



# **Indian Institute of Science Education & Research, Kolkata**

*(Under the Ministry of Human Resource Development, Deptt. of Higher Education, Govt. of India)*



# **Annual Report**

## **2010-2011**

# **ANNUAL REPORT**

**2010 – 11**



**IISER KOLKATA**

**Indian Institute of Science Education and Research – Kolkata**

Mohanpur Campus

P.O.-Krishi Viswavidyalaya, Mohanpur, Dist: Nadia-741252

# ANNUAL REPORT

2010 - 11

*Prepared by:*

## **Annual Report Committee**

Prof. Narayan Banerjee	-	Chairman
Prof. Soumitro Banerjee	-	Member
Dr. Jayasri Das Sarma	-	Member
Dr. Asok K. Nanda	-	Member
Dr. Supriyo Mitra	-	Member
Sri Siladitya Jana	-	Member Secretary

**PART - A**



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## I. Foreword

Like every year it is a great pleasure to write the Foreword for our Annual Report, but unlike last years where I had concentrated on infrastructure and student/faculty-development, this year I have the added happiness to extol the achievements of our first batch of the BS-MS dual degree programme who is about to graduate. Despite our modest beginning from the IIT Kharagpur and NITTTR campuses in Salt Lake in 2006, when our students — 38 of them — had to be moved around frequently, be it from their hostels or classrooms or laboratories, they have done wonders which have made us proud. Two of the students are going to Oxford University in the UK — one with the prestigious Rhodes Scholarship, two are going to Cornell University Ithaca, one to Wisconsin, one to Johns Hopkins, three to Goettingen in Germany, a few to the National University of Science, Singapore, a couple to our premier organization of the Tata Institute of Fundamental Research, and so on, for pursuing doctoral studies. Though it is gratifying to note that more than 80% of our first batch of students are planning to do a Ph. D., it is equally heartening to see that a few are going to join prestigious management programmes at IIM, Ahmedabad and IIT, Delhi.

It is a also matter of great satisfaction that some of our young Assistant Professors have excelled in research — they have been awarded Ramanujan, Ramalingaswamy and Wellcome Trust Fellowships, Young Scientist Prizes of the Indian National Science Academy, Associateships of the Indian Academy of Sciences — they have published in high impact factor journals such as Nature, Nature Materials, etc.

All in all, in less than five years of our existence, we can confidently state that the seeds of an oasis of excellence have already been sewn in this rural set up of Bengal in spite of various adverse physical conditions. We look forward to even more fruitful years ahead.



**Sushanta Dattagupta**

Director

## II. Members of the Society

1. **Dr. R. A. Mashelkar, FRS** **Chairman**  
*Bhatnagar Fellow and President, Global Research Alliance  
National Chemical Laboratory,  
Dr. Homi Bhabha Road,  
Pune - 411 008*
  
2. **Shri Samar Ghosh, IAS** **Member**  
*Chief Secretary  
Government of West Bengal,  
Office of Chief Secretary,  
Kolkata*
  
3. **Prof. S. Dattagupta** **Member**  
*Director  
Indian Institute of Science Education and Research, Kolkata  
C/O National Institute of Technical Teachers' Training & Research,  
Block - FC, Sector III, Salt Lake,  
Kolkata 700 106*
  
4. **Smt. Vibha Puri Das, IAS** **Member**  
*Secretary (School & Higher Education),  
Ministry of Human Resource Development,  
Government of India,  
Shastri Bhawan,  
New Delhi-110 001*
  
5. **Dr T. Ramasami** **Member**  
*Secretary  
Department of Science and Technology  
Technology Bhavan  
New Mehrauli Road  
New Delhi - 110 016*
  
6. **Prof. Sanjay Govind Dhande** **Member**  
*Director  
Indian Institute of Technology Kanpur,  
Director's Office  
Indian Institute of Technology,  
Kanpur - 208 016*

7. **Prof. Ved Prakash** **Member**  
The Chairman  
University Grants Commission  
Bahadur Shah Zafar Marg  
New Delhi - 110 002
8. **Prof. Sunil Sarangi** **Member**  
Director  
National Institute of Technology  
Rourkela -769 008
9. **Prof. Sibaji Raha** **Member**  
Director  
Bose Institute  
93/1 Acharya Prafulla Chandra Road  
Kolkata - 700 009
10. **Ms. Sushma Nath** **Member**  
Secretary  
Government of India  
Department of Expenditure  
Ministry of Finance  
North Block, Central Secretariat  
New Delhi - 110 003
11. **Dr. M. K. Bhan** **Member**  
Secretary  
Government of India,  
Department of Biotechnology,  
Block No. 2, CGO Complex, Lodi Road  
New Delhi 110 003
12. **Dr. Srikumar Banerjee** **Member**  
The Secretary  
Department of Atomic Energy  
Anushakti Bhavan  
Chatrapati Shivaji Maharaj Marg  
Mumbai - 400 001
13. **Dr. V. K. Saraswat, Secretary** **Member**  
Chairman (or his nominee not below the rank of Jt. Secretary, GOI)  
Defence Research & Development Organization,  
Government of India  
Ministry of Defence  
New Delhi - 110 011

14. **Dr. K. Radhakrishnan** **Member**  
Secretary  
Department of Space  
Lokmanya Bhavan  
3 rd Floor, Khan Market  
New Delhi - 110 003
15. **Prof. Samir K. Brahmachari** **Member**  
Director General  
Council of Scientific and Industrial Research  
Anusandhan Bhawan  
2, Rafi Ahmed Kidwai Marg  
New Delhi - 110 001
16. **Prof. Promod Tandon** **Member**  
Vice Chancellor  
North-Eastern Hill University, Permanent Campus  
Umshing Mawkynroh  
Shillong - 793 022 Meghalaya
17. **Prof. D. P. Singh** **Member**  
Vice Chancellor  
Banaras Hindu University  
Varanasi - 221 005
18. **Prof. P. Balaram** **Member**  
Director  
Indian Institute of Science  
Bangalore - 560 012
19. **Prof. K. N. Ganesh** **Member**  
Director  
Indian Institute of Science Education and Research (IISER), Pune  
First floor, Central Tower,  
Sai Trinity Building, Garware Circle,  
Sutarwadi, Pashan,  
Pune 411021
20. **Mr. Joydeep Sil** **Non-Member Secretary**  
Registrar  
Indian Institute of Science Education and Research  
Kolkata Campus, NITTTR, Block - FC,  
Sector-III, Salt Lake City,  
Kolkata 700 106

### III. Board of Governors

- |    |   |                 |
|----|---|-----------------|
| 1. | <p><b>Dr. R. A. Mashelkar, FRS</b><br/> <i>Bhatnagar Fellow &amp; President,<br/>           Global Research Alliance<br/>           National Chemical Laboratory,<br/>           Dr. Homi Bhabha Road,<br/>           Pune - 411 008</i></p>  | <b>Chairman</b> |
| 2. | <p><b>Prof. Sushanta Dattagupta</b><br/> <i>Director<br/>           Indian Institute of Science Education &amp; Research, Kolkata<br/>           C/O National Institute of Technical Teachers' Training &amp; Research,<br/>           Block - FC, Sector III, Salt Lake,<br/>           Kolkata 700106</i></p> | <b>Member</b>   |
| 3. | <p><b>Smt. Vibha Puri Das, IAS</b><br/> <i>Secretary (School &amp; Higher Education),<br/>           Ministry of Human Resource Development,<br/>           Government of India,<br/>           Shastri Bhawan,<br/>           New Delhi-110001</i></p>   | <b>Member</b>   |
| 4. | <p><b>Prof. P. Balaram</b><br/> <i>Director<br/>           Indian Institute of Science<br/>           Bangalore – 560 012</i></p>   | <b>Member</b>   |
| 5. | <p><b>Prof. Sanjay Govind Dhande</b><br/> <i>Director<br/>           Indian Institute of Technology Kanpur,<br/>           Director's Office,<br/>           Indian Institute of Technology,<br/>           Kanpur - 208 016</i></p>  | <b>Member</b>   |
| 6. | <p><b>Prof. K. N. Ganesh</b><br/> <i>Director<br/>           Indian Institute of Science Education and Research (IISER), Pune<br/>           First floor, Central Tower,<br/>           Sai Trinity Building, Garware Circle,<br/>           Sutarwadi, Pashan,<br/>           Pune 411021</i></p>              | <b>Member</b>   |

7. **Dr. M. K. Bhan** **Member**  
Secretary  
Department of Biotechnology  
Ministry of Science & Technology  
Block-2, 7th Floor  
CGO Complex, Lodi Road, New Delhi-110003
8. **Dr. Shailesh Nayak** **Member**  
Secretary  
Ministry of Earth Sciences,  
Government of India,  
Block-12, Mahasagar Bhavan,  
C.G.O. Complex Lodhi Road,  
New Delhi-110003
9. **Shri Deepak Gupta** **Member**  
Secretary  
Ministry of Nonconventional Energy Sources,  
Block No.14, C.G.O. Complex,  
Lodi Road,  
New Delhi – 110003
10. **Prof. B. K. Mishra** **Member**  
Director  
Institute of Minerals and Materials Technology  
Council of Scientific & Industrial Research,  
Bhubaneswar - 751 013
11. **Dr. Pawan Kapur** **Member**  
Director  
Central Scientific Instruments Organization,  
Sector - 30/C,  
Chandigarh - 160 030
12. **Prof. Sankar K. Pal** **Member**  
Ex-Director  
Indian Statistical Institute,  
203 Barrackpore Trunk Road,  
Kolkata 700108
13. **Prof. Kankan Bhattacharyya** **Member**  
Director and Chair Professor (on lien),  
Department of Physical Chemistry  
Indian Association for the Cultivation of Science,  
2A & 2B, Raja S.C. Mullick Road, Jadavpur,  
Kolkata 700 032

14. **Shri Samar Ghosh, IAS** **Member**  
*Chief Secretary,  
Government of West Bengal,  
Office of Chief Secretary,  
Kolkata*
15. **Shri Sanat Kumar Ray** **Permanent Invitee**  
*Joint Secretary & Financial Adviser  
Ministry of Human Resource Development  
Department of Education  
Shastri Bhawan, New Delhi-110001*
16. **Mr. Joydeep Sil** **Non-Member Secretary**  
*Registrar  
Indian Institute of Science Education and Research  
Kolkata Campus, NITTTTR, Block - FC,  
Sector-III, Salt Lake City,  
Kolkata 700 106*

## IV. Staff and Students

### Faculty Members

#### Professors

Sushanta Dattagupta (Director)	<i>Condensed Matter and Statistical Physics (Theory)</i>	Ph.D.- Physics (St.John's / Brookhaven National Laboratory, 1973/74), FNA, FNASc, FASc, FTWAS
Sanjib Bagchi (till 15.05.2010)	<i>Photochemistry, Experimental Spectroscopy</i>	Ph.D.- Chemistry (University of Calcutta, 1979)
Narayan Banerjee	<i>Gravitation &amp; Cosmology</i>	Ph.D.- Physics (Jadavpur University, 1986)
Soumitro Banerjee	<i>Nonlinear Dynamics</i>	Ph.D. - Electrical Engineering (Indian Institute of Technology Delhi), FNA, FASc, FNAE
Chanchal Das Gupta	<i>Biology</i>	Ph.D.- Biology (Saha Institute of Nuclear Physics, Kolkata, 1974) FNA, FNASc, FASc
Somnath Dasgupta (on lien from 09.08.2010 for one year)	<i>Geochemistry, Petrology</i>	Ph.D.- Geology (Jadavpur University, 1979) FNA, FNASc, FASc, FTWAS
Amitava Datta	<i>High Energy Physics</i>	Ph.D. - Physics (Visva Bharati, Santiniketan, 1974), FNA
Swapan Kumar Datta (till 15.08.2010)	<i>Experimental Nuclear Physics</i>	Ph.D.- Physics (The University of North Carolina, 1974), FNASc
Partha Pratim Majumder	<i>Biostatistics, Human Genetics, Population Genetics</i>	Ph.D.- (Indian Statistical Institute, Calcutta, 1982), FNA, FNASc, FASc, FTWAS
Prasanta Panigrahi	<i>Field Theory</i>	Ph.D.- (University of Rochester, 1988)

**Adjunct Professor**

Bidyendu Mohan Deb	<i>Theoretical Chemistry, Chemical Physics</i>	D.Phil (Oxon, 1969), FNA, FASc, FTWAS
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**Associate Professors**

Satyaki Bhattacharya (till 06.01.2011)	<i>Experimental High Energy Physics</i>	Ph.D. - Physics (Tata Institute of Fundamental Research, Mumbai, 1999)
Tarun Kumar Dalai	<i>Isotope and Trace Element Geochemistry</i>	Ph.D. - Geology ( Physical Research Laboratory/ Maharaja Sayajirao University of Baroda, 2001)
Jayasri Das Sarma	<i>Neural Cell Biology, Neuro- Science</i>	Ph.D. - Immunology/Chemistry (Jadavpur University, Kolkata, 1995)
Supriyo Mitra	<i>Earthquake Seismology, Continental Tectonics</i>	Ph.D.-Geophysics (University of Cambridge, 2004)
Asok K. Nanda	<i>Reliability, Statistics</i>	Ph.D. - Statistics (Panjab University, Chandigarh, 1998)
Vadlamani Ravikant	<i>Crustal Evolution, Isotope Geochemistry and Geochronology</i>	Ph.D (National Geophysical Research Institute / Osmania University, Hyderabad, 2002)
Joyanto Routh	<i>Biogeochemistry, Organic Geochemistry</i>	Ph.D. - Geochemistry (Texas A&M University, 1998)
Prasanta Sanyal	<i>Stable Isotopes Geochemistry</i>	Ph.D. – Geology (Physical Research Laboratory, Ahmedabad/ Maharaja Sayajirao University of Baroda, 2004)
Tapas Kumar Sengupta	<i>mRNA Stability, Gene Regulation, Bioremediation</i>	Ph. D.- Biology (University of Calcutta, 1996)

**Assistant Professors**

Saugata Bandyopadhyay	<i>Partial Differential Equations, Differential Inclusions and Calculus of Variations</i>	Ph.D. - Mathematics (École Polytechnique Fédérale de Lausanne, 2007)
Subhajit Bandyopadhyay	<i>Photochromic Materials; Biomimetic Chemistry</i>	Ph.D. - Chemistry (University of Victoria, British Columbia, 2004)

Anirban Banerjee	<i>Spectral Graph Theory, Structure &amp; Evolution of Biological Networks, Human Brain Functional Networks</i>	Ph. D. -Mathematics (Max Planck Institute, University of Leipzig, 2008)
Ayan Banerjee	<i>Precision Optical Spectroscopy; Optical Sensors (Experimental)</i>	Ph. D. (Indian Institute of Science, Bangalore, 2005)
Bhavtosh Bansal	<i>Condensed Matter Physics (Experimental)</i>	Ph. D. (Indian Institute of Science, Bangalore, 2005)
Rabeya Basu (till 30.07.2010)	<i>Algebra</i>	Ph. D. - Mathematics (Tata Institute of Fundamental Research, Mumbai, 2007)
Punyasloke Bhadury	<i>Molecular Ecology, Climate Change, Nano-biology</i>	Ph.D. - Biological Science (University of Plymouth, 2005)
Anuradha Bhat	<i>Community Ecology, Biodiversity and Conservation, Zebrafish Behavioural Ecology</i>	Ph.D.-Biology (Indian Institute of Science, Bangalore, 2002)
Rangeet Bhattacharyya	<i>Methodological Developments in Liquid and Solid State Nuclear Magnetic Resonance (Experimental)</i>	Ph.D. – Physics (Indian Institute of Science, Bangalore, 2005)
Sayan Bhattacharyya	<i>Materials Chemistry, Nanotechnology</i>	Ph. D. – Chemistry (Indian Institute of Technology Kanpur, 2006)
Robert John Chandran	<i>Terrestrial Ecology</i>	Ph. D. – Biology (Indian Institute of Science, Bangalore, 2001)
Devapriya Chattopadhyay	<i>Invertebrate Paleontology</i>	Ph.D. - Geological Sciences (University of Michigan, Ann Arbor, 2009)
Ananda Dasgupta	<i>Quantum Phenomena (Theory)</i>	Ph. D.- Physics (Saha Institute of Nuclear Physics, Kolkata / Jadavpur University, 2001)
Jyotirmayee Dash	<i>Organic Chemistry</i>	Ph. D. - Chemistry (Indian Institute of Technology, Kanpur, 2003)
Partha Pratim Datta	<i>Structural &amp; Molecular Biology</i>	Ph.D. - Molecular Biology, (Indian Institute of Chemical Biology, Kolkata / Jadavpur University, 2002)

Rupak Datta	<i>Biochemistry, Molecular Cell Biology</i>	Ph.D. – Life Science (Indian Institute of Chemical Biology, Kolkata/ Jadavpur University, 2006)
Priyadarsi De	<i>Polymer Chemistry</i>	Ph.D. - Chemistry (Indian Institute of Science, Bangalore, 2002)
Rumi De	<i>Theoretical Biological Physics; Soft Condensed Matter; Nonlinear Dynamics</i>	Ph.D. – Nonlinear Dynamics, (Indian Institute of Science, Bangalore, 2006)
Pradip Kumar Ghorai	<i>Computer Simulation, Diffusion in Porous Solids and Liquids, Electron Transfer, Self-assembly</i>	Ph. D.- Chemistry (Indian Institute of Science, Bangalore, 2005)
Amit Ghosal	<i>Condensed Matter Physics (Theory)</i>	Ph. D.- Physics (Tata Institute of Fundamental Research, Mumbai 2001)
Mahua Ghosh-Ghosal (till 06.04.2010)	<i>Structural Biology</i>	Ph. D.- Chemistry (Tata Institute of Fundamental Research, Mumbai, 2001)
Anandamohan Ghosh	<i>Non-linear Dynamics; Mathematical and Theoretical Biology</i>	Ph. D.- Physics (National Chemical Laboratory, Pune/ University of Pune, 2004)
Nirmalya Ghosh	<i>Optics &amp; Spectroscopy, Biophotonics</i>	Ph. D.- Physics (Raja Ramanna Centre for Advanced Technology, Indore/ Devi Ahilya Vishwavidyalaya, Indore, 2005)
Debasish Haldar	<i>Supramolecular Bio-organic Chemistry</i>	Ph. D.- Chemistry (Indian Association for the Cultivation of Science, Kolkata/ Jadavpur University, 2005)
Golam Mortuza Hossain	<i>Gravitation &amp; Cosmology (Classical and Quantum)</i>	Ph.D.- Physics (Institute of Mathematical Sciences, Chennai/ University of Madras, 2006)
Manoj Jaiswal	<i>Geomorphology, Quaternary Geochronology, Palaeoseismics and Palaeoclimatic Studies</i>	Ph. D.- Geology (Physical Research Laboratory, Ahmedabad/ Maharaja Sayajirao University of Baroda, Vadodara, 2006)
Sachindranath Jayaraman	<i>Functional Analysis</i>	Ph.D. - Mathematics (Indian Institute of Technology Madras, 2008)

Sumit Khanra	<i>Molecular Magnetism, Bioinorganic Organometallic Chemistry</i>	Ph. D.- Chemistry (Max-Plank Institute for Bioinorganic Chemistry, Mülheim, 2005)
Debasis Koley	<i>Computational Chemistry</i>	Ph. D.- Chemistry (Max-Plank Institute for Coal Research, Mülheim, 2005)
Arindam Kundagrami	<i>Theoretical Soft Condensed Matter Physics</i>	Ph.D -Physics (University of Pennsylvania, Philadelphia, 2003)
Siddhartha Lal	<i>Low-dimensional Quantum Condensed Matter Systems, Strongly Correlated Systems (Theory)</i>	Ph.D.-Physics (Indian Institute of Science, Bangalore, 2003)
Venkataramanan Mahalingam	<i>Luminescent Nanomaterials and Nanocomposites</i>	Ph. D.- Chemistry (Indian Institute of Technology, Madras, 2001)
Sankar Maiti	<i>Actin Cytoskeleton</i>	Ph.D.-Biology (Institute of Microbial Technology, Chandigarh, 2003)
Prasun K. Mandal	<i>Single Molecule Spectroscopy</i>	Ph. D.- Chemistry (University of Hyderabad, 2006)
Swadhin K. Mandal	<i>Organometallic Catalytic Transformations, Nanomaterials</i>	Ph. D. - Chemistry (Indian Institute of Science, Bangalore, 2002)
Chiranjib Mitra	<i>Quantum Information Processing, Quantum Magnetism, Strongly Correlated Electron Systems and Magneto-optics</i>	Ph. D. - Physics (Tata Institute of Fundamental Research, Mumbai, 2001)
Partha Mitra	<i>Magnetism in Mesoscopic Systems and Spintronics Applications</i>	Ph. D. - Physics (University of Florida, 2006)
Balaram Mukhopadhyay	<i>Synthetic Organic Chemistry (Carbohydrate), Glyco-nanotechnology</i>	Ph. D. - Biological Chemistry (Jadavpur University, 2001)
Arindam Mukherjee	<i>Metal Complexes, Magnetism, DNA Cleavage, Anti-cancer Agents, Metalloproteins, Microcalorimetry</i>	Ph. D. - Chemistry (Indian Institute of Science, Bangalore, 2005)

Goutam Dev Mukherjee	<i>Experimental Condensed Matter Physics</i>	Ph. D. - Physics (University of Hyderabad, 1997)
Dhananjay Nandi	<i>Laser-Electron-Molecule Collisions, Photoelectron/Photoion Imaging Spectroscopy, Ultrafast Electron Dynamics</i>	Ph. D. - Physics (Tata Institute of Fundamental Research, Mumbai, 2004)
Dibyendu Nandi	<i>Astrophysical Magnetohydrodynamics, Sun-Earth-System Science, Space Science (Theory)</i>	Ph. D. - Physics (Indian Institute of Science, Bangalore, 2003)
Rajesh Kumble Nayak	<i>General Theory of Relativity, Relativistic Astrophysics and Cosmology</i>	Ph. D.- Physics (Indian Institute of Astrophysics, Bangalore, 2002)
Bipul Pal	<i>Ultrafast Optical Spectroscopy and Semiconductor Nanostructure</i>	Ph. D.- Physics (Tata Institute of Fundamental Research, Mumbai, 2004)
Mohit Prasad	<i>Cell and Developmental Biology</i>	Ph.D.-Biology (Center for Cellular and Molecular Biology, Hyderabad/ Jawaharlal Nehru University, New Delhi, 2005)
Pradipta Purkayastha	<i>Photochemistry and Spectroscopy</i>	Ph. D.- Chemistry (Jadavpur University, 2002)
Satyabrata Raj	<i>Condensed Matter Physics (Experimental)</i>	Ph. D.- Physics (Institute of Physics, Bhubaneswar / Utkal University, Bhubaneswar, 2001)
C. Malla Reddy	<i>Supramolecular Chemistry, Crystal Engineering</i>	Ph. D.- Chemistry (University of Hyderabad, 2006)
Partho Sarothi Ray	<i>Molecular Biology, Translational Control, RNA-Protein Interaction</i>	Ph. D.- Biology (Indian Institute of Science, Bangalore, 2005)
Sujata Ray	<i>Soil Mechanics and Environmental Engineering</i>	PhD.- Environmental Engineering (Princeton University, 2007)
Amlan Kusum Roy	<i>Theoretical Chemistry</i>	Ph. D.- Chemistry (Panjab University, Chandigarh, 1998)
Soumyajit Roy	<i>Materials Science (Experimental)</i>	Ph. D.- Chemistry (University of Bielefeld, 2005)

Subrata Shyam Roy	<i>Operator Theory</i>	Ph.D. - Mathematics (Indian Statistical Institute, Bangalore, 2009)
Srimonti Sarkar	<i>Cell Biology</i>	Ph. D.- Biology ( <i>Pennsylvania State University</i> , 2001)
Raja Shunmugam	<i>Synthetic Macromolecules, Drug Carriers, Self-assembling Nanomaterials, Sensors</i>	Ph.D. - Chemistry (Indian Institute of Technology Madras, 2003)
Ritesh Kumar Singh	<i>High Energy Physics (Theory)</i>	Ph.D. - Physics (Indian Institute of Science, Bangalore, 2005)
Kaneenika Sinha	<i>Number Theory, Arithmetic of Modular Forms, Multiple Zeta Values</i>	Ph.D. - Mathematics (Queen's University, Kingston, 2006)
Subhasis Sinha	<i>Condensed Matter Physics (Theory)</i>	Ph.D. - Physics (Institute of Mathematical Sciences, Chennai/ University of Madras, 2001)
P. A. Sreeram	<i>Quantum Many Body Theory</i>	Ph. D.- Physics (Institute of Physics, Bhubaneswar/ Utkal University, Bhubaneswar, 2000)
Annagiri Sumana	<i>Animal Behaviour and Ecology,</i>	Ph.D. - Biology (Indian Institute of Science, Bangalore, 2002)
Ashwani Kumar Tiwari	<i>Theoretical Reaction Dynamics</i>	Ph. D. - Chemistry (Indian Institute of Technology Kanpur, 2007).
Sanjio S. Zade	<i>Organic Electronics Materials</i>	Ph. D.- Chemistry ((Indian Institute of Technology, Mumbai, 2004)

#### IISER Fellows

V. V. Awasthi	<i>Algebraic Topology</i>	Ph.D. - Mathematics (Harish-Chandra Research Institute, Allahabad, 2008)
Manua Banerjee	<i>Metamorphic Petrology and Structural Geology</i>	Ph.D. - Structural Geology (University of Calcutta, 2000)
Anindita Bhadra	<i>Animal Behaviour, Evolution, Ecology</i>	Ph. D. - Animal Behaviour, (Indian Institute of Science, Bangalore, 2008)
Parna Gupta Bhattacharayya	<i>Synthetic Inorganic Chemistry</i>	Ph.D.- Chemistry (Jadavpur University, 2004)

Mousumi Das	<i>Computational and Theoretical Chemistry</i>	PhD. - Chemistry (Indian Institute of Science, Bangalore, 2006)
Aparajita Dasgupta (till Feb. 2011)	<i>Harmonic Analysis</i>	PhD. - Mathematics (York University, Toronto, 2008)
Tridib Ganguly (till 10.03.2011)	<i>Virology, Bacteriophage</i>	Ph.D. (Bose Institute, Kolkata, 2007)
Pradip Khatua	<i>Giant Magneto-resistance, Spintronics in Semiconductors, Mesoscopic Physics in Superconductors</i>	Ph.D. (Indian Institute of Technology Kanpur, 2006)
Satyaki Mazumder	<i>Outlier Detection in High Dimension, Spatial Trimming</i>	Ph.D. - Statistics (University of Texas at Dallas, 2010)
Himadri Mukherjee	<i>Algebraic Geometry, Commutative Algebra</i>	Ph.D.- Mathematics (Northeastern University, Boston, 2008)
Jitendra Kumar Patnaik	<i>Application of Cosmogenic Radionuclides in Geosciences</i>	Ph. D. - Earth Sciences (Pondicherry University, 2010)

#### Scientific Officers

Uday Kumar	<i>Physics</i>	Ph.D. (University of Bombay)
K. Srikanth	<i>Chemistry</i>	Ph.D. (Indian Institute of Technology Bombay)

