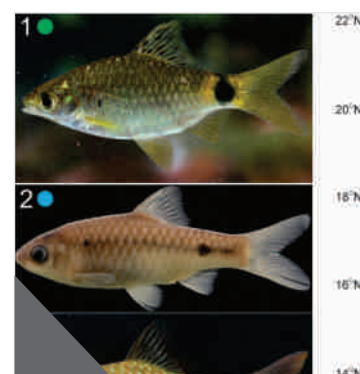
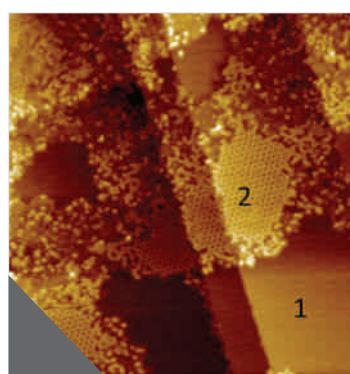
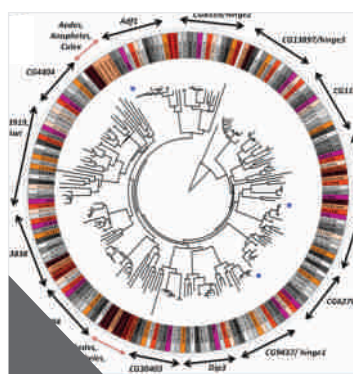
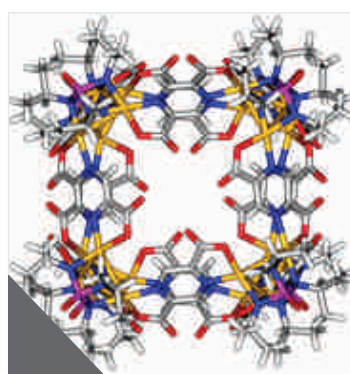
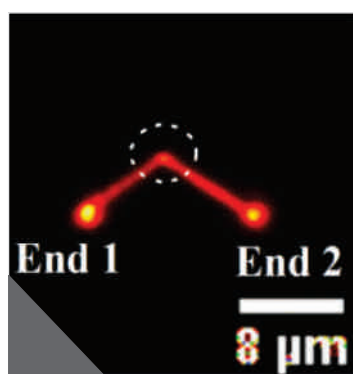
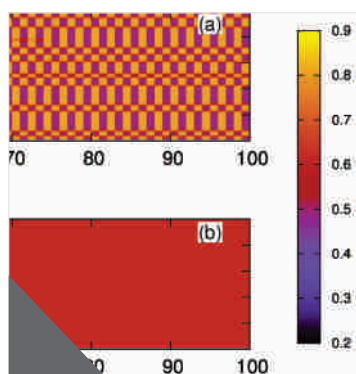




Annual Report 2014-15



भविष्य निरूपण एवं लक्ष्य

उच्चतम महत्व के एक ऐसे वैज्ञानिक संस्थान की स्थापना जिसमें अत्याधुनिक अनुसंधान सहित अध्यापन एवं शिक्षण का पूर्णरूप से एकीकरण हो।

जिज्ञासा तथा रचनात्मकता से युक्त सर्वोत्तम समाकलनात्मक अध्यापन के माध्यम से मौलिक विज्ञान को रोचक बनाना।

लचीले एवं सीमारहित / असीम पाठ्यक्रम तथा अनुसंधान परियोजनाओं के माध्यम से छोटी आयु में ही अनुसंधान क्षेत्र में प्रवेश।

Vision & Mission

Establish scientific institution of the highest caliber where teaching and education are totally integrated with state-of-the-art research

Make learning of basic sciences exciting through excellent integrative teaching driven by curiosity and creativity

Entry into research at an early age through a flexible borderless curriculum and research projects



