee, C. K. Das and A. K. Saxena
    *Journal of Nanoscience and Nanotechnology* 9, 1-10 (2009)

18. Electrical and optical properties of chemical solution deposited barium hafnate titanate thin films
    By Sandip Halder, Theodor Schneller, Rainer Waser and S.B. Majumder
28. In-Situ reinforced of Poly (butylene terephthalate) and Butyl rubber by liquid crystalline polymer (LCP). By S. Kumar, T. Rath, R. N. Mahaling and C. K. Das Polymer Composites In Press (0)
31. Investigations on 0.5Li(Ni0.8Co0.15Zr0.05)O20.5Li(Li1/3Mn2/3)O2 cathode for Li rechargeable battery By S. Sivaprakash, S.B. Majumder, and R.S. Katiyar Journal of the Electrochemical Society 156 A328 (2009)


43. Patterned Si wafer for selective beta-SiC Nanowire growth By S. K. Panda and C. Jacob Advanced Materials Research Accepted (2008)


53. Study of high energy Mn+1 implantation in GaAs By A. Chanda, H. P. Lenka, C. Jacob Applied Physics A 94(1), 89 (2009)


74. Understanding the role of Zr4+ cation in improving the cycleability of LiNi0.8Co0.15Zr0.05O2 cathodes for Li ion rechargeable batteries By S. Sivaprakash and S.B. Majumder Journal of Alloy and Compounds in press) (2009)


77. ZnO nanorod growth with silver catalyst - effect of annealing By S. K. Panda and C. Jacob 

Seminars / Workshops / Conferences:


7. CrO2 modified c-ZrO2 of ferromagnetic nanocomposites, By A. Sengupta and S. Ram, International seminar on high temperature materials, Banaras Hindu University, (2009)


18. Electron phonon coupling assisted emission in single magnetic \( \text{La}_{0.67}\text{Ca}_{0.33}\text{MnO}_3 \) domains of thin nanoplates, By D. De, S. Ram, S. K. Roy, and A. Banerjee, *2nd International conference on Advanced nanomaterials*, Aveiro, Portugal, (2008)


29. Magnetic and transport properties of chemically synthesized (La\(_{1-x}\)Eu\(_x\))\(_{0.67}\)Ca\(_{0.33}\)MnO\(_3\) \((x = 0.1)\) nanoplatelets, By D. De, S. Ram, and S. K. Roy, *International conference on Magnetic materials and their applications for 21st century*, NPL, New Delhi, (2008)


58. Synthesis of hybrid ceramic nanocomposites for photonics”, By S. Ram, *Colloquium for Humboldt fellows and awardees in the engineering sciences in India*, Huyatt Regency Hotel, Delhi, (2008)

59. Synthesis of nanocrystalline La0.8Pb0.2(Fe0.8Co0.2) O3 through green chemistry for detecting toxic gases, By K. K. Bhagav, S. B. Majumder, and S. Ram, *Emerging trends in laser & spectroscopy and applications*, Allahabad Hindu University, (2009)


62. Synthesis of single domain La0.67Ca0.33MnO3 magnetic nanoplates of CMR properties, By D. De, S. Ram, and S. K. Roy, *46th NMD meeting*, Noida, India, (2008)


RELIABILITY ENGINEERING CENTRE

RESEARCH PUBLICATIONS

Journals:

1. Metrics Based Early Software Reliability Prediction By K. Saravana Kumar, R. B. Misra
   International Journal on Advances in Theory, Applications and Practices in Quality and Reliability
   (2009)

2. A Markov System Dynamics (MSD) Approach for Reliability Analysis, By Rao MS, Naikan VNA
   International Journal of Communications in Dependability and Quality
   11, No 3, pp. 17-30 (2009)

3. A Novel Approach of Input variable selection for ANN Based Long Term Load Forecasting By

4. A Proportional Hazard Segmented model for maintained systems By Syamsundar A, V.N.A.
   Naikan
   IMech Journal of Risk and Reliability
   222, 4, 643-654 (2008)

5. An Efficient Approach to Enumerate SCG arising in CRNR Evaluation By R Mishra and SK
   Chaturvedi
   International Journal of Quality Technology and Quantitative Management
   6(1), 43-54 (2009)

6. An Optimal Maintenance Policy for Compressor of a Gas Turbine Power Plant By P. N. S. Rao,
   V.N.a. Naikan
   ASME Journal for Engineering for Gas Turbines and Power
   130, 0218011-0218015 (2008)