#### Administrative Staff

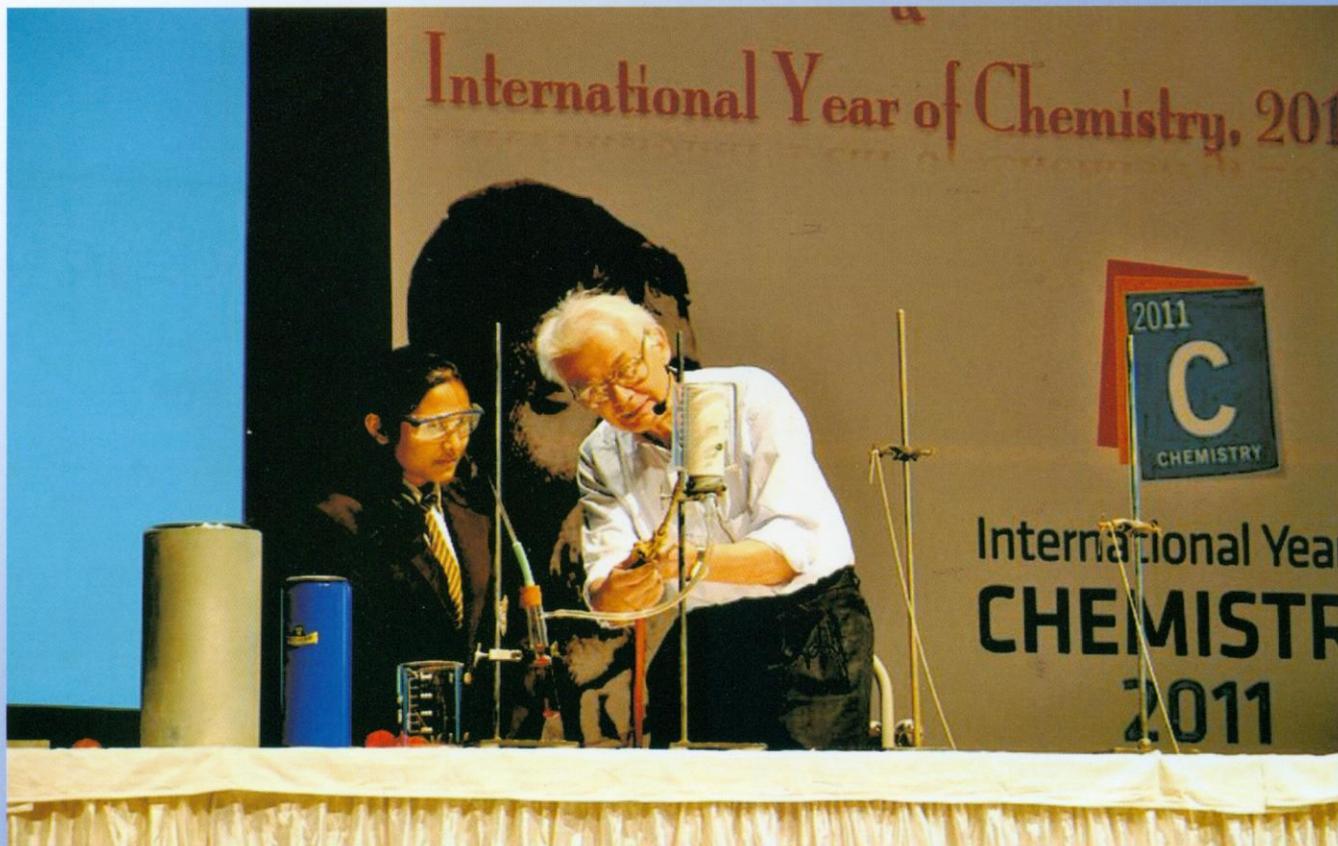
Joydeep Sil	Registrar
V. K. Thomas (till 30.06.2010)	Librarian
N. Muruganantham	Project Engineer cum Estate Officer
Sushmita Bhattacharjee	Assistant Registrar (Admin. & Academics)
Sanad Kumar Shukla	Assistant Registrar (Purchase Section)
Devakivada Govinda Rao	Assistant Registrar (Finance & Accounts)
Siladitya Jana	Assistant Librarian
Rana Bhadra	Technical Officer
Immanuel Alexander	Private Secretary to Director

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Debabrata Majumder	Assistant Engineer (Electrical)
Shibaji Das	Assistant Engineer (Civil)
Biswajit Das	Accountant
Shibnarayan Pal	Accountant
Arnab Chattopadhyay	Scientific Assistant
Rajan Thomas	Personal Assistant
Saberi Sen	Personal Assistant
Sanjib Das	Technical/Scientific Assistant
Sunita Basak	Technical/Scientific Assistant
Rajni Marrick	Technical/Scientific Assistant
Sushanta Kumar Roy	Library and Information Assistant
Arup Kumar Saha	Office Superintendent
Suraj Narayan Bordoloi	Office Superintendent
Himanshu Ghosh	Office Assistant (MS)
Puskar Das	Office Assistant (MS)
Raju Sethi	Office Assistant (MS)
Mitali Pal	Office Assistant (MS)
Ashok Das	Office Assistant (MS)
Surashree Dutta	Office Assistant (MS)
Sudip Mitra	Laboratory Technician
Pintu Das	Laboratory Assistant
Subhas Malo	Attendant



Public Lecture delivered by Dr. R.A. Mashelkar held on 13<sup>th</sup> February, 2011



Public Lecture on Celebration of 150<sup>th</sup> Birth Anniversary of Acharya (Sri) Prafulla Chandra Ray & International Year of Chemistry, 2011 held on 09-02-2011



Visit of Chinese Executives on 7<sup>th</sup> January, 2011



Inauguration of Climate Change Centre at Main Campus on 18<sup>th</sup> March, 2011

## V. IISER-K Administration

During the year 2010-11, the following major academic/administrative activities were undertaken:-

1. One meeting of the **IISER-K Society** (on 20/11/2010), **IISER-K Senate** meeting (on 19/02/11), three meetings of the **Board of Governors** (on 14/04/10, 20/11/10 and 14/02/11), three meetings of the **Finance Committee** (on 14/04/10, 20/11/10 and 14/02/11), four meetings of the **Buildings and Works Committee** (on 20/04/10, 11/04/10, 24/09/10 and 21/01/11), were held.
2. A **Seismological Observatory** in the New Campus (Haringhata) was **inaugurated by Prof. Vinod Gaur** on 18th November 2010.
3. An **MOU** was signed on 30.01.2011 between **IISER-K and National Informatics Centre, New Delhi for creation of Virtual Classrooms** at New Campus.
4. The **Liaison Office and Guest House** building at Salt Lake was inaugurated on 13.02.2011 by Dr. R.A. Mashelkar, FRS, Chairman-BOG.
5. The **Board of Governors** approved the proposed revised **Purchase Rules and Procedures of IISER-K**, in its meeting held on 20/11/2011.
6. Construction Works of the **Hostel cum Dining Block, Lecture Theatre and Laboratory Complex** at the Main Campus of the IISER-K at Haringhata, Nadia are under progress.
7. The Institute is abiding by the Language Policy and the Reservation Policy as per GOI norms.
8. Students' enrolment:

YEAR/COURSE	BS-MS	MS by THESIS	PBIP	Ph.D
2006-07	38	Nil	Nil	12
2007-08	69	Nil	Nil	17
2008-09	47	1	Nil	52
2009-10	99	Nil	10	16
2010-11	85	Nil	12	13

## VI. Faculty Profile

### DEPARTMENT OF BIOLOGICAL SCIENCES

#### Anindita Bhadra

##### Publications

**Bhadra, Anindita.** 2010. "Be nice to crows, otherwise they will scold you!" *Current Science*, 98, 11, 1430-1431.

##### Teaching programme

###### Theory courses

HU111: Communication Skills (with Ayan Banerjee, Anandamohan Ghosh (tutorials)) LS221: Evolutionary Biology

###### Laboratory course

LS315: Animal Behaviour Practical

##### Talks Delivered

The links and hubs of power in a wasp society – An invited talk at the conference on the Evolution of Complex Systems, a satellite meeting of International Centre for Theoretical Sciences, at the Indian Institute of Science, Bangalore, Jan 13th – 15th, 2010.

How to be social: lessons from insect societies. An invited talk at the Bharatiya Samskriti Samsad, Kolkata, on 27th March 2010.

Guest lectures delivered: A series of four lectures as part of the sociobiology course for MSc students at the West Bengal State University, on 9th and 16th April 2010, on *Insect Societies*.

Poster on Regulation of reproduction in the primitively eusocial wasp *Ropalidia marginata*: on the trail of the queen pheromone, at the XVI International Congress of the International Union for the Study of Social Insects, Copenhagen, Denmark, Aug 8th-14th, 2010.

We know that the wasps "know": Cryptic successors to the queen in *Ropalidia marginata*. 13th International Society for Behavioral Ecology Conference, Perth, 28th Sep 2010.

##### Funded Projects

Project title: Behavioural Ecology of the Indian Stray Dog *Canis familiaris*.

Funding agency: Council of Scientific and Industrial Research

Value: ₹ 22,02,000.00 including 2 posts of JRF/SRF/RA.

Effective from: 01.04.10.

Project title: Understanding aggression and its correlates in the Indian feral dog *Canis familiaris*.

Funding agency: INSA

Value: ₹ 1,50,000.00 (as part of the INSA young scientist award)

### **Other academic/educational activities**

Organised Excsite 2010 (jointly with Dr. Ayan Banerjee), an outreach program on the occasion of National Science Day on 6th March'10 at the institute.

Intriguing tales from the living world-Invited talk at the State level Science seminar contest, Digha Science Centre, WB. 20th Aug 2010.

*Mayur kano nâchte shikhlo?* (=Why did the peacock learn to dance?). An essay in Bangla for a compilation of essays published by the little magazine *Âlochonâ Chakra*. This article is a brief history of evolutionary thought, spanning both the theories of natural selection and sexual selection.

## **Anuradha Bhat**

### **Teaching programme**

#### *Theory courses*

LS312: Ecology and Animal Behaviour (Guest lecturers)

SM421: Seminar (with Dr. Srimonti Sarkar)

#### *Laboratory courses*

LS222: Organismal and Evolutionary Biology (with Dr. Annagiri Sumana)

## **Punyasloke Bhadury**

### **Publications**

**Bhadury, P.** and M. C. Austen. 2010. "Barcoding marine nematodes: an improved set of nematode 18S rRNA primers to overcome eukaryotic co-interference." *Hydrobiologia* 641: 245-251

### **Teaching programme**

#### *Theory courses*

LS421: Plant Biology (with Dr. Robert John Chandran)

#### *Laboratory courses*

LS121: Biology Practical (with Dr. Tridib Ganguly)

### **Supervision of students**

Dola Bhattacharya- Postdoctoral Research Associate

Devnita Ghosh- Ph.D. Student

### **Talks Delivered**

National consultative workshop for identification of research gaps in coastal and marine biodiversity research in India [Ministry of Environment and Forests, Government of India] 24th-25th June, 2010, Chennai. Co-chair in the Session: Landscape/Seascape/Ecosystem Level Research

Barcoding marine nematodes: an improved set of nematode 18S rRNA primers to overcome eukaryotic co-interference. Invited poster presentation at the International Symposium on Biodiversity Sciences, 31st July-3rd August 2010, Nagoya, Japan with M C Austen.

Functional diversity of marine phytoplankton- a molecular perspective. Invited thematic lecture, Session: Aquatic Biology and Marine Biotechnology, International Conference on Frontiers in Biological Sciences, 1st-3rd October 2010, Rourkela, Orissa.

Molecular diversity of fungal phylotypes co-amplified alongside nematodes from coastal and deep-sea marine environments. Invited lecture, Session: Marine Biodiversity, Indian Ocean Marine Living Resources Symposium, 2nd – 3rd December 2010, Kochi, Kerala.

### **Funded Projects**

Assessment of impact of climate change on phytoplankton communities in the Sundarbans eco-region. Funding agency: WWF-India, Value: ₹ 3,37,150.00 [Ongoing]

Long term monitoring of plankton and wildlife populations of Tropical Indian Ocean in connection with climate change. Funding Agency: Ministry of Earth Sciences through NCAOR, Goa. Value: Ship-time and sampling costs

Meiobenthic studies in three Olive Ridley turtle rookeries along the coast of Orissa. Funding Agency: Director General of Hydrocarbons, Government of India, Value: ₹ 4,71,500.00 [Ongoing]

Arsenic biogeochemical cycling in groundwater aquifers of the Bengal Delta Plains (West Bengal, India): early detection and remediation issues (Jointly with J. Routh, Dept. of Earth Science, IISERK) Funding Agency: Swedish International Collaborative Scheme, SRL Value: 735,000 Swedish Krona [₹ 5,244,000.00] [Ongoing]

Survey of marine turtles along the coast of West Bengal: distribution, status, threats and management implications. Funding Agency: WWF-India, Value: ₹ 1,00,000.00 [Ongoing]

Monitoring of meiobenthos along Orissa coast including three mass nesting areas of Olive Ridley turtles- PHASE II Study. Funding Agency: Director General of Hydrocarbons. Value: ₹ 4,29,000.00

NEMATOCODE: testing hypotheses of marine nematode diversity using DNA barcoding. Funding Agency: Ministry of Earth Sciences, Value: ₹ 16,58,000.00

Genome-dependent expression on ultra-structure and biochemistry of seed-coats of Indian spices with commercial significance (Multi-Institutional Network programme). Funding Agency: Department of Biotechnology, Value: ₹ 93,33,800.00

Long term monitoring of plankton and wildlife populations of Tropical Indian Ocean in connection with climate change. Funding Agency: Ministry of Earth Sciences through NCAOR, Goa. Value: Ship-time and sampling costs

### **Others**

Team Leader, 3rd Indian Arctic Expedition (Winter Phase), March – April 2010

## **Robert John Chandran**

### **Teaching programme**

#### *Theory courses*

LS421: Plant Biology (with Dr. Punyosloke Bhadury)

ID425: Biostatistics and Bioinformatics (with Prof. Partha Majumder)

#### *Laboratory courses*

LS423: Plant Biology (with Dr. Punyosloke Bhadury)

### **Externally funded research projects**

Lead Principal Investigator on project titled "Programme Support for Technological Innovations and Ecological Research for the Sustainable Use of Bioresources in the Sikkim Himalaya". Funded by the Department of Biotechnology, Government of India. Total outlay ₹ 4,49,89,000/- (May 2009 – May 2014)

Principal Investigator on project titled "Science and Education on the linkages between climate change and biodiversity". Funded by HSBC Bank and Coordinated by Earthwatch UK. Project outlay for the year 2010. £8,000/-

Principal Investigator: Research and Monitoring component of the UNESCO World Heritage Biodiversity Project sites in Assam, India (2008- 2012). Total project outlay US\$ 120,000 over a 4-year period.

### **Others**

Member, Core Group on the Use of Information and Communication Technology (ICT) in the Forestry Sector, Ministry of Environment and Forests, Government of India.

## Jayasri Das Sarma

### Publications

**Das Sarma J.** 2010. "γδ T cells and IL-17/IL-17R signaling axis in CNS inflammation." *International Journal of Interferon, Cytokine and Mediator Research*: 2:149–155. (Invited review)

**Das Sarma, J.** 2010. "A Mechanisms of viral induced demyelination. Perspective and Infectious Disease; Pathogenesis in Neurologic and Psychiatric Disease." *Interdisciplinary Perspectives on Infectious Diseases*. Volume 2010. Article ID 109239, 28 pages; doi:10.1155/2010/109239 (Invited Review).

Marek, R, M. Caruso, A M Rostami, J B Grinspan, **J Das Sarma**. 2010. "Simultaneous isolation of highly purified astrocytes and microglia." *MACS & More*; Special Edition: Neuroscience meets MACS® Technology. 12-2; 7-9. (Cover Page illustration).

### Teaching programme

#### Theory course

LS321: Immunology and Microbiology (with Dr Rupak Datta)

#### Laboratory courses

LS314: Gene Regulation Lab

LS324: Advanced Cell Biology Course (with Dr Srimonti Sarkar)

### Supervision of students

#### Ph. D. students

Dhriti Chatterjee

Kaushiki Biswas

Abhinoy Kishore

#### Project Students

Subhajit Das Sarma

### Talks Delivered

Axonal Transport Limits Virus Induced Demyelination. Kaushiki Biswas, Lawrence C Kenyon, J Das Sarma. *5th Congress of International Federation of Asian and Oceanian Neuroscience Societies & XXVIII Annual Meeting of Indian Academy of Neurosciences*. Lucknow: India, November 25-28, 2010.

Comparison of Direct Viral Mediated Demyelination and Immune Mediated Experimental Autoimmune Encephalitis (EAE) Models of Multiple Sclerosis. Abhinoy Kishore, Anurag Kanunjia, A. M. Rostami, Lawrence C Kenyon, Jayasri Das Sarma. 79th Society of Biological Chemists (India) Meeting, December, 13-15, 2010. Bangalore, India.

Mouse Hepatitis Virus infection mediates cell specific apoptosis in the spinal cord. Dhriti Chatterjee and Jayasri Das Sarma. 79th Society of Biological Chemists (India) Meeting, December 13-15, 2010, Bangalore, India.

Axonal loss can lead to demyelination in virus induced demyelination. Kaushiki Biswas, Jayasri Das Sarma. 79th Society of Biological Chemists (India) Meeting, December, 13-15, 2010. Bangalore, India.

### Research Collaboration

Visited Thomas Jefferson University, Children Hospital of Philadelphia (CHOP) and University of Pennsylvania for collaborative ongoing research work

### Externally funded research projects

Title of the Project: Understanding the cellular consequences of axonal loss and demyelination in viral infection using in vitro myelination system

Role in the grant: Principal Investigator

Co-PI: Raja Shunmugam, Ph.D

Consultant: Lawrence, C Kenyon, MD. PhD. Thomas Jefferson University

Total direct Cost: ₹ 15,00,000.00 for 2 years

Funding Agency: Council of Scientific and Industrial Research

Title of the project: Fluorometric sensor for cadmium in drinking water.

Principle Investigator: Raja Shunmugam

Role in the grant: Co - PI

Total direct Cost: ₹ 47,00,000.00 for 2 years

Funding Agency: Department of Science and Technology

### Others

Editorial Board Member of the Journal *Frontiers in Neuro-Ophthalmology*.

### Partha Pratim Datta

#### Publications

Yassin AS, M E Haque, **P P Datta**, E Elmore, N K Banavali, L L Spremulli, R K Agrawal. 2011. "Insertion domain within mammalian mitochondrial translation initiation factor 2 serves the role of eubacterial initiation factor 1." *Proc Natl Acad Sci USA*. 2011 Mar 8; 108(10):3918-23.

#### Teaching programme

##### Theory courses

ID424: Structural Biology (with Prof. Chanchal Dasgupta)

### *Laboratory courses*

LS122: Biology, Molecular Biology (with Dr. Rupak Datta)

LS212: Biochemistry (with Prof. Chanchal Dasgupta)

LS422: Structural Biology (with Prof. Chanchal Dasgupta)

### **Supervision of students**

Ph. D Student: Ananya Chatterjee

### **Externally funded research projects**

Project title: "Studies on the mechanisms of the translational regulation of the cold shock response genes in human entero-pathogenic bacteria"

Funding Agency: Department of Biotechnology, India, under Call for Proposal for young investigators (*RGYI Scheme*) scheme

Duration: Three years

Total grant amount: ₹ 30,82,000

## **Rupak Datta**

### **Teaching programme**

#### *Theory courses*

LS321: Immunology and microbiology (with Dr. Jayasri Das Sarma)

#### *Laboratory courses*

LS122: Biology Practical (with Dr. Partha Datta)

### **Awards, Prizes etc.**

Ramalingaswami Fellowship from Department of Biotechnology, Government of India.

## **Sankar Maiti**

### **Teaching programme**

#### *Theory courses*

LS421: Movement and Motions (with Dr. Srimonti Sarkar)

LS211: Biochemistry (with Dr. Srimonti Sarkar)

LS 311: Advanced Cell Biology (with Dr. Srimonti Sarkar)

LS411: Advanced Biochemistry (with Dr. Srimonti Sarkar)

*Laboratory courses*

LS324: Immunology and Host-Pathogen Interaction (with Dr. Tridib Ganguli)

**Supervision of students***Ph. D Students*

Amit Das

Priyanka Dutta

Simanti Bhattacharya

**Meetings Attended**

Committee for the Purpose of Control and Supervision of Experiments on Animals workshop  
April 19th 2010, Kolkata.

13th International Conference on Emerging Infectious Diseases (EID) in the Pacific Rim – Focused  
on Enteric Diseases, April 6 - 9, 2009, Kolkata.

Protein Interaction Network Shows Novel Pathway of Huntingtin Mediated Alteration of  
Cytoskeletal Gene Regulation. Amit Das, Simanti Bhattacharya, Sankar Maiti: International  
Conference on Cell Signalling and Disease. KIIT University, Bhubaneswar, 29th – 30th October  
2010. (3rd Best Poster Award).

Understanding the Interaction of VacA Mediated Actin Cytoskeleton Reorientation During  
*Helicobacter pylori* Pathogenesis. Simanti Bhattacharya, Amit Das, Asish K Mukhopadhyay, Sankar  
Maiti: International Conference on Cell Signalling and Disease. KIIT University, Bhubaneswar,  
29th – 30th October 2010.

Protein Interaction Network Shows Novel Pathway of Huntingtin Mediated Alteration of  
Cytoskeletal Gene Regulation. Amit Das, Simanti Bhattacharya, Sankar Maiti: The 79th Society  
of Biological Chemists (India) meeting. Indian Institute of Science, Bangalore, 13th – 15th  
December, 2010.

Understanding the Interaction of VacA Mediated Actin Cytoskeleton Reorientation During  
*Helicobacter pylori* Pathogenesis. Simanti Bhattacharya, Amit Das, Asish K Mukhopadhyay, Sankar  
Maiti: The 79th Society of Biological Chemists (India) Meeting. Indian Institute of Science,  
Bangalore, 13th – 15th December, 2010.

**Mohit Prasad****Teaching Programme***Theory courses*

Systems Biology Course (with Dr Jayasri Das Sarma and Dr Arindam kundagrami)

Genetic Course (with Prof C. K. Dasgupta)

Developmental Biology Course (with Dr Arindam Kundagrami)

Genetic Course with (Prof C. K. Dasgupta)

#### *Laboratory courses*

Systems biology Course (with Dr Jayasri Das Sarma)

Genetic course (with Dr Partha Dutta)

Developmental Biology Course (with Dr Anuradha Bhat)

Genetic course (with Dr Partha Dutta and Dr Rupak Datta)

#### **Supervision of students**

Ph. D Student: Jaganmoy Chowdhury

#### **Conference Attended**

Presented a poster at the 6th Drosophila meeting, November 19-20, 2010 held at Mysore. "Understanding collective cell movement using the model of border cell migration in Drosophila ovary" Mrinal C, J. Chowdhury and M. Prasad.

### **Partho Sarothi Ray**

#### **Publications**

**Ray P.S.**, J C Sullivan, J Jia, J Francis, J R Finnerty and P L Fox. 2011. "Evolution of Function of a Fused Metazoan tRNA Synthetase." *Mol Biol Evol.* 28, 437-447.

#### **Teaching Programme**

##### *Theory courses*

LS 422: Communication (with Dr. Jayasri Das Sharma, Dr. Anindita Bhadra)

LS 313: Cellular Regulation

LS 323: Physiology and Integrative Biochemistry

##### *Laboratory courses*

LS 423: Tissue Culture and Histology (with Dr. Jayasri Das Sharma)

#### **Supervision of students**

Ph. D Student: Dipak Poria

#### **Talks Delivered**

Poster presented at the 79th annual conference of the Society of Biological Chemists (India), at Indian Institute of Science, Bangalore, December, 2010, "The Interplay of mRNA-binding Protein HuR and the microRNA miR-125b in the Translational Control of Tumor Suppressor Protein p53" by Ashish Goyal, Dipak Poria and Partho Sarothi Ray

Invited talk at the Department of Biophysics and Molecular Biology, Calcutta University, Kolkata, March, 2010.

Invited talk at the Department of Microbiology, St. Xavier's College, Kolkata, February, 2011.

### **Externally funded research projects**

Project Title: "Molecular interactions in the post-transcriptional regulation of inflammatory gene expression"

Funding Agency: DBT-Wellcome Trust India Alliance intermediate fellowship.

Value: ₹ 3,38,00,000 (initiated from May, 2011)

### **Awards, Prizes etc.**

Associate, Indian Academy of Sciences, 2010.

Department of Biotechnology, Government of India-Wellcome Trust India Alliance Intermediate Fellowship, 2010

## **Srimonti Sarkar**

### **Teaching programme**

#### *Theory courses*

LS421: Movement and Motion (with Dr. Sankar Maiti)

LS211: Biochemistry (with Dr. Sankar Maiti)

LS311: Cell Biology (with Dr. Sankar Maiti)

LS411: Biochemistry (with Dr. Sankar Maiti)

SM421: Seminar (with Dr. Anuradha Bhatt)

#### *Laboratory courses*

LS324: Advanced Cell Biology (with Dr. Jayasri Das Sarma)

### **Supervision of students**

Ph. D Students:

Sumana Banerjee

Abhishek Sinha

Somnath Dutta

### **Talks Delivered**

Department of Genetics, Institute of Biochemistry and Biophysics, Warsaw, Poland, April 2010

Department of Biochemistry, Bose Institute, Kolkata, India, October 2010

### **Conferences Attended/Posters Presented**

Fourth European Science Foundation Conference on Functional Genomics and Disease, Dresden,

Germany, April 2010. *Poster*. "Comparative Genomics Reveals Selective Distribution and Domain Organization of FYVE and PX Domain Proteins Across Eukaryotic Lineages." (Presenter: Srimonti Sarkar)

### **Funded Projects**

Role of phosphoinositides in intracellular protein transport of *Giardia lamblia*

Funded by: Council of Industrial and Scientific Research

Amount: ₹ 17,82,800.00

### **Tapas K. Sengupta**

#### **Publications**

Jose, Gregor P, Subhankar Santra, Swadhin K Mandal and **Tapas K Sengupta**. 2011. "Singlet Oxygen Mediated DNA Degradation by Copper Nanoparticles: Potential towards Cytotoxic Effect on Cancer Cells." *Journal of Nanobiotechnology*. 25;9:9.

Ray, Manas K, Paromita Banerjee, **Tapas K Sengupta**, and Sushanta Dattagupta. 2010. "Glucose Induced Fractal Colony Pattern of *Bacillus thuringiensis*." *Journal of Theoretical Biology*. 265(3):389-95.

#### **Teaching programme**

##### *Theory courses*

LS322: Cancer Biology

LS111: Cell Biology

##### *Laboratory courses*

LS324 & LS325: Practicals (with Dr. Tridib Ganguly)

#### **Supervision of students**

##### *Ph.D. students*

Gregor P. J.

Debdeep Dasgupta

Brinta Chakraborty

Paromita Banerjee

Postdoctoral Research Associate (Department of Biotechnology, Government of India funded)

Anindita Das

#### **Externally Funded Projects**

Title: Impact of Climate Change on Bacterial Diversity and Bacteria-Phytoplankton Interactions

in Sunderbans Ecosystem. (Dr. Punyasloke Bhadury as Co-I). Funding agency: Ministry of Earth Science, Government of India. Value: ₹ 90,00,000.00

Title: Studies on the Effects of Metal Nanoparticles on Cancer Cells: Implications in Targeted Therapy. Dr. Swadhin K Mandal as Co-Investigator. Funding agency: Department of Biotechnology, Government of India. Value: ₹ 1,52,00,000.00.

## Annagiri Sumana

### Publications

Bang A., S Deshpande, **A. Sumana** and R. Gadagkar. 2010. "Choosing an appropriate index to construct dominance hierarchies in animal societies: a comparison of three indices." *Animal Behaviour* 79: 631-636.