Annual Report 2014-15

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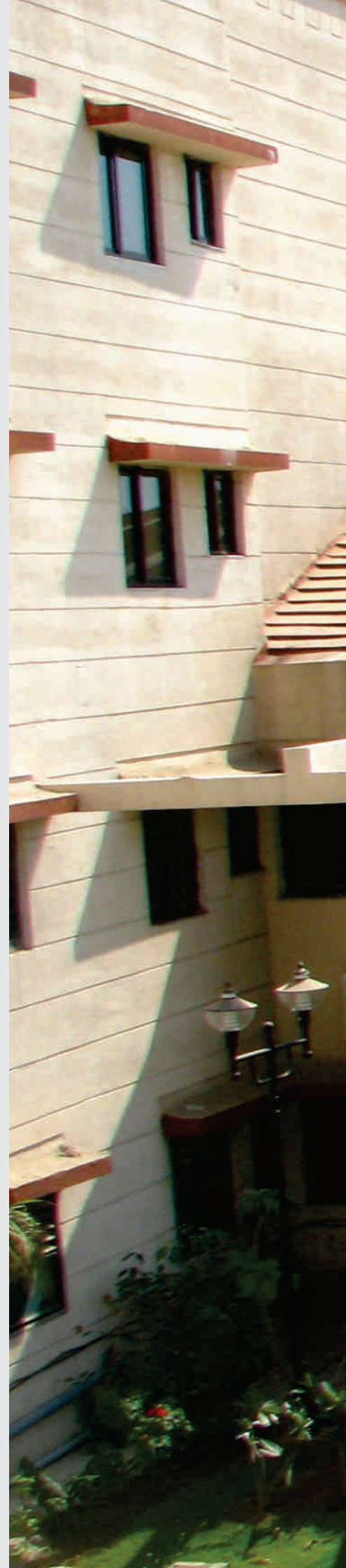
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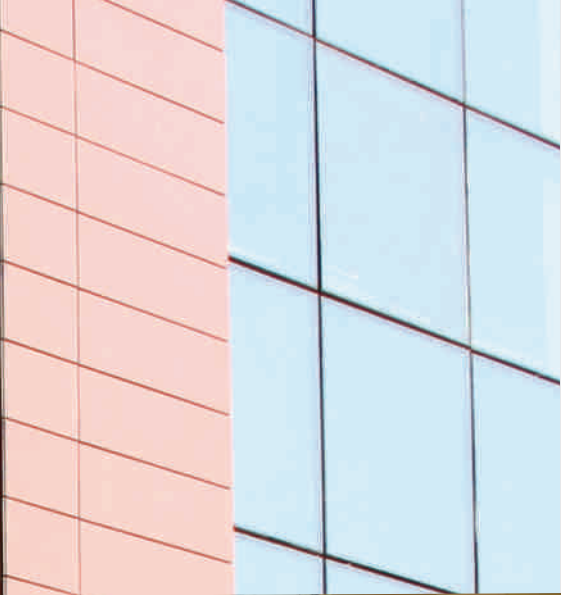
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IISER PUNE

भारतीय
विज्ञान शिक्षा एवं
अनुसंधान संस्थान
पुणे

Indian Institute of
Science Education &
Research Pune





Foreword



I have great pleasure in presenting the Institute's Annual Report for the year 2014-2015.

The period 2014-2015 has been a defining year in the short history of IISER Pune. The major event has been the "Dedication of Institute to the Nation" by Honorable President of India on June 15, 2014. On that day he inaugurated the main building of the Institute and as chief guest delivered his address at the third convocation of the Institute. The honorable Minister for Human Resource Development Smt. Smriti Zubin Irani and the then Governor and Chief Minister of Maharashtra graced the occasion. During his address, the President of India, who is also the Visitor, expressed his anguish about Indian Institutions not making it to the top global rankings and hoped that new Institutions like IISERs would go beyond the national expectations. In this connection, it is noteworthy that in the *Nature Index* of ranking Institutions, IISERs have been ranked fourth in India, behind IITs, CSIR and IISc Bengaluru and in discipline-wise rankings in the Asia Pacific region, IISERs are in 27th position. For Institutions established just 8 years ago, this is no mean achievement.



The year 2014-2015 is a milestone on our campus completion. This year saw all faculty members moving into their offices and laboratories in the main building and the establishment of full administration, library and other facilities in the main building. The Institute vacated its transit campus at Sai Trinity more than a year ago. The technical task of shifting the laboratories, high tech equipment, especially NMR and X-ray machines, microscopes etc into the new premises without any damage has been highly appreciable. During the past academic year, Institute has begun the functioning of new dining hall, auditorium and cricket ground and the Institute housing complex is ready for occupation. The indoor sports stadium, animal house and the third building of housing complex are slated to be finished during this year. By the end of this year, the campus will be complete with all construction work and lot more plantations done.