7. Comments on: An Improved Algorithm for Connectivity Analysis of Distribution Networks By
   Int. Journal of Reliability Engineering and System Safety
   94(3), 783 (2009)

   Goyal
   International Journal of Reliability, Quality and Safety Engineering

   International Journal of Performance Engineering
   5(3), 251-258 (2009)

10. Hierarchical Segmented Point Process Models with multiple change points for Maintained
    Systems By Syamsundar A, V.N.A. Naikan
    International Journal of Reliability Quality and Safety Engineering

11. Maintenance of Industrial Equipment: Degree of Certainty with Fuzzy Modelling Using Predictive
    Maintenance By Kumar Vijay Edwin, S. K. Chaturvedi and A.W. Deshpande
    INTERNATIONAL JOURNAL OF RELIABILITY AND QUALITY MANAGEMENT
    26(2), 196-211 (2009)

12. Mathematical Modeling of Maintained Systems using Point Processes By Syamsundar A and
    V.N.A. Naikan

13. Modeling the economics of software testing to assure desired reliability By Rani, R. B. Misra
    special issue on Software Reliability Techniques and Applications (2009)

14. Modelling of maintained systems using segmented point processes By Syamsundar A., V.N.A.
    Naikan
    Advances in Performance and Safety of Complex Systems
    pp412-419 (2008)

15. Network Reliability Evaluation with Changes in Layout By N.K. Goyal
    International Journal of Performance Engineering
    Accepted (2009)

16. Prediction of Fault Prone Modules using Fuzzy Decision Tree Induction By K. Saravana Kumar,
    R. B. Misra
    Software Quality Journal (0)

17. Reliability Bounds Prediction of COTS Component Based Software Application By Tirthankar
    Gayan, R. B. Misra
    International Journal of Computer Science and Network Security
    Vol. 8, pp 219-228 (2008)

    Approach By Kumar Edwin and SK Chaturvedi
    Journal of Uncertain System


Seminars / Workshops / Conferences :


5. Hierarchical Segmented Point Process Models with multiple change points for Maintained Systems, By A. Syamsundar, V.N.A. Naikan, International Conference on Present Practices and Future Trends in Quality and Reliability (ICONQR 08), Kolkata, (0)

RESEARCH PUBLICATIONS

Journals:

3. Atom Transfer Radical Polymerization of Hexyl Acrylate; Preparation of All-Acrylate Block Copolymer By H. Datta & Nikhil K. Singha Journal Polymer Science; Part A. Polymer Chemistry 46, 3499-3511 (2008)
32. Improvement of conductivity of electrochemically synthesized polyaniline By Sambhu Bhadra; Santanu Chattopadhyay; Nikhil K. Singha; Dipak Khastgir Journal of Applied Polymer Science 108(1), 57-64 (2008)
35. Influence of Different Nanofillers and Their Dispersion Methods on Properties of Natural Rubber Nanocomposites By M. Bhattacharya, M. Maiti and A. K. Bhowmick Rubber Chemistry and Technology, ACS (USA), September-October (2008)


41. Insights into montmorillonite nanoclay based ex-situ nanocomposites from SEBS and modified SEBS by small angle X-ray scattering and modulated DSC studies By A. Ganguly, A. K. Bhowmick, Y. Li Macromolecules, 41(16), 6246-6253 (2008)

42. Low hardness and high strength thermoplastic elastomers from ethylene-butene copolymers and low density polyethylene By S. Tembhekar, M. Maiti, J. J. George, A. Biswas and A. K. Bhowmick Rubber Chemistry and Technology 81, 60 -76 (2008)


44. Mechanical properties and fracture behaviour of short PET fibre waste polyethylene composites By Sukanya Satpathy, Jobin Jose, Ahin Nag and Golok B. Nando Jl. of Reinforced Plastics & Composites 27, 9, 967 - 984 (2008)


67. Synthesis and characterization of chemically crosslinked styrene-butadiene rubber nanogels and their effect on various properties of the rubber By S. Mitra, S. Chattopadhyay, A. K. Bhowmick Rubber Chemistry and Technology 81, 842 (2008)


73. Thermal degradation of elastomer based nanocomposites By S. Sadhu, R.S. Dey, A. K. Bhowmick Polymers & Polymer Composites 16(5), 283-293 (2008)


Seminars / Workshops / Conferences:


7. Correlation of vulcanization and viscoelastic properties of nanocomposites based on natural rubber and different nanofillers, with molecular and supramolecular structure, By Mithun Bhattacharya, Anil K. Bhowmick, Technical Meeting - American Chemical Society, Rubber Division, 174th, Louisville, KY, United States, (2008)