### Teaching programme

#### Theory courses

LS323: Ecology & Animal Behaviour

#### Laboratory courses

LS324: Ecology & Animal Behaviour

LS222: Evolutionary Biology (with Dr. Anuradha Bhat)

### Supervision of students

Ph. D Students

Rajbir Kaur

Swetashree Kolay

### Talks Delivered

"Ant Emigration: How and why do they go from here to there?" Indo-U.S. Science and Technology Forum (IUSSTF), Fourth Annual Symposium, Indian-American Kavli Frontiers of Science, Arnold and Mabel Beckman Center, Irvine, California, April 18-20, 2011

"House hunter and movers – case study of an ant" Young Investigators Meeting 2010 (YIM). 8 to 12th Feb 2010, Raichak, West Bengal. Organized by National Centre for Biological Sciences, Bangalore

Behaviour 2011, Joint meeting of the International Ethological Conference (IEC) and the Animal Behavior Society (ABS), Indiana University, Bloomington, Indiana, July 25th - July 30th, 2011

## DEPARTMENT OF CHEMICAL SCIENCES

### Subhajit Bandyopadhyay

#### Teaching Programme

##### Theory courses

CH414: Chemical Perspectives of Biological Pathways

CH 421: Photochemistry (with Dr J Dash, Prof S Bagchi)

CH 411: 4th Year Seminar Course (with Dr M Venkataramanan and Dr Balaram Mukhopadhyay)

##### Laboratory courses

CH 325: Spectroscopy Lab (with Dr Prasun Mondal)

CH324: Inorganic Chemistry Lab (with Dr S Khanra)

#### Students Supervision

Ph. D Students

Suman Pal

Joydev Hatai

Siva Rama Krishna V. (Integrated Ph.D.)

#### Talks Delivered

"Photoregulation of Copper (II) binding" at Indian Institute of Science Education and Research Pune, March 2011.

#### Funded Projects

Project entitled "Development of photochromic molecules as molecular switches for potential applications in logic devices with photonic inputs and outputs". Department of Science and Technology, Government of India SERC (SR/S1/OC-26/2010). ₹ 24,00,000.00

Control of DNA intercalation by light activated nanoswitches, Department of Biotechnology, ₹ 61,00,000.00

### Sayan Bhattacharyya

#### Publications

**Bhattacharyya, Sayan**, D. Zitoun, A. Gedanken. 2011. "Magnetic Properties of  $Cd_{1-x}Mn_xTe$  / C Nanocrystals." *Nanotechnology*, 22, 075703 (1-7). *Highlighted as news item in Nanotechweb, February 08, 2010* (<http://nanotechweb.org/cws/article/lab/45017>).

Singhal, Riju, Zulfiya Orynbayeva, Ramalingam Venkat Kalyana Sundaram, Jun Jie Niu, **Sayan Bhattacharyya**, Elina Vitol, Michael Schrlau, Elisabeth Papazoglou, Gary Friedman, and Yury

Gogotsi. 2011. "Multifunctional Carbon-Nanotube Cellular Endoscopes." *Nature Nanotech.*, 6, 57-64.

**Bhattacharyya, Sayan**, Y. Estrin, D. H. Rich, D. Zitoun, Yuri Koltypin, A. Gedanken. 2010. "Luminescent and Ferromagnetic CdS:Mn<sup>2+</sup> / C Core-Shell Nanocrystals." *J. Phys. Chem. C*, 114, 22002-22011.

Kuria, Sajith, **Sayan Bhattacharyya**, Judith Desimoni, Eitel L. Peltzer y Blancá, Arles V. Gil Rebaza, N. S. Gajbhiye. 2010. "Investigation of  $\gamma$ -Fe<sub>4</sub>N-GaN Nanocomposites: Structural, and Magnetic Characterization, Mössbauer Spectroscopy and *Ab-initio* Calculations." *J. Phys. Chem. C*, 114, 17542-17549.

Pelletier, Valarie, **Sayan Bhattacharyya**, Isabel Knoke, Farhad Foroohar, Magdy Bichay, Yury Gogotsi. 2010. "Copper Azide Confined Inside Templated Carbon Nanotubes." *Adv. Funct. Mater.*, 20, pp. 3168-3174.

**Bhattacharyya, Sayan**, S. M. Shivaprasad, N. S. Gajbhiye. 2010. "Variation of Magnetic Ordering in  $\epsilon$ -Fe<sub>3</sub>N Nanoparticles." *Chem. Phys. Lett.*, 496, 122-127.

#### Conference Proceedings

Estrin, Yevgeni, Daniel H. Rich, Ofer Moshe, **Sayan Bhattacharyya**, Aharon Gedanken. 2010. "Phase-separation in Zn<sub>x</sub>Cd<sub>1-x</sub>Se/C Core/Shell Nanocrystals Studied with Cathodoluminescence Spectroscopy." *In Photovoltaics and Optoelectronics from Nanoparticles*, edited by M. Winterer, W. L. Gladfelter, D. R. Gamelin, S. Oda (*Mater. Res. Soc. Symp. Proc. 1260*, Warrendale, PA), Paper No. 1260-T10-03.

#### Teaching Programme

##### Theory courses

CH422: Chemistry of Materials (with Dr. M. Venkataramanan)

SM411: Chemistry Seminar (with Dr. M. Venkataramanan)

##### Laboratory courses

CH315: Spectroscopy Laboratory (with Dr. Prasun Mandal)

#### Talks Delivered

*Carbon Nanotube Probes Get Friendly with Living Biological Cells*. 3rd Inter IISER Chemistry Meet, Indian Institute of Science Education and Research Mohali, 20-21 February, 2011.

*Manganese Doping in Semiconductor Nanocrystals: A Dry Autoclaving Approach* (Invited Lecture). First International Conference on Composites and Nanocomposites (ICNC 2011), Kottayam, Kerala, 7-9 January, 2011.

*Doped Nanocrystals and Nanocomposites* (Invited Lecture). Workshop on Indo-German Graduate School on Spintronics, Department of Physics, University of Goettingen, Germany, 14-18 December, 2010.

## Others

The paper on 'Magnetic Properties of  $\text{Cd}_{1-x}\text{Mn}_x\text{Te}$  / C Nanocrystals' in *Nanotechnology* (2011, 22, pp. 075703) was highlighted as news item in Nanotechweb, February 08, 2010 (<http://nanotechweb.org/cws/article/lab/45017>).

The paper on 'Multifunctional Carbon-Nanotube Cellular Endoscopes' in *Nature Nanotechnology* (2011, 6, pp. 57-64) was highlighted as news items in two leading Indian newspapers.

Deccan Herald; December 19, 2010: "Battle against Cancer Gets Nano Boost" <http://www.deccanherald.com/content/121810/battle-against-cancer-gets-nano.html>

The Telegraph; December 20, 2010: "Tiny Probe, Big Benefit" [http://www.telegraphindia.com/1101220/jsp/knowhow/story\\_13320765.jsp](http://www.telegraphindia.com/1101220/jsp/knowhow/story_13320765.jsp)

## Mousumi Das

### Publications

**Das, Mousumi** and S. Ramasesha. 2010. "Fluorescent resonant excitation energy transfer in linear polyenes" *J. Chem. Phys.* 132, 124109

**Das, Mousumi.** 2010. "Low-lying excitations of poly-fused thiophene within Pariser–Parr–Pople model: A density matrix renormalization group study" *J. Chem. Phys.* 132, 194107

**Das, Mousumi.** 2011. "Static Linear Polarizabilities and First Hyperpolarizabilities of Thiophene Derivatives: Potential Materials for Nonlinear Optics" *Nonlinear Optics Quantum Optics*. 42, 79 ,

### Teaching Programme

#### Theory courses

CH413: Computational Chemistry

#### Laboratory courses

CH222: Physical Chemistry Practical (with Dr. Priyadarsi De and Dr. Parna Gupta Bhattacharya)

### Talks Delivered

Delivered an invited talk entitled "Low-lying Excitations of Poly-fused Thiophene within Pariser–Parr–Pople Model : A Density Matrix Renormalization Group Study" in **Theoretical Chemistry Symposium** at Indian Institute of Technology Kanpur, December 8th- 12th, 2010.

Delivered a talk entitled "Theoretical Studies on Electronic Properties of Conjugated Systems and Quantum Charge Transport Study in Single Molecule Device" at University of Gottingen, December 13th-20th, 2010.

## Jyotirmayee Dash

### Publications

Lechel, T., **J. Dash**, E. Christian, I. Brüdgam, D. Lentz and H.-U. Reissig. 2010. "A three-component synthesis of beta-alkoxy-beta-keto-enamides—flexible precursors for 4-hydroxypyridine derivatives and their palladium-catalysed reactions." *Org. Biomol. Chem.* 8, 3007-3014.

Lechel, T., **J. Dash**, P. Hommes, D. Lentz and H.-U. Reissig. 2010. "Three-Component Synthesis of Perfluoroalkyl- or Perfluoroaryl-Substituted 4-Hydroxypyridine Derivatives and Their Palladium-Catalyzed Coupling Reactions." *J. Org. Chem.* 75, 726-732.

### Teaching Programme

#### Theory courses

CH 421: Pericyclic Reactions and Organic Photochemistry (with Dr S. Bandyopadhyay, Dr P. K. Mandal and Prof. S. Bagchi)

CH 421: Synthetic Methodologies and Natural Products

#### Laboratory courses

CH 424: Synthesis of H-bonded bis-amide derivatives (with Dr Raja Shunmugam, Dr Arindam Mukherjee)

CH314: Organic Synthesis (with Dr Debashis Halder)

### Supervision of Students

#### PhD Students

Kalyan Dhara

Rabindranath Das

Sushovan Paladhi

Ganesh Kumar Midya

### Talks Delivered

Delivered a talk at Inter IISER Chemistry Meet, 20-21 Feb 2011, Indian Institute of Science Education and Research Mohali: Supramolecular Self Assembly of Guanosines

Visited Göttingen University as a member of Organic Spintronics Group, Decemeber 13th-20th, 2010. Delivered a talk: Magnetic nanoparticles in organic synthesis.

### Funded Projects

A Diversity Oriented Synthetic Approach toward Functionalized Thiazoles. Department of Science and Technology, Government of India (Fast Track Proposal). ₹ 17,00,000.00

Design, Synthesis and Structural Basis of G-Quadruplex DNA Binding Small Molecules. Council of Scientific and Industrial Research, India. ₹ 9,75,000.00

## Others

Visiting Fellow at University of Bristol (May 2010 to July 2010) to the Centre for Organised Matter Chemistry, School of Chemistry, University of Bristol. *Purpose:* Exploring interdisciplinary research on materials (nano particle) characterization.

## Priyadarsi De

### Publications

Li, M., H Li, **P De**, B S Sumerlin. 2011. "Thermoresponsive Block Copolymer-Protein Conjugates Prepared by Grafting-From via RAFT Polymerization." *Macromol. Rapid Commun.* 32(4), 354-359

Li, M., H. Li, A P Bapat, **P De**, B S Sumerlin. 2010. "Functional polymers and polymer-protein conjugates prepared by RAFT and thiol-ene reactions." *Polym. Prep.* 51, 689-690

Li, M., **P De**, H Li, B S Sumerlin. 2010. "Conjugation of RAFT-generated polymers to proteins by two consecutive thiol-ene reactions." *Polymer Chemistry*, 1, 854-859

### Patents filed/obtained

Johnson, P., P S Stayton, A S Hoffman, R Overell, A Gall, M Prieve, A Paschal, C Diab, **P De**. 2010. Micelles of hydrophilically shielded membrane-destabilizing copolymers. US Patent. WO 2010053597.

Johnson, P., P.S. Stayton, A S Hoffman, R Overell, A Gall, M Prieve, A Paschal, C Diab, **P De**. 2010. Heterogeneous polymeric micelles and conjugates for intracellular delivery. US Patent. WO/2010/021770.

Prieve, M. G., P H Johnson, P S Stayton, A S Hoffman, R W Overell, A S Gall, A E E Paschal, C Diab, **P De**, M S Declue, S D Monahan. 2010. Multiblock copolymers associated with polynucleotides for pharmaceutical compositions. US Patent. WO 2010054266.

### Teaching Programme

#### Theory Course

ID426: General Polymer Chemistry (with Dr. Raja Shunmugam, Dr. Sanjio S. Zade)

ID414: Introduction to Polymer Chemistry (with Dr. Raja Shunmugam)

#### Practical Course

CH222: Physical Chemistry Practical (with Dr. Pradip K. Ghorai, Dr. Amlan K. Roy and Dr. Pradipta Purkayastha)

CH212: Chemistry Laboratory (with Dr. Balaram Mukhopadhyay)

CH222: Physical Chemistry Practical (with Dr. Mousumi Das, Dr. Parna Gupta Bhattacharyya)

## Supervision of Students

### *Ph. D Students*

Sunirmal Pal

Saswati Ghosh Roy

Kamal Bauri

## Invited Talks

**De, P.** "Design and Synthesis of Amino Acid Based Macromolecular Architectures" at Chembiotek, Kolkata on November 25, 2010.

**De, P.** "Advanced Materials by Living/Controlled RAFT Polymerization Technique" in Indian Institute of Science-Department of Biotechnology, Government of India-University of New South Wells-University of Queensland Research Workshop at Indian Institute of Science, Bangalore, February 7-8, 2011.

**De, P.; Li, M.; Sumerlin, B. S.** "Synthesis of "smart" polymer-protein bioconjugates via RAFT polymerization" in Macro-2010, 11th International Conference on Frontiers of Polymers and Advanced Materials, Delhi, December 15-17, 2010.

Li, M.; Li, H.; Bapat, A. P.; **De, P.**; Sumerlin, B. S. "Functional polymers and polymer-protein conjugates prepared by RAFT and thiol-ene reactions" in 240th American Chemical Society National Meeting, Boston, United States, August 22-26, 2010.

Sumerlin, B. S., Li, M.; Li, H.; **De, P.** "Stimuli-responsive block copolymer-protein conjugates" in International Symposium on Stimuli-Responsive Materials, University of Southern Mississippi, Hattiesburg. October 2010.

Sumerlin, B. S. Li, H.; Li, M.; **De, P.** "Thermoresponsive polymer-protein conjugates prepared by grafting-to and grafting-from via RAFT polymerization" in Young Polymer Scientist Symposium, IUPAC World Polymer Congress (Macro2010), Glasgow, Scotland. July 2010.

Li, M.; **De, P.**; Sumerlin, B. S. "Functional polymers and polymer-protein conjugates prepared by RAFT and thiol-ene reactions" in Light on a Hill symposium in honor of the late Prof. Charlie Hoyle, Hattiesburg. April 2010.

## Conferences/Seminars Attended

Colloquium on Perspectives in Polymer Science & Technology, on November 27, 2010 at Indian Association for the Cultivation of Science, Kolkata.

## Funded Project

Project Title: Design and Synthesis of Amino Acid Based Macromolecular Architectures

Funding agency: Department of Science and Technology, Government of India

Total Cost (Rs.): ₹ 41,47,000.00

## B. M. Deb

### Publications

Sadhukhan, Mainak, P. K. Panigrahi and **B. M. Deb**. 2010. "Dynamics of hydrogen atom under a strong, time-dependent magnetic field." *Eur. Phys. Lett.* 91(2), 23001.

### Teaching Programme

#### Theory courses

ID211: Indian Heritage in Science  
CH221: Bonding Structure and Symmetry

### Supervision of Students

Ph. D Student: Mainak Sadhukhan

### Talks Delivered

Invited Lecture at the Theoretical Chemistry Symposium TCS10, Indian Institute of Technology Kanpur, 8 – 12 December, 2010 on Interaction of Atoms and Molecules with Strong Magnetic Fields

Institute Lecture on National Science Day, 28 February 2011, Indian Institute of Technology Kharagpur on Glimpses into Indian Heritage in sciences.

## Pradip Kumar Ghorai

### Publications

**Ghorai, Pradip Kr.** 2010. "Conformational Preferences of n-Butane Inside Zeolite NaY: Comparison of Other Related Properties with iso-Butane." *J. Phys. Chem. C*, 114, 6492.

**Ghorai, Pradip Kr.** And Sharon C Glotzer. 2010. "Atomistic Simulation Study of Striped Phase Separation in Mixed-Ligand Self-Assembled Monolayer Coated Nanoparticles." *J. Phys. Chem. C*, 2010, 114, 19182.

### Teaching programme

#### Theory courses

CH121: Chemical Reactions

#### Laboratory courses

CH222: Chemistry Lab (with Dr. Amlan K. Roy, Dr. Pradipa Purkayastha and Dr. Priyadarsi De)  
CH122: Chemistry Lab (with Dr. Sumit Khanra and Dr. Parna Gupta Bhattacharyya)

### Invited Talk

Delivered a talk entitled "Surfactant self-assembly on nanoparticle surfaces" at the Theoretical Chemistry Symposium TCS 10 at Indian Institute of Technology Kanpur, December 8th- 12th, 2010.

## Parna Gupta Bhattacharyya

### Publications

**Gupta, Parna** and Soumik Mandal. 2010. "Methyl 4-(1H-benzimidazol-2-yl)-benzoate trihydrate." *Acta Cryst.* E66, 02754.

### Teaching programme

#### Theory courses

CH313: Main Group Elements (with Swadhin Mandal)

#### Laboratory courses

CH 112: Chemistry Lab (with Sumit Khanra, Pradip Ghorai)

CH 222: Chemistry Lab (with Priyadarsi De, Mousumi Das)

### Supervision of student

Ph. D Student: Soumik Mandal (jointly with Swadhin Mandal)

### Conferences Attended

*International Symposium on Frontiers in Inorganic Chemistry at Indian Association for the Cultivation of Science, Kolkata from 11-13 December 2010.*

13th National Symposium on Chemistry, organised by Chemical Research Society of India at National Institute of Science Education and Research, Bhubaneswar from 4-6 February 2011.

3rd Inter IISER Chemistry Meet on Frontiers in synthetic and bioorganic chemistry at Indian Institute of Science Education and Research Mohali from 20-21 February 2011.

### Funded Project

Pt-group metal complexes with substituted bipyridine: DNA-binding agents to sensing materials (Project sanctioned in 2009, implemented from 2010). Department of Science and Technology, Government of India -SERC. ₹ 20,45,000.00

Ru(II)/Os(II)-Sugar Complexes as PET Biosensors of Lectins and Potential Therapeutics, Council of Scientific and Industrial Research, India; ₹18,40,000.00

## Debasish Haldar

### Publications

Baptiste, B., J. Zhu, **Debasish Haldar**, B. Kauffmann, J.-M. Léger and Ivan Huc. 2010. "Hybridization of long pyridine-dicarboxamide oligomers into multi-turn double helices: Slow strand association and dissociation, solvent dependence, and solid state structures." *Chemistry an Asian Journal*, 5, 1364–1375.

Jana, P, S. Maity, S. K. Maity and **Debasish Haldar**. 2011. "A new peptide motif in the formation of supramolecular double helices." *Chemical Communications*, 47(7), 2092-2094.

Jana, P., S. Maity and **Debasish Haldar**. 2011. "Insights into self-assembling nanoporous peptide and in situ reducing agent." *CrystEngComm*, 13(3), 973-978.

Jana, Poulami, Sibaprasad Maity and **Debasish Haldar**. 2010. "Developments in the synthesis of organometallic amino acids and analogues." *Current Organic Synthesis*, 7, 224-234.

### Teaching programme

#### *Theory courses*

CH322: Organic Synthesis

#### *Laboratory courses*

CH314: Organic Synthesis (with Dr. Jyotirmayee Dash)

4th year lab rotation for Ravi Kumar and Manish Garg

5th year Project of Pankaj Kumar

Post M.Sc. lab rotation for Subharanjan Biswas, Santu Bera, Bhriguram Das, Yerramsetti Pavan Kumar, Mousumi Samanta, Tapan Kuilya and Sreenivasarao Pagoti

### Supervision of students

Ph. D Students

Poulami Jana

Sibaprasad Maity

Suman K. Maity

### Talks Delivered

Delivered a talk entitled "Self-assembly of foldamers: structure and function" at 3rd Inter IISER Chemistry meeting 2011, Indian Institute Science Education and Research Mohali, Mohali, India, February 20-21, 2011.

Delivered an invited talk entitled "Supramolecular approach towards green chemistry" at Green Approach to Energy and Environment, Haldia, organised by Humboldt Club Kolkata, January 14-16, 2011.

### Funded Projects

"Molecular Recognition and Self-Assembly of Chromophore Based Smart Materials: A Novel Sensor" Department of Science and Technology, Government of India, ₹ 19,86,000.00

"Novel Chemosensor by Molecular Recognition of Embedded Amphiphilic Peptides and Co-embedded Reporter Dyes" Alexander von Humboldt Foundation, Germany. ₹ 4,00,000.00

### Others

Member of the Editorial Board, The Open Natural Products Journal, Bentham publication.

## Debasis Koley

### Teaching programme

#### Laboratory courses

CH122: Qualitative Inorganic Analysis lab (with Dr. M. Venkatraman, Dr. S. Mandal and Dr. S. Roy)

### Funded Projects

Department of Science and Technology fast-track project, title: "Understanding the mechanisms of important transition-metal catalyzed chemical transformations: A computational investigation." Department of Science and Technology, Value: ₹ 23,00,000.00

## Venkataramanan Mahalingam

### Publications

**Mahalingam, Venkataramanan**, Rafik Naccache, Fiorenzo Vetrone and John A Capobianco. 2011. *Chem. Commun.*, 47, 3481. (part of the work was done at IISER-Kolkata)

### Patents filed

van Veggel, F. C. J. M., MingqianTan, **Venkataramanan Mahalingam**, and V. Sudarsan. Blue Light Emitting Nanomaterials and Synthesis Thereof. Application No: PCT/US2009/045850

### Teaching programme

#### Theory courses

ID 420 : Nanoscale Materials and Ultrafast Phenomena (with Dr. Bipul Pal)

CH 422: Chemistry of Materials (with Dr. Sayan Battacharryya)

#### Laboratory courses

CH122: Qualitative Inorganic Analysis lab (with Dr. Debasis Koley, Dr. Soumijit Roy, Dr. Swadhin Mandal and Dr. Srikanth)

### Supervision of students

#### Ph. D Students

Chanchal Hazra

Shyam Sarkar

### Talks Delivered

"Lanthanide-doped Luminescent Nanomaterials" at the Indian Institute of Science Education and Research Mohali, Feb 20-21, 2011.

## Funded Projects

**Title:** Template-Assisted synthetic methods to develop new luminescent nanoarchitectures and their applications

**Agency:** Department of Science and Technology, Government of India

**Value:** ₹ 36,80,000.00

**Title:** Development of cyclopenta[c]heterol based conjugated systems for dye-sensitized solar cells (DSSCs). [PI: Dr. Sanjio S Zade and Co-PI Dr. Venkataramanan Mahalingam and Dr. K. Srikanth]

**Agency:** Department of Science and Technology, Government of India

**Value:** ₹ 31,00,000.00

**Title:** Design and Synthesis of Robust Lanthanide Nanocomposites and their applications”

**Agency:** Defence Research and Development Organisation

**Value:** ₹ 56,26,720.00

## Prasun Kumar Mandal

### Teaching Programme

#### *Theory courses*

CH315: Single-photon and Multi-photon Spectroscopy of Atoms and Molecules with Dr. Pradipta Purkayastha

ID 428: Fluorescence Spectroscopy: Principles and Applications

#### *Laboratory courses*

CH325: Chemistry Spectroscopy Laboratory with Dr. Subhajit Bandyopadhyay

CH315: Spectroscopic Characterization Laboratory (UV-Vis Spectroscopy) with Dr. Sayan Bhattacharyya

### Supervision of Students

#### *PhD Students*

Anup Ghosh

Tanmay Chatterjee

Sanjib Kumar Sardar (Joint supervision with Professor Sanjib Bagchi)

### Talks Delivered

Delivered a talk entitled “Towards semiconductor quantum dots (QDs) with superior photoluminescence properties: Spectrally and time-resolved single particle investigations on CdSe/CdS/ZnS QDs” in International Symposium on Luminescence Spectrometry held in Prague, Czech Republic, during 13th -16th July, 2010

Delivered a talk entitled "Single Molecule Investigation of Semiconductor Quantum Dot-Dye Hybrids Towards Understanding of Excitation Energy Transfer" in 16th International Workshop on Single Molecule Spectroscopy and Ultra Sensitive Analysis in the Life Sciences held in Berlin, Germany during 15th -17th September, 2010.

### Academic Visit

Visited and worked in the group of David Bensimon and Vincent Croquette, Ecole Normale Supérieure, Paris, France during summer of 2010 to pursue research work with Marie Curie Fellowship.

## Swadhin Mandal

### Publications

**Mandal, S. K.** and H W Roesky. 2010. "Assembling Hetero Metals Through Oxygen: An Efficient Way to Design Homogeneous Catalysts." *Acc. Chem. Res.*, **43**, 248–259

**Mandal, S. K.** and H W. Roesky. 2010. "Interstellar Molecules: Guides for New Chemistry." *Chem. Commun.*, **46**, 6016-6041 (Highlighted on Front Cover)

### Teaching Programme

#### Theory courses

CH313: Chemistry of Main Group Elements (with Dr. Parna Gupta Bhattacharya)

CH424: Physical Methods for Structural Elucidation (with Dr. Malla Reddy, Dr. Arindam Mukherjee and Dr. Rangeet Bhattacharya)

#### Laboratory courses

CH122: Chemical Analysis (with Dr. M. Venkataramanan, Dr. Debasis Koley, and Dr. Soumyajit Roy)

### Supervision of Students

#### PhD Students

Arup Mukherjee

Subhankar Santra

Tamal K Sen

Samaresh Chandra Sau

### Funded Projects

Title: Design and Synthesis of Heterometallic Catalysts: Olefin Polymerization, Copolymerization and Tandem Catalysis. Funding Agency: Department of Science and Technology, Government of India. Value: ₹19,44,000.00

Title: Syntheses and Design of Green Catalysts for Hydroamination Reactions Based on Phenalenyl Ligands. Funding Agency: Council of Scientific and Industrial Research. Value: ₹ 12,80,000.00

Title: Studies on the effects of metal nanoparticles on cancer cells: Implications in targeted therapy (with Dr. Tapas Sengupta). Funding Agency: Department of Biotechnology, Government of India. Value: ₹ 1,60,00,000.00

### Talks Delivered

"Catalytic Organic Transformation through Non-Traditional Metals" National Seminar on Recent Advances in Synthesis and Catalysis: 10-12 February, 2011 University of Dibrugarh.

### Others

Visiting Scientist to University of Goettingen, June 2010-July 2010.

## Arindam Mukherjee

### Teaching Programme

#### Theory courses

CH313: Main Group Chemistry

CH424: Physical methods in chemistry

CH111: Elements of Chemistry

ID427: Physical methods in Chemistry

### Supervision of Students

#### Ph. D. students

Suman Kumar Dey

Subhendu karmakar

Amrita Sarkar

Sudipta Bhattacharyya

### Conferences/Seminars attended

Coordination complexes as molecular magnets, University of Goettingen, Dec 2010,

### Funded Projects

Metal complexes of nitrogen mustards as anticancer agents, (SR-S1-IC-36-2010) Start date 28/02/2011

Funding Agency: Department of Science and Technology, Government of India

Amount: ₹ 25,67,000.00

## Balaram Mukhopadhyay

### Publications

- Mandal, Santanu, Nayan Sharma, **Balaram Mukhopadhyay**. 2010. "Synthesis of the tetrasaccharide glycone part of the triterpenoid saponin isolated from *Bellis perennis* (compositae)." *Tetrahedron: Asymmetry*, 21, 2172-2176.
- Mandal, Santanu, Sumita Mukherjee, Somnath Mukherjee and **Balaram Mukhopadhyay**. 2010. "Synthesis of a trisaccharide related to the triterpenoid saponin "kalopanaxsaponin I" isolated from *Nigella sativa*." *Journal of Carbohydrate Chemistry*, 29, 133-141.
- Mukherjee, Somnath, **Balaram Mukhopadhyay**. 2010. "La(OTf)<sub>3</sub>:an efficient promoter for thioglycoside activation in conjunction with *N*-iodosuccinimide." *Synlett*, 2853-2856.
- Rajput, Vishal Kumar, **Balaram Mukhopadhyay**. 2010. "Syntheses of a tetra- and a trisaccharides related to the non-reducing *O*-linked oligosaccharides of *Pseudallescheria boydii*." *Trends in Carbohydrate Research*, 2, 5-13.
- Verma, Prashant Ranjan, **Balaram Mukhopadhyay**. 2010. "Synthesis of a tetrasaccharide related to the *O*-antigen from *Azospirillum lipoferum* SR65." *Carbohydrate Research*, 345, 432-436.
- Verma, Priya, **Balaram Mukhopadhyay**. 2010. "Synthesis of glycosylated *N*-sulfonylamides using copper catalyzed multicomponent reaction with sugar alkynes and sulfonyl azides." *Trends in Carbohydrate Research*, 2, 35-41.
- Verma, Priya, Ritu Raj, Bimalendu Roy, **Balaram Mukhopadhyay**. 2010. "Synthesis of a tetrasaccharide related to the triterpenoid saponin isolated from *Schima noronhae*." *Tetrahedron: Asymmetry*, 21, 2413-2418.