At present, IISER Pune has close to 600 BS-MS students and about 400 Int PhD and PhD students and 100 faculty members. This number is about 50% of the final capacity of 2000 students and 200 faculties for which IISER Pune is planned. In about 3-4 years, we will reach the full capacity in terms of students. During the last year, 14 new faculty (1 Professor, 2 Associate

Professors and 12 Assistant Professors) have joined the Institute in different disciplines. Earth & Climate Science discipline has been initiated under the leadership of Prof. Shyam Rai and the first course was offered in Spring semester 2015.

Several achievements of our students and faculty continue to make us proud. At the BS-MS level, during 2014, 5 students received DAAD-WISE fellowship, while in 2015, this number has doubled to 10. The other student exchange programs include Khorana program with Wisconsin University (1), Ohio State University (3), and Erasmus NAMASTE program (2). More than 30 BS-MS/PhD students visited a number of overseas universities to present their research work in conferences and symposia. Many of them bagged best poster awards in conferences such as ACS Chemical Biology meeting, summer chemistry program at BASF, Germany and Reaxys program. Two PhD students each in 2014 and 2015 were selected by the Royal Society of Chemistry to spend 6 weeks in their Publications Division to get training in publishing process. I am sure the list of student achievers will grow unabated in future.

Like students, many faculty members have made us proud through their scientific achievements in the Institute, by receiving peer recognitions. Prof. Sunil Mukhi was elected as Fellow of the Academy for Developing World (TWAS) in 2014. Dr. Harinath Chakrapani received the 2015 CRSI Young scientist Award, Dr. Amit Hogadi and Dr. Gayathri Pananghat received INSA Young Scientist medals, Dr. Srinivas Hotha received the 2014 CRSI Bronze medal, Dr. Angshuman Nag was named Young Associate of the Indian Academy of Science and, along with Dr. Anirban Guha (Post Doctoral Fellow), was chosen for Young Scientist Platinum Jubilee Award, National Academy of Sciences, Allahabad. Dr. Akanksha Chaturvedi and Dr. Krishanpal Karmodiya were selected for DBT Innovative Young Biotechnologist Award (IYBA), while Dr. Jeet Kalia was granted Wellcome-DBT India Alliance Intermediate Fellowship.

As required by MHRD, Institute subjected itself to full critical review of the research and teaching programs of the Institute in the disciplines of Physics, Chemistry and Mathematics by expert committees consisting of academicians of international repute. The review of Biology discipline will be done shortly. The expert committees have not only placed IISER Pune on par with international Institutes, but also have suggested various course corrections and future directions. Institute has started implementing many of the suggestions.

The total number of research projects being funded and implemented at the Institute till now is about 120 with 35 new projects sanctioned during 2014-15. The amount of funds generated from all running projects is about 22 crores, constituting to about 20% of our sanctioned budget for the Institute. About 180 research publications have emanated from the Institute during the year 2014, majority of them in highly reputed international journals.

During 2014-2015, the Institute has entered into new MoUs with University of Bath (U.K.) for participation in Doctoral Training Center; University of Melbourne (Australia) for development and implementation of blended BSc course; University of Parma (Italy) and Leibniz University (Hannover, Germany) for students exchange and joint research programs. The MoU with University of Glasgow (U.K.) has been renewed for a second term for pedagogy development along with expanding the scope with research collaborations. Several delegations from abroad have visited the Institute to develop future collaborations, some of the major ones being Bioinformatics Institute (Singapore), CNRS (France), British Council (U.K.), ENS de Lyon (France), European Union Commission, Binghamton University-State University of New York and Arkansas State University (U.S.A.). These visits and the increasing number of requests indicate the growing eagerness about IISER Pune in the international circles.