ANNUAL REPORT
2008-2009


29. Electron beam modified Ethylene Methyl Acrylate (EMA) for cable sheathing application, By Tapan Kumar Chaki and Bhajaran Padhan, 25th Annual meeting of the Polymer Processing Society, Goa, India, (0)


35. High Temperature Resistant Tailor-made Poly(meth)acrylate by a Controlled Radical Polymerization, By A. Amalin Kavitha, Nikhil K. Singh, IIT Delhi, New Delhi, (2008)


44. Mechanical and rheological behavior of peroxide cured polypropylene (PP)/ethylene octene copolymer (EOC) thermoplastic vulcanizates (TPVs), By R. R. Babu; N. K. Singh; K. Naskar, International Conference on Advances in Polymer Technology, University of Science & Technology,Kochi, (2008)
45. Mechanical, Thermal and Rheological Characterization of Electron Beam Irradiated Nanosilica Filled High Vinyl Styrene Butadiene Styrene Block Copolymer, By S. Datta; N. K. Singha; K. Naskar, 5th International Rubber Exhibition Conference and Buyer Seller Meet, Hyatt Regency, Kolkata, (2009)


52. Polymers - The Contemporary Issues and Recent Developments, By Golok B Nando, Advances in Chemical Engineering, Thapar University, Patiala, (2009)


71. Transition metal catalyzed controlled radical copolymerization of Glycidyl methacrylate (GMA) and 2- Ethylhexyl acrylate (EHA), By Dhruba Haloi, Nikhil K. Singha, *1th CRSI National Symposium in Chemistry (NSC)*, National Chemical Laboratory (NCL), Pune, (2009)

RESEARCH PUBLICATIONS

Journals :


Seminars / Workshops / Conferences :


RAJIV GANDHI SCHOOL OF INTELLECTUAL PROPERTY LAW

RESEARCH PUBLICATIONS

Journals :


Seminars / Workshops / Conferences :

1. Nanomaterials and effects on biological systems: Development of effective regulatory norms., By Dr. M.Padmavati, Dr. T.K.Bandyopadhyay, National Conference on Nanotechnology and Regulatory Issues, Kolkata, (0)
2. Regulatory Framework for Biotecnology, By KD Raju, National Conference on Science and Technology, Teri University, New Delhi, (2008)


33. System Testing for Object-Oriented System with Test Case Prioritization By Debashis Kundu, Monalisa Sarma, Debasish Samanta, Rajib Mall *Software, Testing Verification and Reliability (STVR)* Vol. 56, No. 8 (2009)


Seminars / Workshops / Conferences:


23. Neural Network Models for Speech Recognition in Mobile Environments, By Anil Kumar Vuppala and K. Sreenivasa Rao, 13th Int. Conf. on Cognitive and Neural systems, Boston, MA, USA, (2009)


30. Significance of Word and Syllable level Information for Expressive speech processing, By K. Sreenivasa Rao, S. R. M. Prasanna and T. Vidya Sagar, 7th International Conference on Advances in Pattern Recognition, ISI, Kolkata, India., (2009)


A two-stage mechanism for registration and classification of ECG using Gaussian Mixture Model


Control of Diabetes and dyslipidemia by a combination of Flaxseed and Garlic or Flaxseed and Vitamin A. By Mitra Analava & D. Bhattacharya. IJP D Vol. 5, No. 3 (2009)


23. Relationship of IQ with glucose and lipid level By Mitra A, Thakur G. Journal of Clinical and Diagnostic Research October 5(1); 3 (2008)


Seminars / Workshops / Conferences:


4. An integrated approach and molecular imaging for wound repair through tissue regeneration, By J. Chatterjee, S. Dhara and A. Barui, New Biomedical Devices in Indo-Australian Workshop Meeting, New Delhi, (2009)

5. An integrated approach and molecular imaging for wound repair through tissue regeneration, By J. Chatterjee, S. Dhara and A. Barui, Indo-Australian discussion Meeting on new biomedical devices, New Delhi, (2009)


23. Upper critical level of ROS in follicular fluid for predicting outcome failure in women with endometriosis undergoing IVF, By S Das, N Babu, SK Jana, R Chattopadhyay, K Chaudhury and BN Chakravarty., 64th Annual Meeting of the Society of the American Society for Reproductive Medicine (ASRM), San Francisco, USA, (2008)

RESEARCH PUBLICATIONS

Journals:

1. An Integrated Framework of Indices for Quality Management in Education: A Faculty Perspective


24. Surprise Marketing By Dey, S. and Datta, B. International Journal of Hospitality and Tourism (0)


Seminars / Workshops / Conferences:


3. Determinants of Post Issue Promoters Holding, By Seshadev Sahoo, Prabina Rajib, Financial Sector: Contemporary Issues, ICFAI Business School, Bhubaneswar, (0)


1. Debashis Mandal and T.K.Bhatacharyya, Implementation of CMOS low power integer-N frequency synthesizer for SOC design, journal of computers, VOL 3, No. 4, pp31-38, Academy publishers. April 2008


Seminars / Workshops / Conferences :


Semiconducting p-Ge1-xMnx/n-Ge Diode, Homi Bhaba Centenary DAE-BRNS National
Conference on Spintronics and Magnetoelectronics Materials and Devices, Puri, India, p. 45,
(2009)
Inhomogeneity and Electrical Characteristics of Nickel Silicide Schottky Contacts Formed on 4H-
25. Ravi Sankar and S. Das, Experimental Analysis of Galvanic Corrosion of Al-Cr-Au Metals Stack
Accelerometer with Enhanced Performance using Electroplated Gold on Proofmass, International
27. Ravi Sankar and S. Das, Squeeze Film Damping and Temperature Drift Analysis of a Silicon
Piezoresistive Acceleration Sensor, International Conference on Active/ Smart Materials, TCE,
Madurai, (2009)
Microstructures in CMOS Compatible Anisotropic Etching., International Conference on Active/
Smart Materials, TCE, Madurai, (2009)
29. S. K. Panda, J. Sengupta and C. Jacob, Beta SiC/SiO2 nanocables synthesized by APCVD
technique, Materials Research Society of India, 20th AGM., Kolkata, (2009)
30. J. Sengupta, S. K. Panda and C. Jacob, Effect of reconstruction of catalyst on the catalytic growth
of partially filled carbon nanotubes by chemical vapour deposition, Materials Research Society of
India, 20th AGM., Kolkata, (2009)
31. S. K. Panda, J. Sengupta and C. Jacob, Hot wall and cold wall CVD grown polycrystalline beta-
SiC - a comparative study, International Conference on High Tech Materials (ICHTM-09), IIT
Kharagpur , (2009)
32. J. Sengupta and C. Jacob, Growth and characterization of carbon nanotubes synthesized by
propane decomposition using CVD, International Conference on High Tech Materials (ICHTM-09),
IIT Kharagpur , (2009)
thickness of MEMS structures by optical transmission”, Communicated to Int. Conf. of fiber optics
and photonics, PHOTONICS-2008, 2008
34. Behavioral Modeling of a CMOS Compatible High Precision MEMS based Electron Tunneling
Accelerometer, IEEE VLSI Design 2008, Hyderabad, 595-600, &nbsp IEEE (2008), Authors : T.K.
Bhattacharyya, A. Ghosh
35. Physical Modeling of a MEMS based electron tunneling accelerometer, IEEE Sensors
Applications Symposium, Atlanta, USA, 101-106, IEEE (2008), Authors : T.K. Bhattacharyya, A.
Ghosh, and D. Paul
36. A Fast settling 100 dB OPAMP in 180 nm CMOS Process with Compensation based optimization,
Chatterjee, and T.K. Bhattacharyya
RESEARCH PUBLICATIONS

Journals:


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CENTRAL LIBRARY

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Journals :

Seminars / Workshops / Conferences :
RESEARCH PUBLICATIONS

Journals:


2. A study on wire deflection of WEDM based on finite difference and new marks method, by S. Patra and A. Mana accepted in In. Ji. Of Manufacturing Tech. research, USA

3. Effects of grain refinement and residual elements on hot tearing in aluminum castings, by D.B. Karmekar, S. Patra. Accepted in Int. Journal of Advance Manufacturing Technology
CENTRE FOR THEORETICAL STUDIES

RESEARCH PUBLICATIONS

Journals:

17. Simulating the impact of HI fluctuations on matched filter search for ionized bubbles in redshifted 21-cm maps by Datta, Kanan K.; Majumdar, Suman; Bharadwaj, Somnath; Choudhury, T. Roy Monthly Notices of the Royal Astronomical Society, 291, 1900 (2008)
35. Impedance spectroscopy of (Na0.5Bi0.5)(Zr0.25Ti0.75)O3 lead-free ceramic by Lily Kumari, K., Pradhan Dillip K., Choudhary R. N. P., Banerjee A. Journal of Materials Science: Materials in Electronics, 459(1-2), 411-417 (2008)
42. Structural and impedance properties of Ca3Nb2O8 ceramics. by Khatri Praveen, Behera Banarji, Choudhary R. N. P. Journal of Physics and Chemistry of Solids, 94(2), 321-327 (2009)
45. Effect of Mn-substitution on structural and dielectric properties of Pb(Zr0.65-xMnxTi0.35)O3 ceramics. by Tiwari, B., Choudhary, R. N. P. Solid State Sciences, 11(1), 219-223. (2009)
51. Impedance spectroscopy analysis of (Pb0.93Gd0.07)(Sn0.45Ti0.55)0.9825 O3 ferroelectrics. by Das, B. P.; Choudhary, R. N. P.; Mahapatra, P. K. Indian Journal of Engineering & Materials Sciences, 15(2), 152-156. (2008)
82. Micro-Scale Thermo-Fluidic Transport in Two Immiscible Liquid Layers Subject to Combined Electro-Osmotic and Pressure-Driven Transport by A. Garai and S. Chakraborty International Journal of Heat and Mass Transfer, in press (0)
83. Capillary Filling in Centrifugally Actuated Microfluidic Devices with Dynamically Evolving Contact Line Motion by D. Chakraborty, R. Gorkin, M. Madou, L. Kulinsky, S. Chakraborty Journal of Applied Physics, accepted (0)
84. Reply to the Comment on "A generalized langevin formalism of complete DNA melting transition by T. Das and S. Chakraborty Europhysics Letters, accepted (0)
94. Thermal transport in fluids containing homogeneous microstructures by D. Chakraborty, S. Chakraborty International Journal of Thermal Sciences, in press (0)
95. DSMC Simulations of gas flows through 180 degree hairpin bends in circular micro-ducts by A. Sarkar, S. Chakraborty International Journal of Micro and Nano Systems, accepted (0)
96. Squeeze-flow electroosmotic pumping between charged parallel plates by S. Talapatra and S. Chakraborty International Journal of Fluid Mechanics Research, accepted (0)

ANNUAL REPORT
2008-2009

101. Modeling of temperature distribution within a dental profile on account of laser irradiation by J. Mukherjee and S. Chakraborty International Journal of Biomedical Engineering and Technology, accepted (0)


KALPANA CHAWLA SPACE TECHNOLOGY CELL

RESEARCH PUBLICATIONS

Journals:


19. M. K. Mandal, V. Vamsi Krishna, S. Sanyal and A. Bhayacharya, "Design of ultra-wideband bandstop filter with three transmission zeros", accepted for publication in Microwave Optical Technology Lett. (MOTL)


37. B. Ghosh, K. Ghosh and C.S. Panda, "Coplanar waveguide feed to the hemispherical DRA", accepted for publication to the IEEE Trans. Antennas and Propagation


Seminars / Workshops / Conferences :


21. V. Vamsi Krishna, M. K. Mandal, A. Bhattacharya and S. Sanyal, "Realization of Reduced Size Planar 90 degree Branch-Line Coupler using Parallel Lines for RF/Microwave Applications", proceedings of Conference on Advances in Space Science and Technology (CASST 2008), KCSTC - IIT Kharagpur, India, 14-16 Jan 2008, pp.22 (Paper ID 64)


23. "A Fast Settling 100dB OPAMP in 180nm CMOS Process with Compensation Based Optimisation"; Kundu, Amal Kumar, Chatterjee, Subho; Bhattacharyya, Tarun Kanti; Page(s):311 - 316 IEEE VLSI Design 4-8 Jan 2008


ANNUAL REPORT
2008-2009
39. K.B.M Swamy, Thakur Praveen Singh, Sougata Kumar Kar and Siddhartha Sen. "Design of Different Structural Element Configurations for Applications in Micro Sensors and Actuators"; International Conference on Active/Smart materials, Thaigarajar college of Engineering, Madurai, Jan 7-9, 2009, India


42. A. Ravi Sankar and S. Das, Squeeze Film Damping and Temperature Drift Analysis of a Silicon Piezoresistive Acceleration Sensor, International Conference on Active/ Smart Materials, TCE, Madurai, (2009)


45. Sunil Kumar S., and Nandi T. K., “A numerical model for prediction of effective thermal conductivity of perforated plates in matrix heat exchangers”, presented in 22nd National Symposium on Cryogenics, IISc, Bangalore (December 4-6, 2008)