### Teaching Programme

#### Theory courses

- CH425: Medicinal Chemistry: Carbohydrates and Peptides  
 CH423: Medicinal Chemistry: Carbohydrates, Peptides and Heterocycles  
 Seminar Course: 4th Year Integrated MS, Spring 2011 (with Dr. Subhajit Bandyopadhyay)

#### Laboratory courses

- CH122: Laboratory (with Dr. Swadhin Mandal, Dr. Parna Gupta Bhattacharyya, Dr. Venkatramanan Mahalingam and Dr. K. Srikanth)  
 CH212: Laboratory (With Dr. Priyadarsi De and Dr. Raja Shunmugam)

### Supervision of Students

#### Ph. D. students

Santanu Mandal

Priya Verma

Prashant Ranjan Verma

Somnath Mukherjee

*BS/MS/PBIP Students*

Mr. Nayan Sharma

Mr. Vipin Kabra

Mr. Arghya Modak (Jointly with Dr. Subhajit Bandyopadhyay)

Mr. Ritu Raj

Mr. Manish Arya

Mr. Nethi Vamshidhar

Ms. Rituparna Das

### **Talks Delivered**

Carbohydrates: The Sweet World: in the Annual Conference of Chemical Research Society of India (Kolkata chapter) held at Bengal Engineering and Science University, Shibpur. June 2010

Synthetic Carbohydrate Chemistry and Galectin Biology: Invited talk in the joint project workshop at Lund University, Sweden held on 8-10th May, 2010

Invited delegate in the XIV Organic Chemistry Conference organized by National Organic Symposium Trust (NOST) chaired by Prof. Vinod K. Singh at Goa held on 5-8th December, 2010

Synthetic Carbohydrate Chemistry: IISER Chemistry Meet at Indian Institute of Science Education and Research Mohali, February 20-21, 2011

Carbohydrates: The Sweet World: Central Drug Research Institute-National Institute of Pharmaceutical Education and Research-Raebarelli Joint Symposium at Central Drug Research Institute Lucknow, March 2011

### **Collaborative work**

Prof. Robert A. Field, Department of Biological Chemistry, John Innes Centre, Norwich.

Prof. Ulf J. Nilsson, Department of Organic Chemistry, Lund University.

Prof. David A. Russell, School of Chemical Sciences, University of East Anglia, Norwich.

Prof. Hakon Leffler, Division of MIB, Lund University.

### **Funded Projects**

Project Title: Synthesis of the oligosaccharides related to the repeating units of the O-antigens from *Shigella boydii* type-16 and type-17 and further vaccine designing (SR/S1/OC-67/2009)

Project Status: Implemented on 6th April, 2010

Duration: 3 Years (06.04.2010-05.04.2013)

Funding Agency: Department of Science and Technology, Government of India

Total cost: ₹ 22,65,000.00

Project Title: Synthesis hexasaccharide repeating unit of the O-antigen from *E. coli* O35 and a tetrasaccharides related to the capsular polysaccharide repeating unit of *Vibrio cholerae* serogroup O31 NRT36S

Project Status: Approved for funding

Duration: 3 Years

Funding Agency: Council of Scientific and Industrial Research

Total cost: ₹ 17,20,000.00

### Others

Editor: *Trends in Carbohydrate Chemistry* (www.trendscarbo.com)

Reviewer: *Journal of Organic Chemistry*

Reviewer: *Tetrahedron Letters*

Reviewer: *Carbohydrate Research*

Reviewer: *Synthetic Communications*

Reviewer: *Molecules*

## Pradipta Purkayastha

### Publications

Das, T., A. Kumar, P. Ghosh, A. Maity, S.S. Jaffer, and **P. Purkayastha**. 2010. "Interaction of twisted intramolecular charge transfer probe loaded silver nanoparticles with the hydrophobic nanocavities of cyclodextrins." *J. Phys. Chem. C* 114, 19635-19640.

Ghosh, P., S.S. Jaffer and **P. Purkayastha**. 2011. "Effect of cyclodextrins on the photophysics of three indoloquinoline derivatives: An intriguing fluorometric study." *J. Phys. Chem. B* 115(9), 2046-2054.

Ghosh, P., S.S. Jaffer, T. Das, A. Maity, M. Kumar, D. Kumar, and **P. Purkayastha**. 2011. "Solvatochromic study of three indoloquinoline derivatives: Effect of chloro group/s on the photophysics of the compounds." *J. Lumin.* 131(1), 147-154

Jaffer, S.S. and **P. Purkayastha**. 2010. "Steady state fluorescence spectroscopic technique revealing the thermodynamics of fragmentation of compound induced  $\alpha$ -cyclodextrin nanotubular suprastructures." *J. Colloid Interface Sci.* 342, 57-61.

Jaffer, S.S., P. Ghosh, A. Das, and **P. Purkayastha**. 2010. "Opening of DNA double helix at room temperature: Application of  $\alpha$ -cyclodextrin self-aggregates." *Nanoscale* 2, 1420-1422.

**Purkayastha, P.** 2010. " $\text{Cu}^{2+}$  induced charge transfer switch by choosing the right cyclodextrin environment." *J. Photochem. Photobiol. A: Chem.* 212, 43-48.

## Teaching programme

### Theory courses

CH 323: Single Photon and Multi Photon Spectroscopy of Atoms and Molecules (with Dr. Prasun K. Mondal)

CH 211: Spectroscopy and Other Physical Methods for Molecules and Solids

### Laboratory courses

CH 222: Chemistry Lab (with Dr. Priyadarsi De, Dr. Pradip Ghorai and Dr. Amlan Kusum Roy)

## Supervision of students

### Ph. D Students

S. Syed Jaffer

Prasun Ghosh

Arnab Maity

Tarasankar Das

Amrita Sarkar jointly with Prof. Sanjib Bagchi

Niraja Kedia jointly with Prof. Sanjib Bagchi

## Talks Delivered

Three Cryptosanguinolentine Derivatives: Photophysics in the Nanocavities of Cyclodextrins, National Symposium on Radiation and Photochemistry (NSRP-2011), 2011. Jai Narain Vyas University, Jodhpur, India, March, 10-12, 2011.

The Cyclodextrin Nanotubular Suprastructures, Conference on Molecules to Materials. Haldia Government College, March 16-17, 2011.

## Funded Projects

"Physicochemical characterization of guest molecule induced cyclodextrin nanotubular suprastructures," sanctioned by the Council of Scientific and Industrial Research (January 2009 – December 2011).

Value: ₹ 10,32,000.00

## C. Malla Reddy

### Publications

Kiran, M. S. R. N., S. Varughese, **C M Reddy**, U Ramamurty, and G R Desiraju. 2010. "Mechanical Anisotropy in Crystalline Saccharin: Nanoindentation Studies." *Cryst. Growth Des.*, 10, 4650–4655

Rambabu, D., G R Krishna, **C M Reddy** and M Pal. 2010. "4-[(4-Methylbenzyl)amino]-3-[(4-methylbenzyl)iminomethyl]-2H-chromen-2-one." *Acta Cryst. E66*, o2870

**Reddy, C. M.**, G R Krishna, S Ghosh. 2010. "Mechanical properties of molecular crystals—applications to crystal engineering" *CrystEngComm*, 12, 2296–2314. (Review)

### Teaching programme

#### Theory courses

CH312: Physical Organic Chemistry

ID427: Physical Methods for Structure Elucidation (with Dr. Rangeet Bhattacharyya, Dr. Swadin Mandal and Dr. Arindam Mukherjee)

### Supervision of students

#### Ph. D Students

G. Ramakrishna

Partha Pratim Bag

Soumyajit Ghosh

### Talks Delivered

1st China-India-Singapore Symposium on Crystal Engineering, 30 July to 2 Aug 2010, National University of Singapore

9th International Workshop on the Crystal Growth of Organic Materials, 4-7 Aug 2010, Nanyang Technological University

17th Larson Workshop, Oct 3-6, 2010, Department of Chemical Engineering, Rutgers University

### Funded Projects

Title: Crystal Engineering of Biotin (Vitamin B-7) Co-crystals

Funding agency: Department of Science and Technology, Government of India (Fast-Track Project; No.SR/FT/CS-074/2009)

Value: ₹ 19,40,000.00

## Amlan Kusum Roy

### Publications

**Roy, Amlan K.**, J. L. Speyer, L. Bartell and D. Neuhauser. 2010. "Spin-birefringence in molecular currents: Tellurium and gold complexes." *Chem. Phys. Lett.* 484 104-109. (Considered significant contribution by the Editor).

### Book Chapter

**Roy, Amlan K.** 2010. "A new density functional method for electronic structure calculation of atoms and molecules." In *Handbook of Computational Chemistry Research*, pp. 409-434, Charles T. Collett and Christopher D. Robson (Eds.), Nova Science Publishers, Hauppauge, New York.

**Roy, Amlan K.** 2011. "A general method for central potentials in quantum mechanics." In *Mathematical Chemistry*, pp. 555-599 W. I. Hong (Ed.), Hauppauge: Nova Science Publishers

### Teaching programme

#### Theory courses

CH311: Quantum Chemistry

ID418: Numerical Methods (with Dr. Dibyendu Nandi and Dr. Arindam Kundagrami)

ID426: Symmetry

### Soumyajit Roy

#### Teaching programme

##### Laboratory courses

CH122: Laboratory (with Dr. K. Srikanth, Dr. Swadhin Mandal, Dr. M. Venkatramanan Mahalingam, Dr. Debasis Koley)

#### Conferences/Seminars Attended

Inter-IISER Chemistry Meet at Mohali, India, 2011.

### Raja Shunmugam

#### Teaching

##### Theory courses

ID414: Chemistry and Physical aspects of Polymers (with Dr. Priyadarsi De)

##### Laboratory courses

CH325-Polymer Synthesis (with Dr. Sanjio Zade)

#### Students Supervision

Ph. D Students

Santu Sarkar

Sourav Bhattacharya

Sibsankar Mane

Vijay Nirala

Junior Research Fellow (Project funded by Defence Research and Development Organisation)

Mutyala Naidu Ganivada

### Talks Delivered

**Raja Shunmugam**, Engineering polymers towards drug delivery and sensor applications, Nanotech 2010 International Conference held between 19th-21st Nov. 2010 in Kochi, India.

**Raja Shunmugam**, Engineering block copolymers for metal assisted self-assembled super structures. Perspective in Polymer Science and Technology, at Indian Association for the Cultivation of Science, Jadavpur, on November 27th 2010.

Vijayakameswararao N, Santu Sarkar, Shivshankar Mane, Sourav Battachariya and **Raja Shunmugam**, Designing polymers towards drug delivery and sensor applications. Macro 2010-International Conference on Polymers held between 15th to 17th Dec. 2010 at Delhi India.

**Raja Shunmugam**, Engineering polymers towards drug delivery and sensor applications, 3rd IISER Chemistry Meet held between 20th-21st Feb. 2011 in IISER-Mohali India.

### Funded Projects

"Turn On" Sensors for Arsenic Threats in Drinking Water SR/FT/CS-017/2009. Department of Science and Technology, Government of India. ₹ 14,00,000.00

Ramanujan Fellowship, SR/S2/RJN-27/2009. Department of Science and Technology, Government of India. ₹ 73,00,000.00

"Sensing of chemical warfare agents with norbornene based polymers ERIP/ER/0904503/14/01. DRDO. ₹ 17,47,000.00

Fluorometric sensor for cadmium in drinking water DST/TSG/PT/2009/100. Department of Science and Technology, Government of India. ₹ 47,00,000.00

Understanding the cellular consequences of axonal loss and demyelination in viral infection using in vitro myelination system. Dr. Jayasri Das Sarma (PI). Council of Scientific and Industrial Research. ₹ 15,00,000.00

### Awards, Prizes etc.

Ramanujan Fellowship, Department of Science and Technology, Government of India.

### Ashwani Kumar Tiwari

#### Conferences Attended

Inter IISER Chemistry Meet at Indian Institute of Science Education and Research Mohali.

## Talks Delivered

Delivered an invited Talk entitled "Dynamical Insights into heterogeneous Catalysis: Methane Dissociation on Metal Surfaces" in Theoretical Chemistry Symposium at Indian Institute of Technology Kanpur, 8-12 December 2010.

Delivered two invited Talks entitled "Dynamics of Molecular Reactions on Surfaces" and "Quantum Chemical Studies on Salicylic Acid" in a Workshop on Electronic Structure Calculations at Banaras Hindu University, Varanasi, 26-27 March 2011.

## Sanjio S. Zade

### Publications

Das, Soumyajit and **Sanjio S. Zade**. 2010. "Poly(cyclopenta[c]selenophene): a new polyselenophene." *Chem. Commun.* 46, 1168-1170.

Das, Soumyajit, Pradip K. Dutta, Snigdha Panda and **Sanjio S. Zade**. 2010. "3,4-Ethylenedioxythiophene and 3,4-Ethylenedioxy-selenophene: Synthesis and Reactivity of C<sub>α</sub>-Si Bond." *J. Org. Chem.* 75, 4869-4871.

Mukherjee, Anna J., **Sanjio S. Zade**, Harkesh B. Singh and Raghavan B. Sunoj. 2010. "Organoselenium Chemistry: Role of Intramolecular Interactions." *Chem. Rev.* 110, 4357-4416.

**Zade, Sanjio S.** and Michael Bendikov. 2010. "Heptacene and Beyond: The Longest Characterized Acenes." *Angew. Chem. Int. Ed.* 49, 4012-4015.

**Zade, Sanjio S.**, Natalia Zamoshchik and Michael Bendikov. 2011. "From Short Conjugated Oligomers to Conjugated Polymers. Lessons from Studies on Long Conjugated Oligomers." *Acc. Chem. Res.* 44, 14-24

### Teaching Programme

#### Theory courses

CH411: Organometallic Chemistry

#### Laboratory courses

CH325: Polymer Chemistry Lab (with Dr Raja Shunmugam)

### Supervision of Students

#### Ph. D Students

Soumyajit Das

Pradip Kumar Dutta

Palas Baran Pati

Anjan Bedi

## Research Collaboration

Visited Weizmann Institute of Science as a visiting scientist in the group of Dr. Michael Bendikov for the collaborative research.

## Talks Delivered

Delivered an invited talk in the national symposium "Frontier in Chemical Sciences-2010" held at Indian Institute of Technology Guwahati, during 3-4 Dec 2010

## Funded Projects

"Development of cyclopenta[c]heterol based conjugated systems for dye-sensitized solar cells (DSSCs)" under Technology System Development Program, Department of Science and Technology, Government of India. ₹ 31,00,000.00 (as PI in collaboration with Dr. K. Srikanth and M. Venkatramanan as Co-PIs)

## DEPARTMENT OF EARTH SCIENCES

### Manua Banerjee

#### Teaching Programme

##### *Theory courses*

ES312: Structural Geology

ES322: Petrology (with Prof. Somnath Dasgupta and Dr. V. Ravikant)

ES 424: Seminar (with Dr. Manoj Jaiswal)

##### *Laboratory courses*

ES324: Petrology Laboratory (with Prof. Somnath Dasgupta, Dr. Biswajit Ghosh and Dr. V. Ravikant)

ES315: Structural Geology (with Dr. V. Ravikant)

Fieldwork: 1. Digha-Recent Sedimentary Deposits, September 2010

2. Galudih-Structural Mapping and Rock Type Study, December 2010

### Devapriya Chattopadhyay

#### Teaching Programme

##### *Theory courses*

ES411: Sedimentology and Principles of Stratigraphy

ES323: Principles of Paleontology

### Laboratory courses

ES412: Sedimentology Laboratory (with Dr. Jitendra Pattanaik)

ES323: Invertebrate Paleontology Laboratory

ES411: Seminar Course (with Dr. Tarun Dalai)

### Funded Projects

Effect of long-term climate change on molluscs: A case study on Cenozoic coastal deposits of Gujarat, India. Ministry of Earth Sciences, ₹ 70,00,000.00

Evaluating relative importance of biotic and environmental factors in body size evolution of Recent invertebrates from Red Sea. Ernst-Mach Research Grant, OeAD-GmbH, Austria, \$6000

## Tarun Kumar Dalai

### Teaching Programme

#### Theory courses

ES311: Mineralogy and Geochemistry: (with Dr. Ravikant Vadlamani)

ES422: Isotope Geology (with Dr. Prasanta Sanyal)

ID441: Introduction to Oceanography (with Dr. Jitendra Kumar Pattanaik)

### Funded Projects

Chemical weathering of black shales: Implications for release of CO<sub>2</sub> to the atmosphere and trace metals to the rivers.

Funding Agency: Department of Science and Technology, Government of India.

Value: ₹ 19,84,000.00

Investigation of trace metal geochemistry and anthropogenic inputs in the Ganga (Hooghly) River Estuary.

Funding Agency: Ministry of Earth Sciences

Value: ₹ 1,35,40,000.00

## Manoj Kumar Jaiswal

### Publications

Wu, T.S., **M K Jaiswal**, N L Yunong, Y W Chen, Y G Chen. 2010. "Residual luminescence in modern debris flow deposits from western Taiwan: A single grain approach." *Journal of Asian Earth Sciences*, 38, 274-282 (doi:10.1016/j.jseaes.2010.02.002)

## Teaching Programme

### *Theory courses*

ID 415: Geomorphology and Environmental Geochemistry (with Dr. Joyanto Routh)

ES221: Introduction to Geology (with Dr. Joyanto Routh)

ES424: Coordinator of 4th year MS students seminar (with Dr. Manua Banerjee)

## Conferences/Seminars Attended

One day seminar on "ArcGIS and its applications" by ESRI on 20th October, 2010, Kolkata.

## Supriyo Mitra

### Teaching Programme

#### *Theory courses*

ES313 Geophysics

ES321 Geodynamics

#### *Laboratory courses*

ES413 Geophysics (with Jitendra Kumar Patnaik)

## Funded Projects

Project Title: 3-Dimensional imaging of the lithosphere and active deformation across Sikkim-Darjeeling Himalaya and a comparison with NW-Himalaya. PI: Supriyo Mitra. Co-PIs: S.S. Rai (National Geophysical Research Institute) and V. Joshi (G. B. Pant Institute of Himalayan Environment and Development). Sponsor: Department of Science and Technology. Value: ₹ 55,50,000.00

Project Title: The exhumation factor in the genesis of inverted metamorphic sequences an evaluation from structure, metamorphism, fluid inclusion and earthquakes. PI: Saibal Gupta, Co-PIs: M. K. Panigrahi (Indian Institute of Technology Kharagpur), Supriyo Mitra. Sponsor: Department of Science and Technology (DST). Value: ₹ 14,22,000.00

## Awards and Honours

2010 INSA Medal for Young Scientist in Earth Sciences

## Jitendra Kumar Pattanaik

### Publications

#### *Conference Proceedings*

Khare N., P Govil, Pankaj Kumar, A Mazumder, S Chopra, **J K Pattanaik**, S Balakrishnan and G S Roonwal. 2010. "10Be as palaeoclimatic tracer: Initial results from South Western Indian Ocean",

Proceedings of the International conference on Application of Radiotracers in Chemical, Environmental and Biological Sciences (ARCEBS), Vol. 3, 7–13th Nov. 2010, Saha Institute of Nuclear Physics, Kolkata, pp no. 107–109.

Pankaj Kumar, Archana Bohra, **J. K. Pattanaik**, S. Ojha, A. Jhingan, S. Gargari, R. Joshi, S. Balakrishnan, G. S. Roonwal, S. Chopra and D. Kanjilal. 2011. "AMS facility at IUAC, New Delhi – Status Report", International conference, Indian Particle Accelerator Conference (INPAC), 2011, New Delhi.

Pankaj Kumar, **J K Pattanaik**, Sunil Ojha, S Gargari, R Joshi, S Balakrishnan, S Chopra and D Kanjilal. 2010. "10Be measurements at IUAC-AMS Facility", Proceedings of the International conference on Application of Radiotracers in Chemical, Environmental and Biological Sciences (ARCEBS), Vol. 3, 7–13th Nov. 2010, Saha Institute of Nuclear Physics, Kolkata, pp no. 104–106.

**Pattanaik J. K.**, S Balakrishnan, R Bhutani and P Singh. 2010. "Sr isotope geochemical studies on rivers of South India: Evidence for high CO<sub>2</sub> consumption rates on chemical weathering of silicates", *Geochemica et Cosmochemica Acta*, Vol. 74, Issues 12, A799, Proceedings of the 20th Annual V. M. Goldschmidt Conference 2010, Knoxville, Tennessee.

## Teaching Programme

### Theory courses

ES423: Economic Geology (with Prof. Somanath Dasgupta)

ID441: Introduction to Oceanography (with Dr. Tarun Dalai)

### Laboratory courses

ES413: Geophysics Lab (with Dr. Supriyo Mitra)

ES412: Sedimentology Lab (with Dr. Devapriya Chattopadhyay)

ES325: Paleontology Lab (with Dr. Devapriya Chattopadhyay)

## Joyanto Routh

### Publications

Baskar, S., R Baskar, and **J Routh**. 2011. "Biogenic evidences of moonmilk deposition in the Mawmluh Cave, Meghalaya, India." *Geomicrobiology Journal* 28, 252-265.

Choudhary, P., **J Routh**. 2010. "Distribution of polycyclic aromatic hydrocarbons in Kumaon Himalayan lakes, northwest India." *Organic Geochemistry* 41(9), 891-894.

Ranjan, R.K., **J Routh**, A L Ramanathan. 2010. "Bulk organic matter characteristics in the Pichavaram mangrove-estuarine complex, south-eastern India." *Applied Geochemistry* 25, 1176-1186.

Choudhary, P., **J Routh**, 2010. "Organic geochemical record of increased productivity in Lake Naukuchiyatal, Kumaun Himalayas, India." *Environmental Earth Sciences* 60(4), 837-843.

## Teaching Programme

### Theory courses

- ES221: Introduction to Earth Science (with Dr. Manoj Jaiswal)
- ID415: Environmental geochemistry and Geomorphology (with Dr. Manoj Jaiswal)
- ID416: Hydrology and Rock Mechanics (with Dr. Sujata Ray)
- ID429: Biogeochemical Cycles

## Supervision of students

### Ph. D students

- Gustaf Hugelius (Stockholm University)
- Rajesh Ranjan (Stockholm University)
- Xavier Middleton (Stockholm University)
- Devnita Ghosh (Indian Institute of Science Education and Research Kolkata)

## Visit to foreign labs in connection with ongoing projects

- Bureau of Mines, Thimpu (Bhutan) for fieldwork (2010)
- Heidelberg University (2010 and 2011)
- Stellenbosch University (2011) for fieldwork
- University of East Anglia (2011)
- Continuing work with ongoing projects at Stockholm University and Örebro University in Sweden in lake sediments in the organic geochemistry lab

## Prasanta Sanyal

### Teaching Programme

#### Theory courses

- ES422: Isotope Geology (with Dr. Tarun Kumar Dalai)
- ES421: Stratigraphy (with Dr. V. Ravikant)

## Supervision of students

### Ph. D students

- Shailesh Agrawal (Thesis submitted at Indian Institute of Technology Kharagpur)
- Kshirod Sahoo

## Funded Projects

- Calcretes on metamorphosed rocks of the Precambrian Eastern Ghats Mobile Belt, Orissa: Genesis and implications to climate. PI: Dr. Prasanta Sanyal. Sponsor: Council of Scientific and Industrial Research. Value: ₹ 18,00,000.00

Reconstruction of monsoonal rainfall from the late Quaternary Himalayan foreland sediments by Stable Isotope tracers: implications to climate forcing on vegetation and river response. Principal Investigator: Dr. Prasanta Sanyal; Co-PI: Dr A Sarkar (Indian Institute of Technology Kharagpur). Sponsor: Department of Science and technology, Government of India. Value: ₹ 19,00,000.00

## Ravikant Vadlamani

### Publications

**Ravikant, V.**, M T Clementz, S Bajpai, S Sarvanan, V Prasad, I B Singh. 2010. "Early Eocene warming events and the timing of terrestrial faunal exchange between India and Asia." *Geology* 39(1):15-18.

**Ravikant, V.**, P R Golani 2011. "Rb-Sr direct dating of pyrite from the Pipela VMS Zn-Cu prospect, Rajasthan, NW India." *Journal of the Geological Society of India* 77:149-159.

### Conference Proceedings

**Ravikant, V.** "Probable ~1.9 Ga-aged large igneous event in the southeastern margin of Eastern Dharwar craton, SE India: necessity for testing contrasting geodynamic models through high-resolution zircon geochronology and geochemistry." Presentation at the 5th International SHRIMP and High Resolution Geochronology Conference, Beijing, October 11-16, 2010

### Teaching Programme

#### Theory courses

ES311: Mineralogy & Geochemistry with Dr Tarun K Dalai

ES322: Igneous and Metamorphic Petrology with Prof Somnath Dasgupta and Dr Manua Banerjee

ES421: Stratigraphy (Phanerozoic and Precambrian Stratigraphy) with Dr Prasanta Sanyal

#### Laboratory courses

ES315: Optical Mineralogy Lab

ES314: Structural Geology lab with Dr Manua Banerjee

ES324: Igneous and Metamorphic Petrology Lab with Prof Somnath Dasgupta and Dr Manua Banerjee

### Supervision of students

Saju Varghese (co Supervisor, registered at Indian Institute of Technology Roorkee)

Krishna Kumar (co Supervisor, registered at Indian Institute of Technology Roorkee)

Rimjhim Singh (co Supervisor registered at Indian Institute of Technology Roorkee)

**Invited Talk**

The dynamic Earth: evidences from supercontinents. Invited talk at the Indian Council for Social Sciences-Earth Sciences session, Guwahati University, Guwahati (December 2010).

**Funded Projects**

Lode gold mineralization in the Southern Granulite Terrain: geochemical and petrological constraints on their genesis (2011-2014 – three-year project; ₹ 43,00,000.00) [File No. SR/S4/ES-430/2009]

Understanding geodynamic processes associated with the Permian mafic magmatic suites of 'northern India'. Three-year project sanctioned from the University of Hong Kong. (HK\$ 77,00,000.00)

On the stratigraphical subdivision and correlation of the early Precambrian of China and Asia". Project No. 1212010611802 of the Geological Survey of China, which involves the correlation research of the early Precambrian of the Indian, North China and Siberian cratons. Totally funded by the Geological Survey of China

Climate changes during major Late Cretaceous-Cenozoic stages in marine sequences of Kutch, western India: inputs from strontium, carbon and oxygen isotopes and trace and rare earth elemental proxies, Ministry of Earth Sciences (MoES), approx ₹ 90,00,000.00 (for a five-year project).

**DEPARTMENT OF MATHEMATICS****Veerendra Vikram Awasthi****Teaching Programme***Theory courses*

- MA111: Single Variable Analysis
- MA518: Homotopy and Homology Theory
- MA423: Differential Geometry

*Seminar Courses*

- SM411: On Strict Contractibility
- SM421: Nagata-Smirnov Metrization Theorem

## Anirban Banerjee

### Teaching Programme

#### Theory courses

MA121: Linear Algebra and Differential equation (with Dr. Satyaki Mazumder)

#### Laboratory courses

MA424/ID443: Computer Lab

## Saugata Bandyopadhyay

### Teaching Programme

#### Theory courses

MA 511: Partial Differential Equations

MA 513: Distribution theory and Sobolev Spaces

MA 324: Integration and Measure

ID 442: Ordinary Differential Equations

### Talks Delivered and Meeting Presentations

International Congress of Mathematicians Satellite Conference on Partial Differential Equations and Related Topics, August 13-17, 2010, Bangalore.

### Other academic/educational activities

Visiting Scientist, Tata Institute of Fundamental Research-Centre for Applicable Mathematics, Bangalore (July 2010).

## Sachindranath Jayaraman

### Publications

**Jayaraman, Sachindranath.** 2010. "Nonnegative generalized inverses and interval linear programs." *Numerical Functional Analysis and Optimization*, 31(11), 1272-1282.

**Jayaraman, Sachindranath.** 2010. "Nonnegative reflexive generalized inverses and applications to group monotonicity, Operators and Matrices." 4(3), 353-363.

### Teaching

#### Theory courses

MA313: Graph Theory and Combinatorics

MA316: Advanced Linear Algebra

MA321: Topology

MA324: Integration and Measure

### Talks Delivered

Sachindranath Jayaraman, Some aspects of weak monotonicity, Topics in Functional and Numerical Analysis (TOFNA), Indian Institute of Technology Mumbai, December 2005.

## Satyaki Mazumder

### Teaching programme

#### Theory courses

MA121: Linear Algebra and Differential equation (with Dr. Anirban Banerjee)

MA523: Decision Theory and Bayesian Perspective

#### Laboratory courses

MA325: Statistics Laboratory

### Talks Delivered

"Affine Invariant, Robust and Computationally Easy Multivariate Outlyingness Functions", Invited Talk in Indian Statistical Institute, Kolkata, January, 2011

## Himadri Mukherjee

### Teaching programme

#### Theory courses

MA312: Algebra I

MA322: Geometry of Curves and Surfaces

MA422: Representations of Groups and Algebras

MA422: Representation theory of Groups and Algebras

MA 515: Riemann Surfaces

## Asok K. Nanda

### Publications

Kundu, Chanchal and **Asok K. Nanda** (2010): Some Reliability Properties of the Inactivity Time. *Communications in Statistics - Theory and Methods*, 39(5), 899-911.

Kundu, Chanchal, **Asok K. Nanda** and Sudhansu S. Maiti (2010): Some Distributional Results Through Past Entropy. *Journal of Statistical Planning and Inference*, 140(5), 1280-1291.

Maiti, Sudhansu S., Mahendra Saha and **Asok K. Nanda**. 2010. "On Generalizing Process Capability Indices." *Journal of Quality Technology and Quality Management*, Vol. 7(3), 279-300.

**Nanda, Asok K.** and Amarjit Kundu. 2011. "Comparison of Two Repairable Systems." *Statistics and Probability Letters*, Vol. 81, 446-450.

### Teaching programme

#### Theory/Seminar courses

ID417: Mathematical Statistics

MA516: Multivariate Analysis

MA221: Probability and Statistics

SM421: Seminar

Project (5th Year) (one student)

### Supervision of students

Ph. D Students

Suchismita Das

Satya Kumar Misra (Joint Supervisor-KIIT University, Bhubaneswar)

### Talks Delivered

An invited talk given at the "National Seminar on Reliability: Theory and Practice" held at the Department of Statistics, University of Calcutta during January 28-29, 2011.

An invited talk given at the "International Conference on Development and Application of Statistics in Emerging Areas of Science and Technology" held during December 8-10, 2010 at the Department of Statistics, Jammu University.

Chaired a session at the National Seminar on Statistics and Informatics for Massive Data Sets organized by the Department of Agricultural Statistics, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, West Bengal, India and the Department of Statistics, Kalyani University, Kalyani, Nadia, West Bengal, India during December 3-5, 2010.

Chaired a session at the "Workshop on Reliability Theory and Survival Analysis" held during November 25-27, 2010 at the Department of Mathematics, Indian Institute of Technology Bombay, Mumbai, India.

A seminar given in the Stastical Quality Control and Reliability Meeting at Indian Statistical Institute, Kolkata on November 14, 2010.

A seminar given in the Stastical Quality Control and Reliability Meeting at Indian Statistical Institute, Kolkata on August 12, 2010.

### Other academic/educational activities

Associate Editor of the journal "Statistics and Probability Letters" since May, 2010.

Associate Editor of the "Journal of Indian Statistical Association" since May, 2010.

Associate Editor of the journal "Communications in Statistics- Theory and Methods" since February, 2009.

Associate Editor of the journal "Communications in Statistics- Simulation and Computation" since February, 2009.

## **Subrata Shyam Roy**

### **Teaching programme**

#### *Theory*

MA411: Advanced complex analysis

MA323: Algebra II

MA421: Fourier analysis (with Dr. Aparajita Dasgupta)

SM421: Guided Antareep Mondal and Sameer Desai

MA524: Operator theory and operator algebras

### **Conference Attended**

Attended Mathematics Meeting at Coorg, Karnataka, February 23-27, 2011

## **Kaneenika Sinha**

### **Teaching programme**

#### *Theory*

Maths 314: Elementary Number Theory

### **Funded Projects**

The non-vanishing of central values of the Rankin-Selberg L-Functions, a research project undertaken with Professor Henryk Iwaniec, funded by Mathematical Sciences Research Institute, Berkeley.

Zeros of the zeta functions of plane curves, a research project undertaken with Professors Chantal David, Matilde Lalín, Alina Bucur and Brooke Feigon, funded by Mathematical Sciences Research Institute, Berkeley and The Natural Sciences and Engineering Research Council of Canada.

### **Others**

Arithmetic Statistics Postdoctoral Fellowship from Mathematical Sciences Research Institute, Berkeley from January to May 2011.

## DEPARTMENT OF PHYSICAL SCIENCES

### Ayan Banerjee

#### Publications

##### *Conference Proceeding*

Maity, Sandip, **Ayan Banerjee**, and Chayan Mitra. 2010. "Temperature dependence of the reflectance of metals at visible wavelengths", *Proc. SPIE 7792*, 77920D; doi:10.1117/12.856785

#### Teaching Activities

##### *Theory courses*

HU111: Communication Skills (with Anindita Bhadra)

PH512: Atomic and Molecular Physics (with Dhananjay Nandi)

##### *Laboratory courses*

PH212: Modern Physics (with Dr. Goutam Deb Mukherjee)

PH221: Waves and Optics (with Dr. Nirmalya Ghosh, Dr. Bhavtosh Bansal)

PH424: Advanced Optics (with Dr. Satyabrata Raj)

SM411: Seminar Course (with Prof Prasanta Panigrahi, Dr Chiranjib Mitra, and Dr Ananda Dasgupta)

#### Conferences, Seminars, Symposia, Workshops organized

Co-organized the Indo-Brazil Workshop on Cold Atoms, Mesoscopic Systems, and Quantum Information, Hyderabad, Oct 16 – 18, 2010.

#### Conferences/Workshops attended

SPIE Conference on Optics and Photonics, San Diego, August 2 – 5, 2010 – talk given entitled "Temperature Dependence of the Reflectance of Metals at Visible Wavelengths".

Indo-Brazil Workshop on Cold Atoms, Mesoscopic Systems, and Quantum Information, Hyderabad, Oct 16 – 18, 2010 – delivered invited talk entitled "Exploring the dynamics of Mesoscopic Particles using Optical Tweezers".

Science and Engineering Research Council School on Preparatory Optics held at Indian Institute of Technology Guwahati between November 14-16, 2010 – conducted practical classes for post-graduate and research students.

#### Talks Delivered

Visited University of Texas at Arlington, August 2010 and delivered a talk entitled "Tuning Widely: Optical Resonators from Precision Frequency Metrology to Biodetection".

Visited Niels Bohr Institute, Copenhagen, August 2010 and delivered a talk entitled "Tuning Widely: Optical Cavities from Biosensing to Optical Tweezers".

## Narayan Banerjee

### Publications

**Banerjee, Narayan**, S. Das, K. Ganguly. 2010. "Chameleon field and the late time acceleration of the universe." *Pramana*, 74 (3), L481-L489.

### Teaching Activities

#### Theory courses

ID-121: Thermodynamics

ID421 General Relativity and Cosmology (with Dr. R.K. Nayek)

### Students Supervision

Ph. D Student: Barun Majumder

### Talks Delivered and Meeting Presentations

Attended IAGRG meeting at HRI, Allahabad in January 2011. Chaired one session

Invited talk at an International Conference on Mathematics and Computational Sciences in March 2011 at Department of Applied Mathematics, University of Calcutta.

Gave a 6 lecture course on General Relativity in May, 2010 at Harish-Chandra Research Institute, Allahabad

Gave a 12 lecture course on General Relativity in the Science and Engineering Research Council School at Birla Institute of Technology and Science, Pilani, Goa in November 2010.

Gave an 8-lecture course on Cosmology at Assam University, Silchar in February 2011.

### Others

Member of UG Board of Studies of Physics, Calcutta University

Member of Special committee, School of Physical Sciences, Jawharlal Nehru University.

### Education, Public Outreach and Synergistic Activities

Gave popular and semi-popular talks at various places, mainly other universities and Undergraduate collages.

## Soumitro Banerjee

### Publications

Ing, J., E. Pavlovskaja, M. Wiercigroch, and **S. Banerjee**. 2010. "Bifurcation analysis of an impact oscillator with one sided elastic constraint near grazing," *Physica D*, Vol. 239, pp.312-321.

Kundu, S., **S. Banerjee**, and D. Giaouris. 2010. "Vanishing singularity in hard impacting systems," *Discrete & Continuous Dynamical Systems, part B*, Vol.16, No.1.

Pavlovskaja, E., J. Ing, M. Wiercigroch, and **S. Banerjee**. 2010. "Complex dynamics of bilinear oscillator close to grazing," *International Journal on Bifurcation & Chaos*, Vol. 20, No. 11, pp. 3801-3817.

### **Teaching programme**

#### *Theory courses*

ID423: The Method of Science

ID445: Nonlinear Dynamics and Chaos Theory

### **Talks Delivered**

I. Syranidis, D. Giaouris, A. Yakovlev, and S. Banerjee, "Stability analysis of limit cycles in CMOS circuits by Floquet theory and Filippov method," 19th Institute of Electrical and Electronics Engineers Conference on Nonlinear Dynamics of Electronic Systems, Kolkata, India, 9-11 March 2011.

S. Banerjee and D. Giaouris, "Classifying the Bifurcations of an Ergodic Torus: The Method of Second Poincare Section," (invited talk), European Conference on Iteration Theory, Nant, France, 12-17 Sept., 2010.

### **Collaborative work**

Visited the Newcastle University and the University of Aberdeen during the summer of 2010 for research collaboration.

### **Others**

Member of the Sectional Committee on Engineering Sciences, Indian Academy of Sciences

## **Bhavtosh Bansal**

### **Teaching Programme**

#### *Theory courses*

PH312: Electricity and Magnetism –II

#### *Laboratory courses*

PH222: Wave and Optics Laboratory (with Dr Nirmalya Ghosh and Dr Ayan Banerjee)

SM411: Seminar Course( with Prof P Panigrahi, Dr G Hossain, Dr S Sinha, Dr A Ghosh)

### **Talks Delivered**

"Hydrogenic exciton in magnetic field: a two-body problem" International Centre for Theoretical Sciences Condensed Matter Programme 2010, (Mysore, India, December 2010)

### **Conferences Attended**

Institute of Nanoscale Physics and Chemistry, Department of Physics, Catholic University Leuven, Belgium between May—July 2010 as Visiting Fellow

Delivered lecture titled "Optical characterization of nanostructures using high magnetic fields" at the Winter School on Semiconductor Characterization, Department of Radiophysics, Science College, University of Calcutta Kolkata (March 4, 2011) and at the Department of Electronic Science, Science College, University of Calcutta, Kolkata (March 23, 2011)

### **Others**

National Physical Laboratory, New Delhi (February 24—25, 2011). Went as an expert for a two day discussion meeting with National Physical Laboratory Director and staff to help them set up a pulsed field laboratory.

## **Rangeet Bhattacharyya**

### **Teaching programme**

#### *Theory courses*

ID427: Physical Methods for Structure Elucidation (with Dr. Arindam Mukherjee, Dr. Swadhin Mandal, Dr. C Malla Reddy)  
CH323: Guest lectures: Single and Multi-photon Spectroscopy

#### *Laboratory courses*

MC121: Introduction to Computer Programming (with Dr. Rajesh Kumble Nayak and Dr. Ananda Dasgupta)

### **Conferences Attended**

Indo-Brazil workshop on Cold Atoms, Mesoscopic systems and Quantum information processing, Hyderabad, October 2010.

International conference on pharmacology and annual meeting of National Magnetic Resonance Society India, Amritsar, March 2011. Oral presentation as guest speaker on "Methodological developments in NMR and their use in Li-ion batteries".

## **Ananda Dasgupta**

### **Teaching Programme**

#### *Theory courses*

MA211: Complex Analysis  
PH412: Electromagnetism 3  
PH221: Waves and Optics

#### *Laboratory courses*

EL111 – Electronics (alongwith other instructors)

MC121 – Introduction to Computation (with Dr. Rajesh Kumble Nayek and Dr. Rangeet Bhattacharya)

### Talks Delivered

Delivered an invited lecture – “Unsolved problems in Mathematics” – concluding a month long program “Celebration of Mathematics” organized jointly by the British Council, India and the National Council of Science Museums, March, 2011

### Others

Executive Committee Member – Regional Council 15 of the Indian Association of Physics Teachers.

## Amitava Datta

### Publications

Bhattacharyya, Nabanita, **Amitava Datta**, Monoranjan Guchait, Manas Maity, Sujoy Poddar. 2010. “The interplay between the charged Higgs and squark-gluino events at the LHC.” *Phys.Rev.D82:035022*.

Bhattacharyya, Nabanita, **Amitava Datta**, Sujoy Poddar. 2010. “SUSY darkmatter at the LHC - 7 TeV run.” *Phys.Rev.D82:035003*.

### Teaching Programme

#### Theory courses

Phys 421: Quantum Field Theory

Phys 422: High Energy Physics

### Students Supervision

#### Ph.D. Students

Nabanita Bhattacharyya

Arghya Choudhury

### Other academic/educational activities

The interplay between Higgs and squark-gluino events at the Large Hadron Collider, paper presented at SUSY 10, 23.8.2010 -28.8.2010, Bonn.

## Sushanta Dattagupta

### Publications

Aharony, Amnon, Shmuel Gurvitz, Ora Entin-Wohlman, and **Sushanta Dattagupta**. 2010. “Retrieving qubit information despite decoherence.” *Phys. Rev. B* 82, 245417.

Bandopadhyay, M. and **S. Dattagupta**. 2010. "Role of quantum heat bath and confinement in the low-temperature thermodynamics of cyclotron motion." *Phy. Rev. E* 81, 042102.

**Dattagupta, Sushanta**. 2010. "Challenges and Opportunities in Science Education Scenario in India." *Physics News* 40, 4.

**Dattagupta, Sushanta**. 2010. "Peierls' Elucidation of Diamagnetism." *Resonance* 15, 428.

Roy, Manas K., Jaita Paul, and **Sushanta Dattagupta**. 2010. "Modeling of ferroelectric domain imaging by atomic force microscopy." *J. Appl. Phys.* 108, 064102.

Roy, Manas K., Jaita Paul, and **Sushanta Dattagupta**. 2010. "Domain dynamics and fractal growth analysis in thin ferroelectric films." *J. Appl. Phys.* 108, 014108.

Roy, Manas K., Paromita Banerjee, Tapas K. Sengupta, and **Sushanta Dattagupta**. 2010. "Glucose induced fractal colony pattern of *Bacillus thuringiensis*." *J. Theoretical Biology* 265, 389.

### Teaching Programme

Non-equilibrium Statistical Mechanics

### Students Supervision

*Ph.D. Students*

Manas Kumar Roy

Jishad Kumar T. M. (jointly with Dr. P.A. Sreeram)

Debmalya Chakraborty

*BS/MS Students*

Ebad Kamil

Ipsita Satpathy

### Conferences, Seminars, Symposia, Workshops Organized

Indo-Brazil Workshop on Cold atoms, Mesoscopic Systems, and Quantum Information Processes, Hyderabad, October 16 – 18, 2010

### Conferences Attended

*International*

Invited by Prof. David Gross, Director, Kavli Institute for Theoretical Physics, University of California, USA to attend the program entitled "Electron Glasses" from 6th to 30th July, 2010. Talk given on "Dissipative Diamagnetism".

Invited by Prof. Amit Dutt, Organizer of Young Investigators' Meeting Boston to attend the 2nd Annual YIM Boston 2010 from 8th to 10th October, 2010 at Boston, USA. Talk given on "Capacity Building – an IISER-K Experience".

### *National*

Attended a Conference on “Advances in Magnetism: Phenomena and Materials (AMPM-2010) held during 2nd – 5th June, 2010 at Manali, Himachal Pradesh.

Attended the 6th meeting of the Indo-Brazilian Science Council held on 14th August, 2010 at Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore.

Attended the 6th JNC Research Conference on Chemistry of Materials held from 2th – 4th October, 2010 at Cochin, Kerala.

Delivered a Public Lecture at the Physical Research Laboratory, Ahmedabad on 10th November, 2010 on “Diffusion”.

Delivered an Inaugural Lecture at the Annual Day Function of the University Grants Commission-Department of Atomic Energy Consortium for Scientific Research, Indore held on 8th December, 2010 on “Ferroelectric Domains”.

Delivered a lecture at the Condensed Matter School and Workshop entitled “ICTS Condensed Matter Programme 2010” held from 12th to 23th December, 2010 at Mysore, on Magnetism.

Lectured at the Conference on Current Trends in Condensed Matter Physics – 2010 held from 15th to 19th December, 2010 at the National Institute of Science Education and Research, Bhubaneswar, on Coherence and Decoherence.

Delivered the C.V. Raman Medal lecture at the Indian National Science Academy Meeting held from 28th to 30th December, 2010 at the Indian Institute of Science, Bangalore, on “Two Hundred.....(and More) years of Diffusion”.

### **Funded research projects**

J.C. Bose Fellowship, Department of Science and Technology, Government of India. Value : ₹ 53,05,000.00

### **Recognitions won (Committee Membership)**

- Member, Executive Council, Central University, Koraput, Orissa
- Member, BoG, Indian Institute of Science Education and Research Pune.
- Member, Governing Body, National Institute of Biomedical Genomics, Kalyani
- Member, Executive Councils of Burdwan, Kalyani and Bengal Engineering and Science Universities

### **Education, Public Outreach and Synergistic Activities**

Delivered “Inspire” lecture at the National Institute of Technology, Durgapur and Visva-Bharati, Santiniketan, on “Diffusion”.

### **Awards, Prizes, etc.**

Indian National Science Academy C.V. Raman Medal (2010)

## Rumi De

### Publications

**De, Rumi**, A. Zemel and S. A. Safran. 2010. "Theoretical concepts and models of cellular mechanosensing." *Methods in Cell Biology*, vol. 98, p. 143.

### Teaching Programme

#### Theory courses

ID446: Theoretical Biological Physics

### Talks Delivered

Orientation of cells in gel, 6th World Congress of Biomechanics, Singapore, August, 2010.

Cellular Mechanosensing. Discussion Meeting in Computational Biology, Coorg, February 27-March 2, 2011 (Invited speaker).

### Recognitions won

Young Investigator Award, 6th World Congress of Biomechanics, Singapore, August, 2010.

## Amit Ghosal

### Teaching Programme

#### Theory Course

PH-514: Advanced Condensed Matter Physics (with Dr. Arindam Kundagrami)

### Students Supervision

Ph.D. Student: Dyuti Bhattacharya

### Talks Delivered

Invited Talk in the "Workshop on Condensed Matter Physics" at Harish Chandra Research Institute (November, 2010)

Title: Self-consistent calculations for Strongly Interacting Inhomogeneous Systems".

## Anandamohan Ghosh

### Teaching Programme

#### Theory courses

ID445: Nonlinear Dynamics (with Prof Soumitro Banerjee)

HU111: Humanities (with Dr Anindita Bhadra)

PH211: 3 guest lectures in the course offered by Dr Siddhartha Lal

SM411: Evaluated the seminars given by Physics major students

### Laboratory courses

PH122 - General Lab (with Dr Partha Mitra, Dr Dhananjay Nandi, Dr Siddhartha Lal)

### Talks Delivered

Invited talk at Workshop and Symposium on Mathematical Physiology, Indian Institute of Science Education and Research Pune (January 15 - 23, 2011)

### Meeting Attended

19th *Institute of Electrical and Electronics Engineers* Workshop on Nonlinear Dynamics of Electronic Systems, Indian Institute of Chemical Biology – Saha Institute of Nuclear Physics, Kolkata (March 8-11, 2011)

Invited for Academic visit and Seminar at Institute of Mathematical Sciences, Chennai (March 21-23, 2011)

## Nirmalya Ghosh

### Publications

**Ghosh, Nirmalya**, Jalpa Soni, M. F. G. Wood, M. A. Wallenberg and I. A. Vitkin. 2010. "Mueller matrix polarimetry for the characterization of complex random medium." *Pramana – Journal of Physics*, 75 (6), 1071 – 1086.

Wallenburg, Marika A., Michael F. G. Wood, **Nirmalya Ghosh** and I. Alex Vitkin. 2010. "Polarimetry-based method to extract geometry-independent metrics of tissue anisotropy," *Optics Letters*, 35 (15), 2570 – 2572.

Wallenburg, Marika A., Mihaela Pop, Michael F. G. Wood, **Nirmalya Ghosh**, Graham A. Wright and I. Alex Vitkin. 2010. "Comparison of optical polarimetry and diffusion tensor MR imaging for assessing myocardial anisotropy." *Journal of Innovative Optical Health Sciences*, 3(2), 109-121.

Wood, Michael F. G., **Nirmalya Ghosh**, Marika A. Wallenburg, Shu-Hong Li, Richard D. Weisel, Brian C. Wilson, Ren-Ki Li, and I. Alex Vitkin. 2010. "Polarization birefringence measurements for characterizing the myocardium, including healthy, infarcted, and stem cell treated regenerating cardiac tissues." *Journal of Biomedical Optics*, 15 (4), 047009.

### Teaching Programme

#### Laboratory courses

PH 112: Mechanics and General Properties of Matter (with Dr. Partha Mitra)

PH 222: Waves and Optics (with Dr. Ayan Banerjee)

### Conferences, Seminars, Symposia, Workshops organized

Conducted a short course on "Biophotonics" organized by Indian Laser Association (ILA) at Raja Ramanna Centre for Advanced Technology, Indore (November 29 - 30, 2010).

## Funded Projects

Research project submitted to Department of Science and Technology, Government of India

Project Title: A novel experimental approach for probing the physics of *photonic atoms* with diverse potential biomedical applications

Total Cost (Rs.): ₹ 1,68,30,000.00

Dr. Ayan Banerjee (Department of Physical Science, IISER-Kolkata) is the co- principal investigator of this project.

Research project submitted to Department of Atomic Energy-Board of Research in Nuclear Sciences

Project Title : Mueller matrix polarimetry for biological tissue characterization

Total Cost (Rs.) : ₹ 75,00,000.00

## Golam Mortuza Hossain

### Publications

**Hossain, G. M.**, V. Husain and S. S. Seahra. 2010. "The Propagator in polymer quantum field theory." *Phys. Rev. D* 82, 124032.

### Teaching Programme

#### Theory courses

SM411: Seminar Course (with Prof. Prasanta Panigrahi, Dr. Bhavtosh Bansal and Dr. Subhasis Sinha)

ID444: General Relativity and Cosmology (with Prof Partha Majumdar)

SM421: Seminar Course (with Prof. Prasanta Panigrahi, and Dr Bhavtosh Bansal)

#### Laboratory courses

PH112: Pre-lab with Prof Ranjan Bhattacharya, Prof Amitava Datta, Dr Amit Ghosal

### Talks Delivered

Plenary session of 26th Meeting of the Indian Association for General Relativity and Gravitation (IAGRG-26) held at the Harish Chandra Research Institute (HRI), Allahabad during January 19-21, 2011

"Emerging Trends in Gravitation and Cosmology" held at the Jadavpur University, Kolkata on 15th March, 2011.

### Conferences, Seminars, Symposia, Workshops organized

Organized the parallel session on "Quantum Gravity" in Indian Association for General Relativity and Gravitation -26 meeting held at Harish Chandra Research Institute, Allahabad during Jan 19-21, 2011

## Others

Initiated and formed an Astrophysics/Gravity/Cosmology discussion group called Astroturf. As a part of this group activity, organized 9 talks by different speakers in last seven months of its existence.

## Pradip Khatua

### Teaching Programme

#### Laboratory courses

PH212: Modern Physics Lab (with Dr. Gautam Dev Mukherjee, and Dr. Ayan Banerjee)

### Talk Delivered

Delivered a talk entitled "An attempt to study 'spin-optics' in the two dimensional electron gas" at Indira Gandhi Centre for Atomic Research, Kalpakkam on 24th Feb.2011

## Uday Kumar

### Publications

#### Book Chapter

**Uday Kumar.** 2010. "Sol-Gel based solid state dye-laser—Past, Present and Future", In *The Sol-Gel Process: Uniformity, Polymers and Applications*, edited by Rachel E. Morris, 645-686. New York: Nova Science Publishers.

### Teaching Programme

#### Laboratory courses

PH122: Electricity and Magnetism (with Dr. Partha Mitra, Dr. Ananda Mohan Ghosh, Dr. Siddhartha Lal and Dr. Dhananjay Nandi)

PH112: Mechanics and General Properties of Matter (with Dr. Nirmalya Ghosh and Dr. Partha Mitra)

### Conference Attended/Talk Delivered

**Uday Kumar,** Kambalapalli Srikanth, R. Ranganathan, Chandan Mazumdar: "Magnetism and Crystal Structure of Bulk and Small Particle  $\text{NiCr}_2\text{O}_4$  Spinel Oxide", Presented in International Conference on Magnetism and Magnetic Materials – 2010 (ICMM-2010) at Saha Institute of Nuclear Physics, Kolkata, 25-29 October 2010.

## Arindam Kundagrami

### Teaching Programme

LS221: Systems Biology (with Dr. Mohit Prasad and Dr. Jayasri Das Sarma)

LS412: Developmental Biology (with Dr. Mohit Prasad)

ID418: Numerical Methods (with Dr. Amlan K Roy and Dr. Dibyendu Nandi)

PH514: Advanced Condensed Matter Physics (with Dr. Amit Ghosal)

PH321: Equilibrium Statistical Mechanics

### Conferences Attended

STATPHYS-KOLKATA VII, November 26-30, 2010, Saha Institute of Nuclear Physics, Kolkata, India.

Current Trends in Condensed Matter Physics (CTCMP), 2010, December 15-19, 2010, National Institute of Science Education and Research, Bhubaneswar, India.

## Siddhartha Lal

### Teaching programme

#### Theory courses

PH211: Quantum Mechanics

#### Laboratory courses

PH122: Electricity-Magnetism, Heat and Thermodynamics (with Dr. Partha Mitra, Dr. Anandamohan Ghosh and Dr. Dhananjay Nandi)

### Conference attended

Attended and presented seminar entitled "Mixed Edges and Inhomogeneous Quantum Hall Systems" at Indo-Brazil workshop on Quantum Information, Cold Atoms and Mesoscopic Physics at Hyderabad, 16-18 October, 2010.

### Recognitions won

Ramanujan Fellowship from the Department of Science and Technology, Government of India on 22nd July 2010; Fellowship begun from 1st December 2010.

## Chiranjib Mitra

### Publications

Panigrahi, Prasanta K. and **Chiranjib Mitra**. 2010. "Understanding Quantum Correlation For Quantum Computation." *Physics News*, 40 (4), 45.

Sengupta, Joydip, Avijit Jana , N D Pradeep Singh, **Chiranjib Mitra** and Chacko Jacob. 2010. "Site-selective synthesis of in situ Ni-filled multi-walled carbon nanotubes using Ni(salen) as a catalyst source." *Nanotechnology*, 21 (41), 415605.

## Teaching programme

### Theory courses

PH 511: Quantum Magnetism

PH421: Quantum Computation and Quantum Optics

### Lab courses

PH415: Materials Characterization, Magnetism (with Dr. Partha Mitra)

PH324: Condensed Matter Phys (with Dr. Bipul Pal)

## Conferences Attended

International symposium on "75 Years of Quantum Entanglement" organized jointly by S N Bose National Centre for Basic Sciences and Bose Institute, Kolkata, from January 6-10, 2011.

Went to Goettingen University to attend a workshop on Molecular Spinelectronics (<http://www.uni-goettingen.de/en/195215.html>). Gave a talk on "Quantum Magnetism and Entanglement in correlated systems".

## Partha Mitra

### Teaching programme

#### Laboratory courses

PHY112: Mechanics and General Properties of Matter (with Dr. Nirmalya Ghosh, Dr. Uday kumar)

PHY122: Electricity-Magnetism, Heat and Thermodynamics (with Dr. Dhananjay Nandy, Dr. Siddharth Lal, Dr. Ananda Mohon Ghosh)

PHY 415: Materials Characterization, Magnetism (with Dr. Chiranjib Mitra)

### Student Supervision

Ph.D. Student: Arpita Mondal

### Workshop attended

Attended a workshop on "Molecular Spinelectronics" at University of Gottingen, Germany in December 2010

## Goutam Dev Mukherjee

### Publications

Paul, Sanhita, **Goutam Dev Mukherjee**, Anirudha Ghosh, Shuiji Oishi and Satyabrata Raj. 2011. "Temperature dependent X-ray diffraction study of lightly-doped  $\text{Na}_x\text{WO}_3$ ." *Appl. Phys. Lett.* 98 (12): 121910

## Teaching Programme

### Laboratory courses

- PH 122: Electricity-magnetism and Heat-thermodynamics (with Dr. Partha Mitra)
- PH/ID 425: Nanomaterials and X-ray Diffraction (with Dr. Uday Kumar)
- PHY212: Foundations of Quantum Mechanics (with Dr. Ayan Bannerjee and Dr. Pradip Khatua)

## Student Supervision

Ph.D. Student: Abhisek Basu

## Talks Delivered and Meeting Presentations

Melting behaviour of solids at extreme conditions of pressure; Goutam Dev Mukherjee (Invited Talk), International Centre for Theoretical Sciences Condensed Matter Programme (ICMP), Mysore (December 18, 2010).

Solids at extreme conditions of pressure and temperature; Invited Seminar Lecture, University of Hyderabad, October 2010.

Phase transitions in  $\text{Pb}_{1-x}\text{Ca}_x\text{TiO}_3$ : High pressure Raman investigations, Abhisek Basu, Goutam Dev Mukherjee, A. Chandra and A.K. Tyagi, Condensed Matter Days 2010, Kalyani University, August 25 – 27, 2010.

## Funded Projects

Title: Electrical conductivity measurements of silicate minerals and transition metal oxides at high pressures and high temperatures, and its implications

Funding agency: Department of Science and Technology, Government of India

Sanctioned amount: ₹ 28,81,000.00

## Dhananjay Nandi

### Publications

**Nandi, Dhananjay**, Vaibhav S. Prabhudesai, B. Nestman, and E. Krishnakumar. 2011. "Dissociative electron attachment to NO probed by velocity map imaging." *Phys. Chem. Chem. Phys.* 13: 1542 – 1551.

## Teaching programme

### Theory courses

PH512: Atomic and Molecular Physics (with Dr. Ayan Banerjee)

### Laboratory courses

EL111 : Electronics Laboratory (with Dr. Satyaki Bhattacharya)

PH 122: Heat & Thermodynamics and Electricity and Magnetism (with Dr. Partha Mitra, Dr. Siddhartha Lal and Dr. Anandamohan Ghosh)

## Conferences Attended

Indian National Science Academy Anniversary General Meeting held at Indian Institute of Science, Bangalore, 28-30th December, 2010

XVIIIth National Conference on Atomic and Molecular Physics, Karnatak University, Dharwad, February 22-25, 2011.

## Recognitions won

INSA Medal for Young Scientist in Physics for the year 2010

## Dibyendu Nandi

### Publications

Munoz-Jaramillo, A., **D Nandy**, and P C H Martens. 2010. "Magnetic Quenching of Turbulent Diffusivity: Reconciling Mixing-length Theory Estimates with Kinematic Dynamo Models of the Solar Cycle." *Astrophysical Journal Letters* 727: L23

Munoz-Jaramillo, A., **D Nandy**, P C H Martens and A R Yeates. 2010. "A Double-Ring Algorithm for Modeling Solar Active Regions: Unifying Kinematic Dynamo Models and Surface Flux-Transport Simulations." *Astrophysical Journal Letters* 720: L20

Mursula, K., I. Usoskin, **D. Nandy** and D. Marsh. 2010. "A review of Space Climate and an introduction to the papers of the JASTP special issue on Space Climate", special issue of the *Journal of Atmospheric and Solar-Terrestrial Physics* 73(2-3) (also editor of this issue)

**Nandy, D.**, A. Munoz-Jaramillo, and P C H Martens. 2010. "The Unusual Minimum of Solar Cycle 23 Caused by Changes in the Sun's Meridional Plasma Flows." *Nature* 471: 80

Preminger, D., **D Nandy**, G Chapman and P C H Martens. 2010. "Empirical Modeling of Radiative versus Magnetic Flux for the Sun-as-a-Star", *Solar Physics* 264: 13

### Book Chapter

**Nandy, D.** 2010. "Dynamo Processes" (Invited Book Chapter), In *Heliophysical Processes*, Eds. N. Gopalswamy, S.S. Hasan and A. Ambastha, Springer (Berlin) ISBN: 978-3-642-11340-6

## Teaching Programme

### Theory courses

PH121: Electromagnetism

### Laboratory courses

ID 418: Numerical Methods (with Dr. Amlan K. Roy, Dr. Arindam Kundagrami)

PH122: Pre-Lab (with Dr. Amit Ghosal, Dr. Amitava Datta)

## Students Supervision

### *Ph.D. Students*

Andres Munoz-Jaramillo (Montana State University) (Graduated in 2010)

Dario Passos (Instituto Superior Técnico, Lisbon) (External co-supervisor, thesis submitted in 2010)

Soumitra Hazra

## Talks Delivered

“Physics of Space Weather and Climate” (Institute Colloquium), Physical Research Laboratory, Ahmedabad, India, 2010

“Solar Cycle Predictions” (Invited Talk), Astrophysics Division—Physical Research Laboratory, Ahmedabad, India 2010

“Dynamo Model Based Solar Cycle Predictions” (Invited Talk), Symposium STP12 of the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), Berlin, Germany, 2010

“The Deep Minimum of Solar Cycle 23: A Solution to the Mystery of the Missing Sunspots” (Invited Talk), Scientific Assembly of the Committee on Space Research (COSPAR), Bremen, Germany, 2010

“Aditya Mission: Theoretical Modeling and Data Analysis” (Invited Talk), Team meeting of the space mission “Aditya”, Bangalore, 2010

“Dynamo Models of the Solar Cycle: Current Trends and Future Prospects” (Invited Talk), Asia-Pacific Solar Physics Meeting, Bangalore, 2011

“Martian Atmosphere and Hotspots: Planetary Evolution and Habitability in Response to Solar Forcing” (Contributed Talk), Mars Mission Brainstorming, Physical Research Laboratory, Ahmedabad, India, 2011

## Conferences, Seminars, Symposia, Workshops organized

Fourth International Space Climate Symposium “Space Climate 4”, Goa, India. Chairman—Local Organising Committee and Member—Scientific Organising Committee

## Funded Projects

“Ramanujan Fellowship”, Department of Science and Technology, Government of India. ₹ 25,00,000.00, 2009-2014

## Others

Nominated to the governing council of the International Scientific Committee on Solar-Terrestrial Physics (SCOSTEP)

## Rajesh Kumble Nayak

### Publications

Dhurandhar, S V, **K Rajesh Nayak** and J-Y Vinet 2010. "Time-delay interferometry for LISA with one arm dysfunctional." *Class. Quantum Grav.* 27 135013.

### Teaching Programme

#### Theory courses

ID 421: General Relativity and Cosmology (with Prof. Narayan Banerjee.)

#### Laboratory courses

MC121: Computer Lab (with Dr. Ananda Dasguptha)

MA315: Computer Programming

PH315: Computational Physics (with Dr. P. A. Sreeram)

MC121: Computer lab (with Dr. Ananda Dasguptha and Dr. Rangeet Bhattacharya)

### Talks Delivered

Talk given at Twenty Sixth Meeting of the Indian Association for General Relativity and Gravitation (IAGRG-26) at Harish-Chandra Research Institute, Allahabad, 19-21 January 2011, title "Gravito-magnetism and Carter constant."

Lecture on Basic Data analysis at IndIGO School on Gravitational Wave Astronomy during 13-24 December 2010, at University of Delhi.

Lecture on Laser Interferometer Space Antenna mission and Data analysis at IndIGO School on Gravitational Wave Astronomy during 13-24 December 2010, at University of Delhi.

Two lectures on gravitational wave in summer school on Gravitation and Cosmology at Harish-Chandra Research Institute, Allahabad May 2010.

### Conferences, Seminars, Symposia, Workshops organized

Part of organization of IndIGO School on Gravitational Wave Astronomy during 13-24 December 2010 at Delhi University Coordinated parallel Sessions on Classical gravity and gravitational waves in the IAGRG26 meeting at HRI, Allahabad, 19-21 January 2011

### Funded Projects

One of the Co-investigators in Center for computational space-science: Accepted for funding by Ministry of Human Resource Development. Principle investigator is Dr. D. Nandi. Amount ₹ 4,00,00,000.00

### Others

Selection committee member for Gravitational Wave International Committee annual prize for the best Ph.D. Thesis award for year 2011

## Bipul Pal

### Teaching Programme

#### Theory Course

ID420: Nanomaterial and Ultrafast Phenomena (with M. Venkatramanan)

#### Laboratory courses

PH414: Laser Spectroscopy and High-pressure Techniques (with G. D. Mukherjee)

PH324: Condensed matter physics (with Dr. C. Mitra)

### Students Supervision

#### Ph. D. students

Richarj Mondal

Deepak Kumar Sinha Ambast

Int. Ph. D. student: Rupak Kumar Bhattacharya

### Talks Delivered and Meeting Presentations

Invited talk: 'Optical spectroscopy: a versatile tool to study semiconductor physics' in a workshop and discussion meeting for the formation of an International Research Training Group between IISER-Kolkata and Georg-August-University, Goettingen.

### Funded Projects

Title: Time-resolved nonlinear optical spectroscopy in transition-metal-doped ZnO nanoparticles and thinfilms

Funding agency: Department of Science and Technology, Government of India

Proposed value: ₹ 20,40,000.00 for 3 years

## Prasanta K. Panigrahi

### Publications

Gharekhan, A., A. N. Oza, M. B. Sureshkumar, A. Pradhan, **P. K. Panigrahi**. 2010. "Polarized spectral features of human breast tissues through wavelet transform and principal component analysis." *Pramana – Journal of Physics*, 75 (6): 1281.

Kumar Abhinav and **Prasanta K. Panigrahi**. 2011. "On Comment on Supersymmetry, PT-symmetry and spectral bifurcation." *Ann. Phys.* 326: 538.

Manimaran, P. and **Prasanta K. Panigrahi**. 2010. "Statistics of event by event fluctuations." *Physica A*, 389, 3703.

Muralidharan, S., S. Karumanchi, S. Jain, R. Srikanth and **P. K. Panigrahi**. 2011. "2N qubit "mirror states" for optimal quantum communication." *Euro. Phys. Jour. D.* 61, 757-763

Muralidharan, Sreraman, Sakshi Jain and **Prasanta K. Panigrahi**. 2011. "Splitting of quantum information using N-qubit linear cluster states." *Optics Communications* 284: 1082.

Roy, Utpal, B. Shah, Kumar Abhinav and **Prasanta K. Panigrahi**. 2011. "Gapped solitons and periodic excitations in strongly coupled BECs." *J. Phys. B: At. Mol. Opt. Phys.* 44: 035302.

Sadhukhan, Mainak, **P. K. Panigrahi** and B. M. Deb. 2010. "Dynamics of hydrogen atom under a strong, time-dependent magnetic field." *Eur. Phys. Lett.* 91, 23001

### Conference Proceedings

Gharekhan, Anita H., Siddharth Arora, Ashok N. Oza, **Prasanta K. Panigrahi** et al. 2010. "Characterizing polarized autofluorescence of normal and benign tissues using singular value decomposition and wavelet transform." *Progress in Biomedical Optics and Imaging - Proceedings of SPIE*. 7563.

Gudibande R., M. Mozumder, R. Singh, A. Pradhan, **Prasanta K. Panigrahi**, and S. Gupta. 2011. "Differentiating human cervical dysplastic and normal tissue through wavelet domain characterization of intrinsic fluorescence." *Progress in Biomedical Optics and Imaging - Proceedings of SPIE*. 7902.

### Teaching Programme

#### Theory courses

PH513: Advanced Mathematical Methods

SM421: Seminar Course (In charge)

### Students Supervision

#### Ph. D students

Vivek M. Vyas

Priyam Das

Kumar Abhinav

Nandan Roy

Subhrajit Modak

Post Doctoral Student: Abhijit Sen

#### BS/MS Students

Sayan Choudhury

Challenger Mishra

Abhishek Dasgupta

Anshul Saini

Abhijit Jha (IISER-Pune)

**Talks Delivered**

Indian Institute of Science Education and Research Pune Annual Fest – February, 2011

**Conferences/Seminars attended**

Chaired a session in Indo-Brazil Meet, 14-16, September, 2010. Hyderabad

Workshop on Mesoscopic Systems, December 2010, S. N. Bose National Center for Basic Sciences, Kolkata, India, Title:-Gauge Theory of Graphene.

International Conference on Contemporary Trends in Optics and Opto-electronics (XXXV Optical Society of India Symposium) 17-19, January-2011, Thiruvananthapuram. Title: - Soliton dynamics and its control in non-linear fibres.

Conference on Research Frontiers in Ultra Cold Atomic and Molecular Gases, 10-14, January, 2011, Goa, India. Title: - Ground state structure and non-linear excitations in cold atoms

Sixth National Conference on Non-linear systems and dynamics (Center for non-linear Dynamics) Bharathidasan University, 27-30, January-2011. Title: - Non-linear excitons in cold atoms and optical fibers: A Common Approach.

75 Years of Quantum Entanglement: Foundations and Information Theoretic Applications January 6-10, 2011, S. N. Bose National Center for Basic Sciences, Kolkata, India Title: - Sub-Planck Structure and Quantum Meteorology.

International Conference on Quantum Optics and Quantum Computing (ICQOQC-11), 24-26, 2011, March, Jaypee Institute of Information Technology, Noida. Title: - In how many ways can quantum information be split.

**Satyabrata Raj****Publications**

Paul, S., G. D. Mukherjee, A. Ghosh, S. Oishi, and **S. Raj**. 2011. "Temperature dependent x-ray diffraction study of lightly doped  $\text{Na}_x\text{WO}_3$ ." *Appl. Phys. Lett.* 98, 121910.

**Teaching Programme***Laboratory courses*

PH424: Advanced Optics (with Dr. Ayan Banerjee)

**Talks Delivered**

Exotic Properties of Alkali Tungsten Bronzes: A High-Resolution Angle-Resolved Photoelectron Spectroscopy (HR-ARPES) Study. Recent Trends in Condensed Matter Physics (RTCP-2010), 3rd Dec. 2010, Department of Solid State Physics, Indian Association for the Cultivation of Science, Kolkata.

### **Funded Projects**

Title: Study of Electronic Structure of Strongly Correlated System by X-ray Emission Spectroscopy.

Agency : Department of Science and Technology, Government of India

Value : ₹ 21,50,000.00

### **Ritesh Kumar Singh**

#### **Teaching Programme**

*Theory courses*

PH323: Nuclear and Particle physics

#### **Students Supervision**

Ph.D. student: Lisa Edelhäuser (University of Würzburg)

#### **Conferences Attended**

International conference on Dark matter in the LHC era: Direct and indirect searches organized at Saha Institute of Nuclear Physics, Kolkata 4-8 Jan, 2011

Discussion meeting on Physics at early run of the Large Hadron Collider, organized at Indian Association for the Cultivation of Science, Kolkata from 22-23 March, 2011

### **Subhasis Sinha**

#### **Publications**

**Sinha, S.** and K. Sengupta. 2011. "Superfluid-insulator transition of ultracold bosons in an optical lattice in the presence of a synthetic magnetic field." *Europhysics. Lett.* 93, 30005.

#### **Teaching Programme**

*Theory courses*

PH321: Statistical Physics

PH411: Quantum Mechanics III

PH322: Condensed Matter Physics I

*Laboratory courses*

Prelab Course for first year students

#### **Talks Delivered**

"Superfluid –Mott insulator transition and Higgs modes" (Invited talk in Indo-Brazil workshop at Hyderabad, October, 2010).

“Superfluid-Mott insulator transition in the presence of a synthetic gauge field” (Invited talk in International Centre for Theoretical Sciences Condensed Matter Conference at Mysore, 2010).

### **Collaborative work**

Visited “Institute for Theoretical Physics”, Hannover to collaborate with Prof. Luis Santos (July, 2010)

## **P.A. Sreeram**

### **Teaching Programme**

#### *Theory courses*

PH411: Condensed Matter II

PH421: Quantum Many Body Theory

#### *Laboratory courses*

Prelab for Electronics (With Dr. Satyabrata Raj and Dr. Ananda Dasgupta)

### **Students Supervision**

#### *Ph.D. Student*

Jishad Kumar T. M. (jointly with Prof. Sushanta Dattagupta)

#### *BS/MS Students*

Bradraj Pandey

### **Talks Delivered**

Delivered a talk entitled “Memory Effects in Nanomagnets” at IISER-Goettingen meeting at Goettingen in December, 2010.

## VII. IISER-K Departments

### IISER-K Library

IISER-Kolkata Library is fast moving towards becoming an important science library of the country. Started in 2006, as one of the first sets of departments of the Institute, it has become an important information resource centre for the whole institute. The rich and valuable collection built through these years has some important reference materials like *Landolt-Börnstein* series and back volumes of several important journals. Apart from its print collection, the Library is also subscribing to many e-journals, e-books, and databases. The focus of the Library is to act as the backbone of the information support system of the whole Institute.

During the report period, the Library added 429 printed documents to its collection. The total printed book collection is now 14,726 at the Library. In the journal front, the Library started to subscribe to many new journals and complete databases. This success came in part due to collective efforts of all the IISERs to start subscribing to common resources in unison. From this collective effort, the Library started to subscribe to all the journals published by the Royal Society, *Synlett* and *Synthesis* (Current and backfiles) and *Synfacts of Thieme Chemistry*, all the fourteen (14) journals from *Cell Press*, the complete Mathematics and Physics and Life sciences collection of Oxford University Press, a customized collection of thirteen journals from *World Scientific*, and *Euclid Prime* collection. On its own, the Library started to subscribe to the full package of GeoScienceWorld (GSW), an important resource for the earth scientists, complete collection of American Geophysical Union (AGU), OpticsInfobase, the complete journal package of Optical Society of America (OSA). The Library also started to subscribe to some more new journals from several other prominent publishers like, *Cold Spring Harbor Laboratory Press (CSHL)*, *Institute of Physics (IOP)*, *Wiley*, *American Mathematical Society (AMS)* etc. Another important landmark of the Library Acquisitions of this year is the purchase of the complete collection of *Treatise on Invertebrate Paleontology* (fifty volumes until now) in a DVD format. The Library is also engaged in starting an institutional repository of the Institute. A part of the Library is also shifted to Main Campus of our Institute during the reported period.

As part of its document delivery service, the Library provided 13,316 Number of photocopies/print outs to its patrons.

#### Library Hours:

IISER-K Library, Mohanpur Campus

Weekdays: 9.00 to 24.00 hrs.

Saturdays and Sundays: 10.00 to 24.00 hrs.

## Department of Biological Sciences (DoBS)

2010-2011 is a significant year for IISER-K as it is on the edge of awarding its first degree to 5th Year Integrated MS student. During the first five years, the Department of Biological Sciences (DoBS) has made significant progress in the field of teaching, research and outreach programmes.

### Teaching and Research program

The Graduate Program in DoBS at IISER-K is directed towards providing the students with: a) formal instruction in both the classroom and the laboratory; b) sufficient laboratory experience to pursue and develop a scholarly scientific research project; and c) the opportunity to serve as an instructor in order to acquire skills applicable to becoming an effective teacher. The graduate programme provides sufficient flexibility so that graduating students can pursue a career in education, research in an academic setting or industry. Moreover, all the programs offer students an intellectually stimulating environment, with numerous research opportunities and state-of-the-art facilities and encourage students in contributing to the society for the betterment of human kind with their achieved knowledge and skill.

Department of Biological Sciences offer fundamental didactic lectures on Introduction to biology, genetics, evolution, and biochemistry for first two years of MS students. For third, fourth and fifth year students majoring in Biology, DoBS is offering advanced cell biology, cell regulation and cell communication, cancer biology, immunology, microbiology, developmental biology, ecology and conservation biology, behavioral biology, Plant biology and Biostatistics as core theory courses and neurobiology and structural biology as Interdisciplinary courses. These programmes emphasise on practical experimentation by combining course-related laboratory exercises with research opportunities in project-oriented and faculty-sponsored laboratories. Interdisciplinary courses are designed in such a way that they provide a solid background for the emergent interdisciplinary science and for developing integrated scientific perspectives. Interdisciplinary courses are also structured for students from Physics, Chemistry and Mathematics streams. Advanced courses are open to our PhD students and Post B.Sc Integrated PhD students.

### Faculty

At present DoBS has 15 main stream faculties who are experts in different branches of Biology like Ecology, Evolutionary Biology, Plant Biology, Marine Biology, Microbiology, Biodiversity, Genetics, Developmental Biology, Biochemistry, Cell and Molecular Biology, Structural Biology, Neurobiology, Stem Cell Biology. In addition to that, DoBS has offered adjunct position to four faculties from the Departments of Physics and Mathematics with a vision to launch interdisciplinary programs in Mechanobiology, Computational Neurobiology, Mathematical modeling of biological system, and Bioinformatics.

### Students

DoBS offers postgraduate, doctoral and postdoctoral training programmes ranging from general biology to more specialized fields of study and research. At present, DoBS is putting its whole hearted effort in nurturing 21 PhD students, 7 Integrated PhD students, two postdoctoral fellows

and 4 project fellows. PhD students are either sponsored by Council of Scientific and Industrial Research/University Grants Commission fellowship or by IISER-K fellowship. Project fellows are sponsored by individual faculty grant support. In addition to that, in the year of 2010 DoBS had 8 Masters Students who did their individual Masters Thesis as part of their Integrated Masters program. Five of the Integrated Bio Major MS students have already been enrolled to PhD programmes in internationally and nationally recognized Universities in US, UK and Singapore.

### **Research facility**

At present, DoBS is well equipped with basic Biology/Cell and Molecular Biology instrumentations like PCR machine, Gel system, Gel Doc system, Flurimeter, Luminometer, High Speed Ultra Centrifuges, Low Speed Centrifuges, Quick Spin Mini Centrifuges, Electroporator, HPLC system, Water purification system, 2-D Gel Electrophoresis System, Hybridization Ovens and Gel Dryer. DoBS has liquid nitrogen storage tanks and low temperature freezers. In addition to that, DoBS has cutting edge histology and histopathology facility, microscopy facility with high end epi-fluorescent inverted microscope, and Confocal microscope, BSL2 facility for primary cell culture, established cell line cultures and organ cultures. All these tissue culture facilities are well equipped with Biosafety Hood, Co2 incubators, centrifuges, and microscope. DoBS also has a Fly Lab to maintain different inbred drosophila strains with mutant lines and transgenic lines for teaching and research purposes. In the year of 2010, DoBS established a field station for ecological studies in the main campus. With substantial Institutional support, DoBS also provides instrumentation and technical skill for Confocal Microscopy for the entire IISER-K community. Providing core facilities to investigators makes research more affordable, convenient and efficient.

In the year of 2010, DoBS has built a small animal facility for breeding and experimentation on Mice. All animal experimental procedures are approved by a committee for the purpose of control and supervision on experiments on animals (CPCSEA), New Delhi. Biosafety committee is now registered under the Government of India, Ministry of Science and Technology, Department of Biotechnology (DBT). SebRamky, West Bengal Board Certified Agency is collecting biological waste material and animal carcasses since February 2010. A field station for Ecological Sciences has also been established in the year of 2010.

### **Achievements**

This year the faculty of DoBS received grants from several National and International funding bodies Like Welcome-DBT India Alliance Funding (Recipient: Dr. Partha Sarathi Roy), World Wildlife Fund (WWF)-India (Recipient: Dr. Punyasloke Bhadury), Council of Scientific and Industrial Research (Recipient: Dr. Anindita Bhadra, Dr. Jayasri Das Sarma). Dr. Mohit Prasad and Dr. Rupak Datta received Ramalingwaswami Award from Department of Biotechnology, Government of India. Dr. Partha Pratim Datta received Rapid Grant for young investigators from Department of Biotechnology, Government of India.

### **Conferences/ Symposia**

During the period (2010-11), DoBS organized, for the first time, a national symposium on *Frontiers in Modern Biology* at Mohanpur Campus on 26th-27th February 2011. Invited speakers from different

reputed Institutes like National Centre for Biological Sciences, Bangalore; Delhi University South Campus; Centre for DNA Fingerprinting and Diagnostics, Hyderabad; Indian Institute of Science, Bangalore; and Bose Institute, Kolkata came and presented their research work encompassing different topics of modern biology. We have 120 participants from all over India. This symposium was open to the PhD students, PBIP students, and even Master's students and project fellows. Students from all over India and our own students presented posters in this symposium. Four Awards were given to the best posters. This meeting opened avenues for several IISER-K scientists to share their expertise in scientific fields for future collaboration with eminent scientist from different Institutes. During the period of 2010-2011, DoBS executed an internationally recognized prestigious symposium and a seminar under the banner of "Sundarban pavilion". DoBS also hosted an Animal Behavior Symposium 2010 in IISER-K Mohanpur campus which was sponsored by the three national science academies. The symposium was attended by 100 students from IISER-K and scientists in and around Kolkata.

## Department of Chemical Sciences (DoCS)

### Research and Teaching Activities

The Department of Chemical Sciences has strong and vibrant research groups engaged in a wide range of activities spanning from basic to applied research in chemistry. The department encompasses about 23 faculties and 60 graduate students. The prime research interests of each group falls under one of following major areas of research:

1. Photochemistry and Photophysics
2. Synthetic Organic and Supramolecular Chemistry
3. Inorganic and Organic Materials Chemistry
4. Inorganic and Organometallic Catalysis
5. Chemical Biology
6. Chemistry of Macromolecules
7. Theoretical and Computational Chemistry

### 1. Spectroscopy and Microscopy of Chemical, Biological and Material Systems (Faculty members: *Dr. Pradipta Purkayastha and Dr. Prasun Kumar Mandal*)

The photophysics and photochemistry groups working broadly on the following topics:

- o Photophysical characterization of new and biologically potent compounds using their ground and excited state properties.
- o Investigations in homogeneous and microheterogeneous environments induced by the formation of biomimicking milieu by cyclodextrin capsules/nanotubes, micelles, reverse micelles, etc.

- o Application of nanoparticles and nanosystems towards targeted drug delivery.
- o Single molecule spectroscopy and Microscopy using different CW and Pulsed (ps) Lasers
- o Confocal/TIRF/Wide-Field Microscopy, and Ultrafast Fluorescence Spectroscopy to study processes and exploit techniques like Resonance Energy Transfer (FRET), Fluorescence Correlation Spectroscopy (FCS, FCCS,FLCS) to understand phenomena like Rotational Dynamics, Proton Transfer, Blinking, etc.
- o Development of probes for single molecule microscopy. Main target materials are Quantum Dots/Rods, Fluoro-Sensors, Enzymes, Proteins, Ionic Liquids, etc

## 2. Synthetic Organic and Supramolecular Chemistry

**(Faculty members:** *Dr. Subhajit Bandyopadhyay, Dr. Balaram Mukhopadhyay, Dr. Debasish Halder, Dr. Jyotirmayee Dash and Dr. Chilla Malla Reddy*)

The major interests of the faculties working on organic synthesis are

- Natural product synthesis, diversity oriented synthesis, bio-inspired molecular and supramolecular assemblies.
- 'Metal catalyzed reactions', 'Organo catalysis' and Green Chemistry.
- Development of smart peptide-based nanostructured materials, new amino acid analogues with tunable functionality, self-aggregating systems from pharmaceutical small molecules as delivery vehicles and sustained release and low molecular weight gelator compounds.
- Developing simple strategies for various protecting group transformations, synthesizing biologically active oligosaccharides of plant and bacterial origins,
- Design and synthesis of sugar-heterocycle hybrid molecules and carbohydrate-modified nanoparticles (AuNPs and glyco-quantum dots) as biomarkers.
- Synthesis of photonic materials, and molecular sensors for ions and molecules and elucidating the properties of the synthesized molecules using kinetic, photophysical and physical organic methods.
- Biomimetic chemistry.
- Design and synthesis of new solid forms of active pharmaceutical ingredients (APIs) using crystal engineering approach to achieve improved physicochemical and mechanical properties.
- Probing structure-mechanical property correlation in organic solids to provide the molecular basis for mechanical response of soft materials, bio-molecules and mechano/photo-responsive materials.

### 3. Inorganic and Organic Materials Chemistry

**(Faculty members:** *Dr. Sanjio S. Zade, Dr. Venkataramanan Mahalingam, Dr. Arindam Mukherjee, Dr. Sumit Khanra, Dr. Soumyajit Roy and Dr. Parna Gupta Bhattacharyya* )

- Developing  $\pi$ -conjugated systems for redox and optoelectronic applications. The efforts are devoted towards the  $\pi$ -conjugated systems, useful for the absorptive/transmissive and reflective electrochromic devices, polymer-based solar cells, light emitting devices and field effect transistors.
- $\pi$ -conjugated systems comprising heavier chalcogens.
- Development of novel lanthanide-doped luminescent nanomaterials and nanocomposites for optical and photonic applications using a variety of sol-gel and colloidal synthetic routes
- Synthesis of new upconverting nanomaterials which can find potential interest as optical biomarkers in addition to authentication applications.
- Template-assisted synthetic routes to make luminescent nanoarchitectures.
- Polymetallic clusters and cages with tunnel structures, towards magnetic materials and quantum computation
- Bioinspired inorganic chemistry and photochemical/electrochemical water splitting towards sustainable, renewable alternative energy. Non-biological approaches to oxygen-oxygen bond formation will be the target.
- Designing discrete high nuclearity metal clusters as single molecule magnets and their encapsulation in diamagnetic polyoxometallate frameworks.
- Developing transition metal complexes for photovoltaic and OLED applications

### 4. Functional Nanomaterials

**Faculty members:** (*Dr. Sayan Bhattacharyya and Dr. Soumyajit Roy*)

- Engineering carbon nanotubes for magnetic, photonic, catalytic and energy storage applications
- Developing porous nanoarchitectures for specific applications
- Synthesis and structure-property correlation studies of semiconductor nanocrystals, and diluted magnetic semiconductors for applications.
- Magnetic interactions of oxide, nitride and metal-alloy nanoparticles.
- Functional nanocomposites and core-shell materials.

### 5. Inorganic and Organometallic Catalysis

**Faculty members:** (*Dr. Sumit Khanra, Dr. Parna Gupta Bhattacharyya and Dr. Swadhin Mandal*)

- Development of main group based low cost catalysts for ethylene polymerization, ring opening polymerization, and hydroamination reactions.

- Use of metal nanoparticles coated with chemically treated single walled carbon nanotubes as catalysts for organic transformation
- Fixation of small molecules such as CO, CO<sub>2</sub>, SO<sub>2</sub>, NO etc responsible for global warming and their potential activation for catalytic processes through transition metal complexes
- High valent Fe, Ru compounds towards C=C, C-H bond activation
- Low valent low coordination compounds in order to activate N<sub>2</sub>

## 6. Chemical Biology

**(Faculty members:** *Dr. Subhajit Bandyopadhyay, Dr. Arindam Mukherjee, Dr. Debasish Haldar and Dr. Jyotirmayee Dash*)

- Tuning activity of metalloproteins and incorporation of metal clusters in protein clefts to design novel bio-catalyst.
- Synthesis and characterization of hypoxia active metal-based small molecules having potential against various cancer cells.
- Designing magnetic metal clusters for therapeutics
- Synthetic molecules whose binding to DNA can be photonically controlled
- Design and synthesis of bioactive peptides having potential against various cancer cells
- Studying mechanism of amyloid aggregation related with Alzheimer's disease and their respective neurotoxicity
- Target (Nucleic acid)-assisted combinatorial synthesis.
- DNA mediated asymmetric synthesis
- Design and synthesis of small molecules targeting G-quadruplex DNA as novel anticancer agents.

## 7. Chemistry of Macromolecules

**(Faculty members:** *Dr. Raja Shunmugam and Dr. Priyadarsi De* )

- Development of polymers that have potential application in the field of drug delivery with anti tumor prodrugs and link to the nanoparticles so the drug-carrier's path can be influenced by external stimuli like magnetic force facilitating targeted delivery.
- Use of controlled/living polymerization techniques such as ROMP and/or ATRP to synthesize random and block copolymers where the composition of the copolymer length that contain drugs can be controlled.
- Development of polymers that are used to sense heavy metals such as arsenic and mercury is currently under progress.
- Design and synthesis of macromolecular architectures *via* controlled/living radical polymerization techniques

- Water soluble “smart” responsive polymers for drug delivery applications
- Polymer-drug/bio-active molecule conjugate and their biological evaluations
- Synthesis and characterization of polymeric-inorganic hybrid materials and nanomaterials.
- Oxidative polymerization: Polymerization of vinyl monomers under high pressure of oxygen.

## 8. Theoretical and Computational Chemistry

**(Faculty members:** *Prof. Bidyendu Mohan Deb, Dr. Pradip Kumar Ghorai, Dr. Amlan Kusum Roy, Dr. Mousumi Das, Dr. Debasis Koley and Dr. Ashwani Kumar Tiwari*)

The theoretical and computational chemistry research group of our department is actively involved in the following broad research areas:

- Development of quantum mechanical methods to study structures, properties and dynamics of atoms, molecules within the broad domain of DFT and other correlated approaches.
- Laser-atom/molecule interaction within the framework of time dependent Density Functional Theory.
- Theoretical and computational studies on opto-electronic and charge transport properties in conjugated systems.
- Computer simulation studies of diffusion in nanoporous media and in liquids.
- Molecular dynamic simulation studies of surfactant self-assembly on different nanoparticle surfaces.
- Studies of reorganization energy of electron transfer in different solvents.
- Time dependent quantum mechanics, theoretical reaction dynamics, laser control of chemical reactions, and theoretical studies of gas-surface scattering.
- Effects of strong magnetic fields on atoms and molecules
- Quantum chaos.
- Mechanistic investigation of various chemical transformations using Computational techniques.
- Computational biophysics: Understanding ligand/drug protein interactions and molecular docking.

### Equipments available to the department

The following state-of-the-art analytical equipments are available for the department.

NMR Spectrometers (JEOL 400 MHz and Bruker 500 MHz)

Single Crystal X-ray Diffractometer (Bruker, Kapp Apex II Duo (Mo & Cu sources))

Powder X-ray Diffraction (Rigaku, SmartLab, 9 Kw)  
UV-Vis-NIR Spectrometer, Cary (Range 400 nm to 3000 nm)  
Fluorescence Spectrometer (Horiba JobinYvon , Fluoromax-3, Xe-150 W, 250-900 nm)  
Atomic Probe Microscopy, NT-MDT (with accessories for studying magnetism, tunneling)  
Electrochemical Set-up (PAR Model 273, working range up to 5 V)  
Electrochemical Set-up with EQCM (CH Instruments)  
Magnetic Property Measurement System (MPMS), Quantum Design (Evercool, 7 Tesla)  
Micro Raman Spectrometer (Horiba JobinYvon, HR 800 double grating)  
Micro-calorimeter (GE)  
High Performance Liquid Chromatograph, HPLC (Waters)  
LC-MS (Waters)  
Gel Permeation Chromatograph, GPC (Waters)  
Digital Polarimeter (Rudolph)  
TGA-DSC  
Dynamic Light Scattering, DLS (Malvern)  
Ultra High Speed Centrifugator (Bechmann)  
Surface Area and Porosity Analyzer (Gemini VII-2390t)  
Surface Conductivity Measurement (Keithley)

## Department of Earth Sciences (DoES)

The Department of Earth Sciences underwent a considerable growth in faculty strength in 2010. Four Associate Professors, three Assistant Professors and two IISER Fellows joined the department and have been actively involved in building teaching and research laboratories. A summary of the contributions made by our faculty members, this year, are presented in this progress report.

### Teaching Laboratories Established

1. Paleontology Laboratory,
2. Sedimentology Laboratory,
3. Expansion of Mineralogical and Crystallographic laboratory,
4. Petrology laboratory (with 12 world class binocular petrological polarizing microscopes)
5. Geophysics laboratory.

### Research Laboratories Established

1. **IISER-K Seismological Observatory** (50Hz-360s broadband seismograph system).
2. **Organic Geochemistry Laboratory** (Instrument setup and working: Fume hood, accelerated solvent extractor, roto vap and multi vap).

**Research Laboratories (being established)**

1. **Geochemistry laboratory** a) Initiation of procurement and establishment of the Quadrupole Inductively Coupled Plasma Mass Spectrometer (Q ICP MS) for ultra low trace level concentration measurement. b) Procedure to procure a high resolution magnetic sector multiple collector Inductively Coupled Plasma Mass Spectrometer (MC-ICPMS) for measurement of isotopes and trace elements has been initiated. c) Initiated process of procurement of the Thermal Ionization Mass Spectrometer (TIMS).
2. **Stable Isotope Laboratory:** Initiated process of procurement of Stable Isotope Ratio Mass Spectrometer coupled with Gas Chromatograph Mass Spectrometer.

**Ongoing Projects**

1. Chemical weathering of black shales: Implications for release of CO<sub>2</sub> to the atmosphere and trace metals to the rivers. PI: **Tarun K. Dalai**. Funded by Department of Science and Technology, Government of India, Value: Rs. 19,84,000.
2. Millennial scale variability in climate and precipitation in S. Africa – Impacts on terrestrial ecosystems. PI: **Joyanto Routh**, co-PI: AN Choudhury. Funded by Swedish Research Link Program-South Africa (2010-12)
3. Arsenic biogeochemical cycling in Bengal Delta Plain aquifers- Early detection and remediation. PI: **Joyanto Routh**, co-PI P Bhadhury. Funded by Swedish Research Link Program-Asia (2010-12).
4. Biogeochemical and paleoclimate studies from lakes in Bhutan. PI: **Joyanto Routh**. Funded by SASNET (2010-11)
5. High resolution paleoclimate record in stalagmites from northeastern India. PI: **Joyanto Routh**. Funded by SIDA (2010-12).
6. Reconstruction of high-resolution records in lacustrine and marine systems (last 20 ka): Linkages between Indian monsoon variability and North Atlantic oscillations. PI: **Joyanto Routh**, co-PIs: B. Wohlfarth, S Bernasconi, and AK Gupta. Funded by Swedish Research Council, SIDA (2008-11).
7. Lode gold mineralization in the Southern Granulite Terrain: geochemical and petrological constraints on their genesis. PI: **Ravikant Vadlamani**, Funded by Department of Science and Technology, Government of India (Project Ref: File No. SR/S4/ES-430/2009) (2011-2014), Value: ~INR 43,00,000.
8. Understanding the geodynamic processes associated with the Permian mafic magmatic province of “northern India”. Co-PI: **Ravikant Vadlamani**, PI: Dr Jason Ali, other Co-PI's: Prof Jonathan Aitchison, Dr Paul Wignall & Dr Xulong Lai. Funded by Hong Kong University Research Grant. Value: HK\$ 770,000.
9. 3-Dimensional imaging of the lithosphere and active deformation across Sikkim-Darjeeling Himalaya and a comparison with NW-Himalaya. PI: **Supriyo Mitra**. Co-PIs: Dr. S.S. Rai (NGRI)

and Dr.V.Joshi (GBPIHED). Funded by Department of Science and Technology, Government of India.

10. The exhumation factor in the genesis of inverted metamorphic sequences - an evaluation from structure, metamorphism, fluid inclusion and earthquakes. PI: Saibal Gupta (Indian Institute of Technology Kharagpur). Co-PI: M. K. Panigrahi (Indian Institute of Technology Kharagpur), **Supriyo Mitra**.
11. Reconstruction of monsoonal rainfall from Late Quaternary Ganga and Yamuna alluvial plain by Stable Isotope tracers: implications to climate forcing on vegetation and river response. **PI: Prasanta Sanyal**, Co-PI: Anindya Sarkar (Indian Institute of Technology Kharagpur); Rajiv Sinha (Indian Institute of Technology Kanpur) Funded by Department of Science and Technology, Government of India (SR/S4/ES-252/2007) (2008-2011) Value: ~20,00,000

### **Ongoing research collaborations**

#### ***Devapriya Chattopadhyay***

1. Molluscan diversity of Cenozoic Kutch and its relationship to paleoclimate. *Collaborator: S. Bardhan (Jadavpur University)*.
2. Evaluating relative importance of biotic and environmental factors in body size evolution of recent invertebrates from Red Sea. *Collaborator: Martin Zuschin, (University of Vienna)*.

#### ***Manoj Kumar Jaiswal***

1.  $^{10}\text{Be}$ , OSL/IRSL Luminescence and  $^{14}\text{C}$  Dating of Series of abandoned alluvial surfaces laterally offset by the Dead Sea Fault (Jordan) *Collaborator: Maryline Le Beon, Yue Gau Chen and John Suppe (National Taiwan University)*
2. Deciphering the long-term evolution of the Chelungpu Thrust, central Taiwan, by dating deformed terraces. *Collaborator: Maryline Le Beon, John Suppe and Yue-Gau Chen (Department of Geosciences, National Taiwan University)*.
3. Active Faults and Crustal Deformation in parts of the Frontal Himalayas around Chalsa, Jalpaiguri District, West Bengal. *Collaborator: Prof. Dhruvo Mukhopadhyay and Chandrayee Goswami (Calcutta University)*.

#### ***Tarun K. Dalai***

1. Investigation of marine Osmium isotope record and its implications for global climate change, extraterrestrial impacts and large scale volcanism. (*Collaborator: Dr. Greg Ravizza, Univ. of Hawaii at Manoa, Honolulu*).
2. Trace elements in foraminifera: heterogeneity and implications for paleoclimate reconstruction. (*Collaborator: Prof. Yuji Sano, Ocean Research Institute, University of Tokyo*).
3. Trace metal cycling and anthropogenic contributions to Hooghly Estuary. (*Collaborator: Dr. Sunil K Singh, PRL, Ahmedabad*).

**Joyanto Routh**

1. Research collaborations with Stellenbosch University, Heidelberg University, ETH-Zurich, Stockholm University, Glasgow University, University of East Anglia, Purdue University and Indian Institute of Science, Bangalore.

**Somnath Dasgupta**

1. Research collaboration with Ruhr University, Bochum, LEMIT Laboratory, La Plata, Argentina, and University of Brasilia, Brasilia, Brazil.

**Ravikant Vadlamani**

1. Strontium Isotope Stratigraphy of Tertiary and Mesozoic marine sedimentary sequences in Western India. *Collaborator: Prof Sunil Bajpai, (Indian Institute of Technology Roorkee).*
2. Foreland evolution of Himalaya, Ultrahigh pressure evolution of the Himalaya, and granites and crustal evolution in the Himalaya. *Collaborator: Prof Fuyuan Wu (Chinese Academy of Sciences (CAS), Beijing).*
3. Gold mineralization from the Southern Granulite terrain. *Collaborators: Dr K.L. Pruseth, (Indian Institute of Technology Kharagpur) & Dr R Krishnamurthi, (Indian Institute of Technology Roorkee).*
4. Collaborative Project: "On the stratigraphical subdivision and correlation of the early Precambrian of China and Asia" (No. 1212010611802) of the Geological Survey of China, (Co-PI) with the Geologists of the Chinese Academy of Geological Sciences (CAGS), Beijing viz. Dr Yang Chonghui, Dr Wang Yanbin, Dr Du Lillin and Dr Ren Liudong. Total funding by the CAGS.

**Supriyo Mitra**

1. Investigation of the Deep Seismic Structure of the Indo-Himalayan Collision Zone in Eastern India. *Collaborator: Dr. Keith Priestley (Bullard Laboratories, University of Cambridge).*
2. Indian collaborator of the NERC funded Consortium 2004-2005 Indian Ocean earthquakes - Subduction Zone segmentation and controls on earthquake rupture.
3. Indian participant of the Indo-Russian collaborative project funded by ILTP division of Department of Science and Technology, Government of India on Lithospheric structure and anisotropy of the Indian shield and Himalaya. *(lead by Indo Russian Center for Earthquake Research, IMD)*

**Prasanta Sanyal**

1. Molecular signature of vegetational change in Indian Siwalik. *Collaborator: Dr. Peter Sauer (Indiana University, Bloomington, USA).*
2. Late Quaternary climate change. *Collaborator: Dr. Valier Galy (Woods Hole Institute of Oceanography, USA).*

3. Paleocology and Paleoclimatology of Eastern Ghat Mobile Belt. *Collaborator: Dr. Sunil K. Singh (Physical Research Laboratory, India).*

**Jitendra Kumar Pattanaik**

1.  $^{10}\text{Be}$  measurements on sediment core samples from Sambhar and Didwana Lakes in Rajasthan to determine rate of sedimentation: Significance to paleoclimate studies. *Collaborators: Pankaj Kumar and Dr. S. Chopra, IUAC, New Delhi; Prof. S. Balakrishnan, Pondicherry University.*
2.  $^{10}\text{Be}$  measurement on sediment core of South Western Indian Ocean, *Collaborators: Dr. N. Khare, MOES; Dr. Pawan Govil, NCAOR, Goa; Pankaj Kumar and Dr. S. Chopra, IUAC, New Delhi.*

**Research Visits and Research related field works undertaken**

**Manoj Jaiswal** visited the OSL dating Laboratory at NGRI, Hyderabad in the month of April 2010 for scientific discussion and future collaboration to use their laboratory till the development of similar laboratory begins to operate at IISER-K. The meeting was successful in terms of using their laboratory and sending the MS/PhD students for project work.

**Manoj Jaiswal** visited the University of Chulalongkorn, Bangkok, Thailand during 15-22<sup>nd</sup> August for scientific collaboration on "Luminescence Chronology of coastal dune sands of Thailand and their climatic implications".

**Joyanto Routh** and **Manoj Jaiswal** carried out a research field trip to Bhutan between 9 and 18 October, 2010 to collect high altitude lake sediment for high resolution climatic studies. Analysis work is planned to start in semester break.

**Joyanto Routh** visited the Glasgow University and Heidelberg University. A 5th year student working with him on his thesis spent 2.5 months in Heidelberg University to do some of the analyses.

**Somnath Dasgupta** visited LEMIT Laboratory, La Plata, Argentina in May-June, 2010.

**Ravikant Vadlamani** carried out fieldwork along with collaborators of the Chinese Academy of Geological Sciences in Archaean Granite Greenstone terrains in West Shandong Province, China, 16 to 25 October 2010.

**Devapriya Chattopadhyay** carried out fieldwork along with collaborators from the Department of Geological Sciences, Jadavpur University in Cenozoic fossiliferous terrains of Kutch and Dwarka, Gujarat, 12 to 22 December, 2010.

**Supriyo Mitra** carried out fieldwork in Sikkim Himalayas for acquisition of seismological data from the north-south profile of seismometers deployed in Sikkim, 21-26<sup>th</sup> April 2011.

**Supriyo Mitra** and **Ravikant Vadlamani** visited the Helium observatory and plant in Bakreshwar and Tatloi respectively, operated by VECC Kolkata for seismo-geochemical studies, 29 April – 1st May 2011.

## Department of Mathematics and Statistics (DoMS)

The year 2010-2011 has been a very crucial year for the Department of Mathematics and Statistics. Four new faculty members have joined the department this year, increasing our faculty strength to 9 members. This has strongly enhanced the research and the teaching profile of the department. With the joining of the new faculty members, we could offer Mathematical Statistics course, which is an interdisciplinary course offered to the 4th year students of our Institute. A couple of new elective courses have also been offered to the students this year. Not only are we able to offer many more courses than previous years, but also are having two new Ph.D. students this year. The department has also actively organized national and international conference/workshop in 2010. We are also holding a regular mathematics seminar almost in every week.

### 1. New Faculty Members

Four new faculty members joining in April 2010-May 2011 are as follows:

1. Dr. Anirban Banerjee did his Ph.D. from Max-Planck Institute for Mathematics in the Sciences and University of Leipzig, Germany in 2008. After holding a postdoctoral fellowship at Max Planck Institute of Molecular Genetics, he joined us in December, 2010 as an Assistant Professor (jointly with the Department of Biological Sciences). His research interests are in **spectral graph theory, structure and evolution of biological networks and human brain functional networks**.
2. Dr. Aparajita Dasgupta spent eight months (July 2010 - February 2011) as an IISER fellow at the Department of Mathematics and Statistics. She did her Ph.D. from York University in Toronto, Canada in 2008. After holding a postdoctoral fellowship at Indian Institute of Science, Bangalore, she joined us in July, 2010 as an IISER Fellow. Her research interests are in **harmonic analysis**, particularly in analysis on Heisenberg groups and Pseudo-differential operators.
3. Dr. Satyaki Mazumdar did his Ph.D. from University of Texas at Dallas, USA in 2010. After holding a brief visiting position at Indian Statistical Institute Kolkata, he joined us in December, 2010 as an IISER Fellow. His research interests are in **statistics**, particularly in outlier detection and spatial trimming.
4. Dr. Kaneenika Sinha did her Ph.D. from Queen's University in Kingston, Canada in 2006. After holding postdoctoral fellowship at University of Toronto, Canada and Pacific Institute of Mathematical Sciences postdoctoral fellowship at University of Alberta in Edmonton, Canada, she joined us in July, 2010 as an Assistant Professor. Her research interests are in **number theory**, particularly in arithmetic of modular forms, equidistribution theory and multiple zeta functions. She is on leave during January-May, 2011, visiting MSRI, Berkeley, USA, as a post-doctoral fellow.

### 2 Supervision of Ph.D. Students

Our department currently has three Ph.D. students. Ms Suchismita Das joining the department in January, 2009 as JRF is pursuing a Ph.D. under the supervision of Dr. Asok K. Nanda.

Two Ph.D. students are currently undertaking course work before they decide on their topic of specialization.

### 3 Conferences and Workshops

In December 2010, our department organized the following important events:

#### 3.1 IISER Kolkata Winter School on Number Theory (Waring's Problem): December 13-17, 2010:

From 13th to 17th December, 2010, we organized a winter school on number theory. Professor M. Ram Murty delivered a set of five lectures on Waring's problem, including an institute colloquium on the same topic. Professor Murty outlined a proof of Waring's Conjecture using Schnirelmann density and Hua's lemma on certain exponential sums. His lectures were accessible to undergraduate students. Professor Murty's lectures were also supplemented by tutorials, in which students did problems related to the lectures and filled in details. The tutorials were conducted by Jaban Meher, Kasi Viswanath, Jay Mehta and Karam Deo Sankhadhar, Ph.D. scholars at Harish Chandra Research Institute. This winter school had over 50 participants, out of which 25 were from IISER Kolkata and 25 were from institutes and universities all over India.

#### 3.2 Conference on Mathematical Foundations of Quantum Mechanics: December 16-21, 2010:

This international conference was organized from 16th to 21st of December, 2010. The primary aim of the conference was to expose Indian researchers greatly to areas which are hitherto scantily pursued in India, for example, the mathematical theory of coherent states, quantization techniques, foundational questions related to the various quantum mechanical paradoxes, etc. The main speakers for this conference were Professors S. Twareque Ali, Sushanta Dattagupta, Gerald Goldin, Gadadhar Mishra, J.M. Lindsay, Kalyan B. Sinha, Jean-Pierre Gazeau, Pekka Lahti and K.R. Parthasarathy.

### 4 Outreach Activities

- Interaction with the Students of Paljor Namgyal Girls' School, Gangtok:

In December 2010, a representative from our department met students of Paljor Namgyal Girls' School, Gangtok, who were visiting the institute. Students were informed about the courses and the activities of our department. They were given a motivational talk about the historical development of mathematical ideas across civilizations and how a strong training at IISER Kolkata will prepare them to contribute to scientific and economic growth in the intellectually vibrant atmosphere of modern-day India.

- Contribution of the Department in the Science Fair:

On 12th-13th of January, 2011 the Department of Mathematics and Statistics has represented IISER-K in the Prof. S. N. Bose Science, Agriculture & Book Fair which was held during 03 - 13 January, 2011. Not only the 4th and the 5th year students were involved, but also many students of 1st, 2nd and 3rd year were very interested to participate actively in this event. The department had two stalls for showing informative movies, posters, quiz,

puzzles and presentations. In the movie section, videos pertaining to mathematics have been shown continuously. In the quiz and puzzle section, the interesting mathematical puzzles have been provided to the visitors with some encouragement-prizes for the correct answers. Some posters were presented by our students to explain the interesting aspects of Ancient Mathematics which reflect the rich heritage India had in mathematics in the Vedic period, and some on the biographies of mathematicians depicting their contributions to mathematics. There were the interesting ways of exploration of the fractals and the golden ratio in which mathematics comes up in nature. Some students of the department have also presented the symmetry and the different geometrical patterns that have been found in nature. The main aim of the department was to grow interest in mathematics among the local young students through the innovative and the interactive display. The department is now planning to extend it to Kolkata in near future to interact with the school students there.

## 5 Regular Department Activities

We have been running a regular Mathematics seminar at IISER Kolkata on Wednesdays. The seminar speakers have been a healthy mix of candidates who have recently completed their Ph.D., and more senior and established mathematicians/statisticians; the latter gave more general talks, presenting a big picture of their research fields. Some of our prominent speakers for this seminar are listed below:

- Dr. Brooke Feigon (University of East Anglia): Number theory and L-Functions (August 2010)
- Prof. Michael Ruzhansky (Imperial College London): Pseudo-differential operators (August 2010)
- Prof. S. P. Mukherjee (Calcutta University): Measurement: quality and diversity (October 2010)
- Prof. S. C. Bagchi (Indian Statistical Institute Kolkata): Tilings of the real line (November 2010)
- Prof. Mahan Maharaj (RKM Vivekananda University): Introduction to hyperbolic geometry (November 2010)
- Prof. Ashok Bansal (Delhi University): Bayesian statistics: the fourth lie (November 2010)
- Prof. R. Thangadurai (HRI, Allahabad): Small primes in arithmetic progressions (December 2010)
- Dr. Sasanka Roy (CMI): Approximate shortest descent path on a terrain (February 2010)
- Dr. Partha Pratim Ghosh (University of KwaZulu Natal): Understanding Universality, a path to Categories (February 2010)
- Dr. Kirankumar R. Hiremath (Zuse Institute): Computational Optics-Photonics: avenues, challenges and opportunities (March 2010)

- Prof. Gourangadev Chattopadhyay ( Calcutta University): Measure-Theoretic Probability: An Introduction (March 2010)
- Prof. Soumen Roy (Bose Institute): Networks and metrics (March 2010)
- Dr. Ujjwal Koley (BCAM-Basque center for Applied Mathematics): Error estimate for degenerate convection-diffusion equations (April 2010)

## 6 Department Website

Detailed information about our department members and activities can be obtained from our website: <http://math.iiserkol.ac.in>

## Department of Physical Sciences (DoPS)

The Department continued with all the theoretical and laboratory courses from the First to the Fourth Year that were introduced during the last four years. This year we had our first batch of students in their Fifth and final Year. In the Autumn semester they had two elective theoretical courses out of four offered. The courses offered were *Quantum Magnetism*, *Atomic & Molecular Physics*, *Advanced Mathematical Methods* and *Advanced Condensed Matter Physics*. The Salient feature of the Fifth Year was that for most of first semester and the whole of the second were devoted to Research Projects for every student. The students worked in various branches of theoretical or experimental Physics. Some of these works indeed have publishable research, which will be communicated. Consistent with the philosophy of the institute, most of the Final Year students with Physics Major are motivated to take up a research career, 10 out of 11 students will pursue research in basic science in India or abroad.

### Important experimental facilities introduced during this period:

1. **Precision spectroscopy using optical tweezers:** Dr. Ayan Banerjee and Dr. Nirmalya Ghosh have set up a Precision Optics and Spectroscopy research laboratory that possesses a working Optical Tweezers for trapping micro- and nano-particles, biological cells etc. After trapping "tiny" objects in the light field of optical tweezers, the setup has the capability of performing different kinds of optical spectroscopy on the trapped particles including Raman spectroscopy, polarization spectroscopy, etc.
2. **Multi-purpose high vacuum chamber for thin film deposition and processing:** Dr. Partha Mitra has set up a multi-purpose high vacuum chamber for thin film deposition and processing. The system can work with a base pressure of  $1 \times 10^{-7}$  Torr. The substrate can be maintained in the chamber at any elevated temperature up to  $800^\circ\text{C}$  and it can be rotated or tilted by any angle. The system has three magnetron sputter guns, powered either by a 600 V DC power supply or a 330 W RF power supply, for 3 inch circular targets in confocal arrangement. The sputtering unit is used for depositing high-quality thin films of nitride superconductors like Niobium Nitride (NbN) and Titanium Nitride (TiN) etc. and high-K dielectric materials like Titanium dioxide ( $\text{TiO}_2$ ) for field gating, tunnel junctions and capacitive device applications. The system also has one broad beam (5 cm) RF Ion

source which is capable of generating reactive ion beams of gases like oxygen, nitrogen and chlorine, in addition to inert beams of Argon. The ion source can be used to etch reactively or mill wide variety of materials through patterned masks and will be an essential part of nanofabrication process. The system also has one electron-beam evaporator which can be used for simple metallization process like deposition of contact pads for resistivity measurements and formation of mirrors.

3. **Low-temperature photoluminescence setup:** Dr. Bipul Pal and Dr. Bhavtosh Bansal have set up a low-temperature photoluminescence (PL) measurement in reflection geometry which is suitable for semiconductor samples. Sample can be kept in closed-cycle He-cryostat at a variable temperature from 20-300 K. Excitation is done by either a He-Ne laser (wavelength  $\lambda = 632.8$  nm) or diode lasers ( $\lambda = 405$  nm and 530 nm). Emitted luminescence from the sample is dispersed in a spectrograph and detected using a Peltier-cooled CCD array ( $\lambda = 200$ -1050 nm) or an InGaAs diode array ( $\lambda = 900$ -1700 nm). Spectral resolution of about 0.1 nm can be used in this setup. The setup is very sensitive and weak excitation by the monochromatized light from a broadband tungsten-halogen lamp can also be used.
4. **Raman spectrometer for undergraduate laboratory:** A simple Raman spectrometer has been set up in the undergraduate teaching laboratory for training students in the area of precision optical spectroscopy.

#### Conferences/Symposia/Workshops Organised

The Department organised a "Workshop and Symposium on Mathematical Ecology" from 7-14 December 2010.

## VIII. Seminars & Colloquia

### Seminars

- Dr. Prasanth P Jose, University of California, Irvine, 7 April, 2010, "Study of Structure and Dynamics in Condensed Phases Using Molecular Simulations".
- Dr. Prasanta Sanyal, Stable Isotope Laboratory, Department of Geology and Geophysics, Indian Institute of Technology Kharagpur, 21 April, 2010, "Indian Summer Monsoon over the Past 100 Ka: Implications for Climate Forcing on Vegetation ( $C_3$  vs.  $C_4$  plants)".
- Dr. J.K. Pattanaik, Dept. of Earth Sciences, Pondicherry University, Puducherry, 21 April, 2010, "Sr Isotope and Geochemical Studies on Kaveri, Palar and Ponnaiyar Rivers, Southern India and  $^{10}Be$  Isotope Studies on Quaternary Sediments of Kaluveli Lake, Near Pondicherry, India".
- Dr. Sujata Ray, Department of Civil Engineering, Indian Institute of Technology Guwahati, 21 April, 2010, "Microbiological Responses and Population-Adaptation to Chemical Stress".
- Dr. Robert John Chandran, Suri Sehgal Centre for Biodiversity and Conservation, Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangalore, 21 April, 2010, "Understanding Tree Diversity of the Tropical Forests of the World – Findings from a Global Network of Forest Plots".
- Dr. Ashwani Kumar Tiwari, Dept. of Chemistry, University of Massachusetts, Amherst, 19 May, 2010, "Dynamical Insights in Heterogeneous Catalysis: Methane Dissociation on Metal Surfaces".
- Dr. Ajit Bikram Datta, Dept. of Biophysics and Biophysical Chemistry, Johns Hopkins School of Medicine, Baltimore, 28 May, 2010, "Structural Insights into the Mechanism of Ubiquitination: Conjugation, Recognition and Removal".
- Dr. Anirban Bhunia, School of Biological Sciences, Nanyang Technological University, Singapore, 28 May, 2010, "Understanding of Structure-Function Correlation using NMR Spectroscopy".
- Dr. Prasenjit Guchhait, Thrombosis Research Division, Department of Medicine, Baylor College of Medicine, Texas, 9 June, 2010, "Molecular Link between Hemolysis and Thrombosis/Vascular Occlusion In Sickle Cell Disease".
- Dr. Prasenjit Mitra, Institute of Life Sciences, Hyderabad Central University Campus, Hyderabad, 9 June, 2010, "Improving Insulin Secretion and Action : A Therapeutic Approach to Ameliorate Type-2 Diabetes".

- Dr. Swadeshmukul Santra, NanoScience Technology Center, Department of Chemistry and Biomolecular Science Center, University of Central Florida, 28 June, 2010, "Multimodal/Multifunctional Nanomaterials for Biological Applications".
- Dr. Suhas Ranjan Dey, Research Department: Integrity of Small Scale Systems/High Temperature Materials, Institute of Materials, Ruhr University Bochum, 2 July, 2010, "Phase Transformation Studies on Thermal-Treated Ti-Al Based and Ti Alloys Through 2D/3D Microstructure-Crystallographic Characterization".
- Dr. Anurag Danda, Head of World Wildlife Fund-India Sundarbans Programme, 22 July, 2010, "Sundarbans - The Last Refuge: The Story of the Royal Bengal Tiger".
- Prof. Hidehiro Sakurai, Institute of Molecular Science, Okazaki, 30 July, 2010, "Asymmetric Synthesis of a Chiral Buckybowl".
- Dr. Satyaki Mazumder, University of Texas at Dallas, 4 August 2010, "Improving the Robustness of the Sample Spatial Outlyingness Functions through "Spatial Trimming".
- Dr. Deepak Kumar Sinha, Laboratoire de Physique Statistique, Ecole Normale Supérieure, Paris, 11 August, 2010, "Photocontrol of Protein Activity in a Single Cell of a Live Organism".
- Dr. Bidisha Bannerjee Sinha, Group "Membrane and Cellular Functions", Institut Curie, Paris 11 August, 2010, "Understanding Mechanosensing by Caveolae".
- Dr. Prosanta Kumar Khan, Department of Applied Geophysics, Indian School of Mines, Dhanbad, 18 August, 2010, "Assessing the Intraplate Origin for Subduction Zone Mega-Thrust Earthquake with Special Reference to 2004 Sumatra Event MW = 9.3".
- Dr. Nikhil Guchhait, Department of Chemistry, University of Calcutta, 18 August, 2010, "Solvent Dependent/Independent Photo-induced Charge Transfer Reaction: A Study from Condensed Phase to Jet Cooled Molecular Beam".
- Dr. Ramachandran G., Department of Chemistry, University of Nevada, Reno, 19 August, 2010, "Vibrational Energy Flow within the Dimeric Hemoglobin and the Role of Interfacial Water Molecules".
- Dr. Sachin S. Gunthe, Dept of Biogeochemistry, Max-Planck Institute for Chemistry, Mainz, 25 August 2010, "Aerosol – Cloud – Precipitation Interactions: Measurements and Modeling of Cloud Condensation Nuclei (CCN)".
- Dr. Supratim Sengupta, Jawaharlal Nehru University, New Delhi, 25 August 2010, "How Does E.Coli Find its Middle?".
- Dr. Kathakali Bhattacharya, University of Rochester, New York, 26 August 2010, "Geometry and Kinematics of the Fold-Thrust Belt and Structural Evolution of the Major Himalayan Fault zones in the Darjeeling – Sikkim Himalaya".
- Dr. Michael Ruzhansky, Imperial College, London, 27 August 2010, "Pseudo-differential Operators and Symmetries?".

- Prof. Naba K Mondal, Senior Professor, Tata Institute of Fundamental Research, Mumbai, 17 September 2010, "Neutrinos - A New Window to the Universe".
- Dr. Subhas Pan, Scripps Research Institute, Florida, 22 September 2010, "Total Synthesis of Bioactive Natural Products and Catalytic Asymmetric Reactions using Organocatalysts and Organometallic Catalysts".
- Dr. Arnab Dawn, Institute for Advanced Study, Kyushu University, Japan, 22 September 2010, "Let's Find a 'Supramolecular' Solution".
- Dr. Dharmesh Varade, Laboratoire de Physique des Solides, Université of Paris Sud, Orsay, 29 September 2010, "Superstable Foams made from Catanionic Surfactant Mixtures".
- Dr. Punyabrata Pradhan, Institut für Theoretische Physik, Universität Stuttgart, Germany, 29 September 2010, "Fluctuation Relations for Systems Driven far away from Equilibrium".
- Dr. Suchismita Das, Johns Hopkins School of Public Health, Department of Molecular Microbiology and Immunology, Baltimore, 6 October 2010, "Enhancing Mosquito's Innate Immunity via Transgenesis".
- Dr. Joydeep Mukherjee, The Hospital For Sick Children, University of Toronto, Canada, 6 October 2010, "Molecular Heterogeneity in Glioblastoma Multiforme (GBM)".
- Prashanth Upadhyaya, Center for Integrated Nanotechnologies, Los Alamos National Laboratory, USA, 27 October 2010, "Tracking Ultrafast Dynamics in Semiconductor Nanostructures Through Space and Time".
- Prof. Melanie Austen, Plymouth Marine Laboratory, 29 October 2010, "Marine Ecosystem Services and the Other CO<sub>2</sub> Problem: Ocean Acidification".
- Dr. Rajarshi Chakrabarti, University of Illinois at Urbana, Champaign, 3 November 2010, "Statistical Mechanical Investigation of Polymer Nanocomposites, Colloidal Suspensions and Some Condensed Phase Rate Processes".
- Dr. Nilkantha Sen, John Hopkins Medical School, Baltimore, Maryland, 3 November 2010, "Cell Death and Disease: GOSPEL is the New Hope".
- Dr. Supratim Ray, Howard Hughes Medical Institute (HHMI) and Department of Neurobiology, Harvard Medical School, 8 November 2010, "Studies of Attention at Multiple Scales of Neural Integration".
- Dr. Sivaraman Padavattan, Aptuit Laurua Pvt. Ltd., Hyderabad, 10 November 2010, "Insight into Diseases of Modern Era".
- Dr. Padmaja P Mishra, Department of Chemistry, The Pennsylvania State University, 24 November 2010, "Biophysics of Complex Cellular Processes Using Single Molecule FRET".
- Dr. Parthapratim Munshi, UHP-Centre National de la Recherche Scientifique(=National Center for Scientific Research), Nancy Université, France, 8 December 2010, "High-resolution Crystallographic Studies: Small Molecules to Macromolecules".

- Dr. Prosenjit Bhowmik, National Cancer Institute - Frederick, Frederick, 8 December 2010, "Development of Antimalarial Inhibitors Targeting Plasmodium Parasite Plasmepsins".
- Dr. Max Wyss, Director, World Agency of Planetary Monitoring and Earthquake Risk Reduction, Geneva, 15 December 2010, "Scenario and Real-Time Earthquake Loss Estimates: Risk in Assam".
- Dr. Koel Das, University of California, Santa Barbara, 23 December 2010, "Large Scale Data Analysis in Computational Neuroscience".
- Dr. Arnab Das, Theoretical Division (T-4), *Los Alamos National Laboratory*, 27 December 2010, "Dynamical Freezing in Quantum Many-Body System".
- Dr. Akhilesh Mishra, Department of Earth, Ocean and Atmospheric Science, Florida State University, 5 January 2011, "Weather and Climate Forecasts Using Numerical Models".
- Dr. Joydip Das, College of Pharmacy, University of Houston, 7 January 2011, "Protein Kinase C as Drug Target".
- Dr. Guha Dharmarajan, Dept. Forestry and Natural Resources, Purdue University, 11 January 2011, "Inbreeding in Stochastic Subdivided Breeding Systems: The Genetic Consequences of Host Spatial Structure Aggregated Transmission Dynamics and Life History Characteristics in Parasite Populations."
- Dr. Jayanta Chatterjee, European Molecular Biology Laboratory-Heidelberg, 12 January 2011, "Chemical Genetics".
- Dr. Moulinath Acharya, Department of Medical Genetics, University of Alberta, 19 January 2011, "Human PRKC Apoptosis WT1 Regulator is a Novel PITX2-Interacting Protein that Regulates PITX2 Transcriptional Activity in Ocular Cells".
- Dr. Malancha Ta, Manipal Institute of Regenerative Medicine, Bangalore, 19 January 2011, "The Isolation, Clinical Scale Expansion and Long Term Culture of Mscs Derived from Wharton's Jelly of the Umbilical Cord".
- Dr. Narayan Behera, Molecular Reproduction, Development and Genetics, Indian Institute of Science, Bangalore, 2 February 2011, "An Evolutionary Data Mining Algorithm to Find the Candidate Genes of a Disease for Medical Diagnostic".
- Dr. Snehangshu Patra, Department of Organic Chemistry, Weizmann Institute of Science, Israel, 2 February 2011, "Electrochemical Studies of Conducting Polymers and Nanomaterials".
- Dr. Partha Pratim Ghosh, School of Mathematical Sciences, University of KwaZulu Natal, 15 February 2011, "Understanding Universality: A Path to Categories".
- Dr. Sasanka Roy, Chennai Mathematical Institute, Chennai, 15 February 2011, "Approximate Shortest Descent Path on a Terrain".
- Soumik Mukhopadhyay, Department of Physics, Indian Institute of Science, Bangalore, 23 February 2011, "Domain Wall Dynamics in Nanomagnets".

- Dr. Dipanjan Chakraborty, University of Leipzig, 23 February 2011, "Molecular Dynamics Simulation of Hot Brownian Motion on GPUs"
- Dr. Vivek Rai, Department of Medicine, New York University Medical Center, 23 February 2011, "The RAGE Axis: Novel Insights and Key Regulations in Cardiovascular Complication and Tumorigenesis"
- Dr. Amlan Banerjee, New Mexico Institute of Mining and Technology, Department of Earth and Environmental Science, New Mexico, 23 February 2011, "Plumbing of Hydrothermal Systems of Great Basin, USA"
- Dr. Siddhartha Roy, M.D. Anderson Cancer Centre, Houston, Texas, 02 March 2011, "Structural basis for recognition of modified p53 and histones by reader domains"
- Dr. Kirankumar Hiremath, Zuse Institute Berlin, 08 March 2011, "Computational Optics-Photonics: Avenues, Challenges and Opportunities"
- Dr. Subhrangsu Chatterjee, University of Alberta, 16 March 2011, "Species Specific urea induced unfolding of Prion Proteins"
- Dr. Abir De Sarkar, City University of Hongkong, 17 March 2011, "Some useful computational modelling applications in Surface Science"
- Dr. Prim B Singh, Research Center Borstel, Germany, 23 March 2011, "Heterochromatin, Epigenetics and age reprogramming"

### Colloquia

- Prof. Marian Wiercigroch, Centre for Applied Dynamics Research, University of Aberdeen, 5 February 2010, "Nonlinear Dynamics in Engineering Systems"
- Prof. K.B. Sinha, Jawharlal Nehru Centre for Advanced Scientific Research, 6 February 2010, "Spinoff in Mathematics from Classical and Quantum Physics: An Overview"
- Prof. Shantanu Sinha, University of California, San Diego, 20 March 2010, "The Other "Phase" of MRI"
- Prof. Naresh Dadhich, Emeritus Professor, Inter-University Centre for Astronomy and Astrophysics, Pune, 24 March 2010, "Why Einstein (Had I been born in 1844!)?"
- Prof. R. Ramesh, Physical Research Laboratory, 27 March 2010 "How Much of the Recent Climate Change is due to the Sun?"
- Prof. Gautam Desiraju, Indian Institute of Science, 3 April, 2010, "Crystal Engineering: Thirty Years Later"
- Prof. Sunil Mukhi, Tata Institute of Fundamental Research, 10 April 2010, "Strings in Three-Point Perspective"

- Prof. Santanu Bhattacharyya, Indian Institute of Science, 17 April 2010, "How Self-assembled Networks form and Grow?"
- Prof. Jainendra Jain, University of *Pennsylvania*, 10 August 2010, "Exotic Particles in Silicon MOSFETs: Emergence in Action".
- Prof. Andrew Manning, University of Plymouth, 14 August 2010, "Deposition of Natural Cohesive Sediments".
- Prof. J.N. Goswami, Director, Physical Research Laboratory, Ahmedabad, 1 September 2010, "Chandrayaan I and Beyond".
- Prof. D. D. Sarma, Solid State and Structural Chemistry Unit, Indian Institute of Science, Bangalore, 11 September, 2010, "Photophysical Properties of Semiconducting Nanocrystals: What Makes Them Glow?"
- Prof. Sriram Ramaswamy, Indian Institute of Science, Bangalore, 18 September 2010, "Beasts, Birds, Bugs, Biopolymers, Bolts and Batons".
- Prof. Gopal K Shenoy, Advanced Photon Source, Argonne National Laboratory, Argonne, 13 November 2010, "From Roentgen X-ray Tube to X-ray FEL – A Tool-driven Scientific Revolution".
- Prof. Bulbul Chakraborty, Brandeis University, 24 November, 2010, "Taking the Temperature of Sand".
- Prof. M.R.S. Rao, Jawaharlal Nehru Centre for Advanced Scientific Research, 27 November, 2010, "Genomics of Glioblastoma Multiforme: An Aggressive form of Brain Cancer".
- Prof. Michael Avignon, Institute Neel, *Centre National de la Recherche Scientifique* (=National Centre for Scientific Research), 4 December, 2010, "Electronic and Magnetic Properties of Fe Based Double-Perovskites".
- Prof. Aharon Gedanken, Bar-Ilan University, Ramat Gan, 8 December, 2010, "The Application of Nanomaterials to Biology and Medicine".
- Prof. Andrea Lausi, Elettra Synchrotron Source, Trieste, 13 December, 2010, "Advanced Radiation Sources and Applications".
- Prof. Ram Murty, Queen's University, Kingston, Ontario 15 December, 2010, "Waring's Problem".
- Prof Roger Penrose, Emeritus Rouse Ball Professor of Mathematics, University of Oxford, 5 January 2011, "Seeing through the Big Bang into another World".
- Dr. Mike Zaworotko, Department of Chemistry of the University of South Florida, Tampa, 12 January 2011, "Form Meets Function: Crystal Engineering of Organic and Metal-Organic Materials".
- Prof H. R Krishnamurthy, Centre for Condensed Matter, Dept of Physics, Indian Institute of Science, Bangalore, 28 January 2011, "Ultracold Atoms in Optical Lattices as "Emulators" of Strongly Correlated Quantum Systems".
- Prof Jeremy Sanders, University of Cambridge, 2 February 2011, "Molecular Recognition: What is it and Why is it Important?"

Prof Herbert W Roesky, University of Goettingen, 7 February 2011, "Chemistry Inspired by Interstellar Molecules".

Prof. Robert Blair, Australian International Gravitational Research Centre & University of Western Australia, 22 February 2011, "The Promise and the Prospects of Gravitational Wave Astronomy".

Prof Sujatha Ramadorai, Tata Institute of Fundamental Research, Bangalore, 25 February 2011, "Number Theory: An Enduring Discipline".

Prof LS Shashidhara, Indian Institute of Science Education and Research Pune, 04 March 2011, "Behavioral adaptations and evolution".

Prof T Parthasarathy, Emeritus Professor Indian Statistical Institute, Chennai and Adjunct Faculty Chennai Mathematical Institute, 18 March 2011, "Minimax Theorem and Rendezvous value".

### **Public Lectures**

Prof C N R Rao, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, 12 December 2010, "The Man Who Did Not Get the Prize [(Hi) Story of Modern Chemistry]"

Prof. Herbert W Roesky, Goettingen University, 9 February 2011, "Chemical Curiosities: A Spectacular Science Show".

Dr. R.A. Mashelkar, National Chemical Laboratory and Global Research Alliance, 13 February 2011, "More From Less for More".

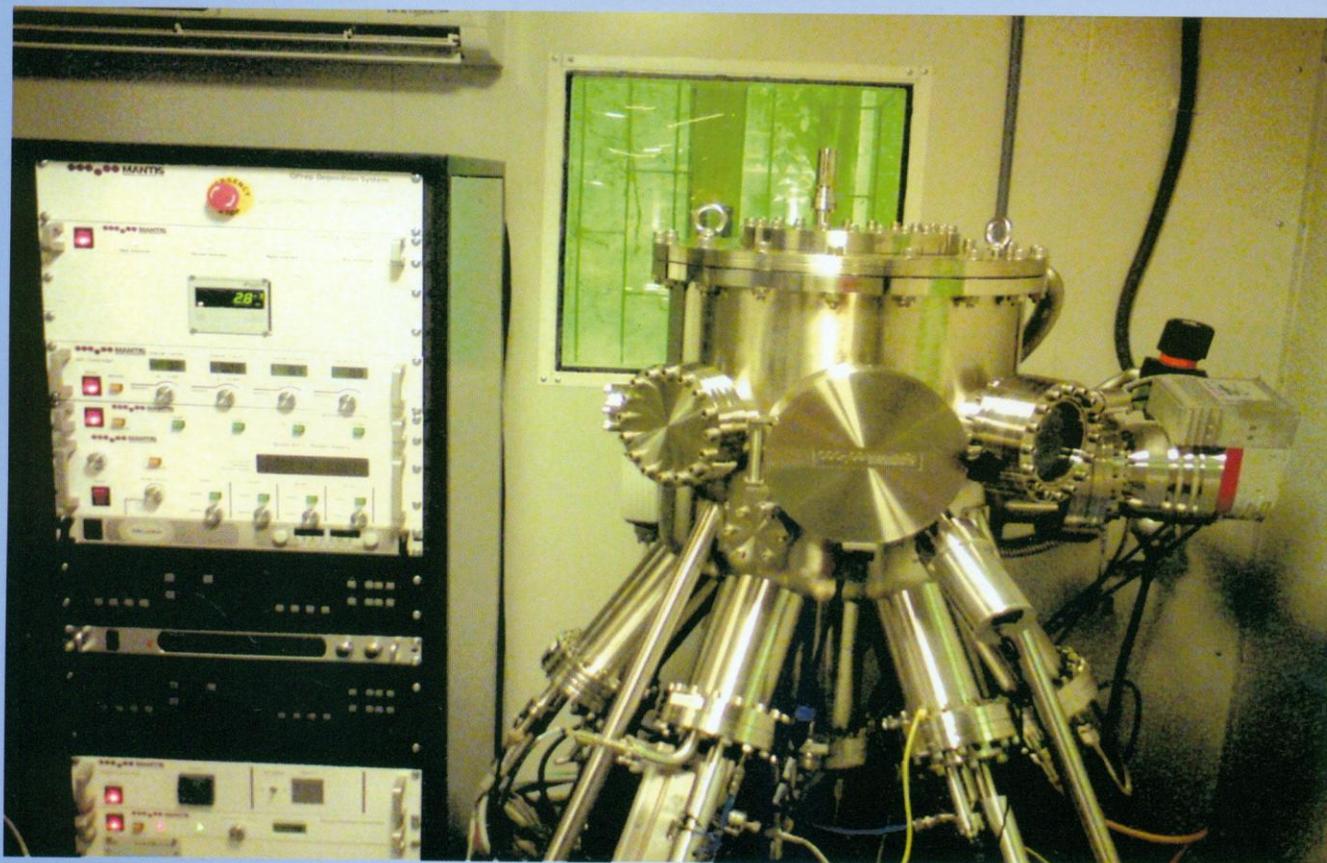
Prof. M.M. Sharma, Institute of Chemical Technology, 24 February 2011, "Milestones in Chemical Industry".



Inauguration of Seismological Observatory at Main Campus on 18<sup>th</sup> November, 2010



Children of THE BUD, Day Care Centre/Creche at Summer Camp



Stuppering System



Students of BS-MS 2006 Batch (1<sup>st</sup> Batch of BS-MS of IISER-Kolkata)

## IX. Faculty Publications

### DEPARTMENT OF BIOLOGICAL SCIENCES

Bang A., Deshpande S., **A. Sumana** and R. Gadagkar. 2010. "Choosing an appropriate index to construct dominance hierarchies in animal societies: a comparison of three indices." *Animal Behaviour* 79: 631-636.

**Bhadra, Anindita**. 2010. "Be nice to crows, otherwise they will scold you!" *Current Science*, 98, 11, 1430-1431.

**Bhadury, P.** and M. C. Austen. 2010. "Barcoding marine nematodes: an improved set of nematode 18S rRNA primers to overcome eukaryotic co-interference." *Hydrobiologia* 641: 245-251

**Das Sarma J.** 2010. " $\gamma\delta$  T cells and IL-17/IL-17R signaling axis in CNS inflammation." *International Journal of Interferon, Cytokine and Mediator Research*: 2:149-155. (Invited review)

**Das Sarma, J.** 2010. "A Mechanisms of viral induced demyelination. Perspective and Infectious Disease; Pathogenesis in Neurologic and Psychiatric Disease." *Interdisciplinary Perspectives on Infectious Diseases*. Volume 2010. Article ID 109239, 28 pages; doi:10.1155/2010/109239 (Invited Review).

Jose, Gregor P, Subhankar Santra, Swadhin K Mandal and **Tapas K Sengupta**. 2011. "Singlet Oxygen Mediated DNA Degradation by Copper Nanoparticles: Potential towards Cytotoxic Effect on Cancer Cells." *Journal of Nanobiotechnology*. 25;9:9, (2011).

Marek, R, M. Caruso, A M Rostami, J B Grinspan, **J Das Sarma**. 2010. "Simultaneous isolation of highly purified astrocytes and microglia." *MACS & More*; Special Edition: neuroscience meets MACS® Technology. Vol 12-2; 7-9. (Cover Page illustration).

Roy, Manas K, Paromita Banerjee, **Tapas K Sengupta**, and Sushanta Dattagupta. 2010. "Glucose Induced Fractal Colony Pattern of *Bacillus thuringiensis*." *Journal of Theoretical Biology*. 265(3):389-95. (Also in the List of the Department of Physical Sciences)

**Ray P.S.**, J C Sullivan, J Jia, J Francis, J R Finnerty and P L Fox. 2011. "Evolution of Function of a Fused Metazoan tRNA Synthetase." *Mol Biol Evol*. 28, 437-447.

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## DEPARTMENT OF CHEMICAL SCIENCES

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