With good physical and campus infrastructure in place, IISER Pune is increasingly becoming a favored venue for organizing national/international conferences and workshops. Some of the major conferences in 2014-15 include the International Conference on Biomolecular Chemistry (ISBOC 10), Workshop on Fluorescence and Raman Spectroscopic Techniques; ICTS-PIMS-IISER Pune Program on Advances in Mathematical Biology, Summer School on Materials Simulations Theory And Numerics (MASTANI), Laboratory Health and Safety Workshop (in collaboration with the Royal Society of Chemistry U.K.), 8th Edition of SERB School in Neurosciences, and the Annual Meeting of Ramanujan Mathematical Society. Jointly with NCL, the Institute also hosted the National Meeting of CRSI, International Conference on Structural Chemistry and Theoretical Chemistry Symposium. These conferences have brought to IISER Pune many highly eminent scientists to the Institute, some being Arieh Warshel (Nobel Laureate in Chemistry 2013), Valery Rubakov (cosmologist who delivered IISER Pune's first Homi Bhabha Lecture in 2014), L. Mahadevan (Harvard University, U.S.A.), Paul Matsudaira (NSU, Singapore), Mike Klein (Temple University, U.S.A.) and many others. In addition to these meetings, Institute had close to 250 research seminars from visiting scientists. Institute believes in maintaining a dynamic flow of academicians in diverse areas that is very important to the growth of faculty and students.

The Institute continues its educational activities beyond the classroom by participating in and organizing several science outreach activities including summer schools, Disha and Prarambh programs, INSPIRE and KVPY camps and teacher workshops. The activities of IISER Pune students in clubs related to science, music, drama, art etc. continue unabated. The cultural event *Karavaan* and the science quiz contest *Mimamsa* are becoming the Institute's brand events. A never-before kind of event was the creation of the largest Warli painting ever – a 2600 sq.mt canvas (the size of a football ground) on November 1, 2014 done by ~400 IISER Pune students in about 11 hrs. The Institute has actively organized several events associated with SPICMACAY and Indian Council of Cultural Relations.

In February 2015, MHRD asked IISER Pune to be the "Mentoring Institute" for the newly approved IISER Tirupati and the Institute has taken up this challenge, in co-ordination with the Andhra Pradesh Government. On March 28, 2015, Honorable Minister for Human Resource Development Smt. Smriti Zubin Irani unveiled the Foundation stone of IISER (Tirupati) along with that of IIT (Tirupati) and IIIT (Tirupati) on the 240 acres of land identified for IISER Tirupati. The Institute has prepared grounds to set up transit campus for admitting the first batch of students in August 2015.

Overall, IISER Pune is emerging as a happening place, both academically and culturally, to the benefit of all students and faculty members. With 80 faculty members and their families moving to live in the housing complex, the quality of life on campus will reach new heights.

I wish to thank each and every one of our students, faculty, and staff including the contract employees, security, and house-keeping members for contributing to the growth of IISER Pune, all working with a sense of belonging and ownership. I must place on record the funding by MHRD and the constructive role of various statutory bodies—the Board of Governors, the Finance Committee, the Building Works Committee, various Selection Committees, the Senate and the members of all internal committees of the Institute, Deans, administration and all faculty colleagues for giving me unstinted support to make IISER Pune a place where tomorrow's science begins today.



K.N. Ganesh
Director



Academic Activities and Achievements of Faculty Members

Awards and Honors

Publications

Invited Lectures

Contributed Talks and Poster Presentations

Academic Events Organized

Memberships and Affiliations

International and National Visits

Discipline Review Committees of the Institute

Awards and Honors

Nirmalya Ballav	ChemComm Emerging Investigator 2014
Harinath Chakrapani	CRSI Young Scientist Award (2015) • Young Scientist Award (2015) by the Pune Municipal Corporation on the occasion of Science Day (February 28, 2015)
Akanksha Chaturvedi	DBT Innovative Young Biotechnologist Award (IYBA) 2014
Aditi Deo	Junior Fellowship to Outstanding Persons in the Field of Culture, Ministry of Culture, Government of India
Sanjeev Galande	Senior Scientist Award (2015) by the Pune Municipal Corporation on the occasion of Science Day (February 28, 2015)
Sujit Ghosh	New Talent: Asia-Pacific by <i>Dalton Transactions</i> (RSC) 2014
Anirban Guha (Post-doctoral Fellow)	Young Scientist Platinum Jubilee Award, National Academy of Sciences (NASI-Allahabad) 2014
Amit Hogadi	Young Scientist Medal, Indian National Science Academy, New Delhi (2014)
Srinivas Hotha	CRSI Bronze Medal, 2014, Chemical Research Society of India • CDRI Award for Excellence in Drug Research (2014)
M. Jayakannan	CRSI Bronze Medal 2014, Chemical Research Society of India
M. Jeganmohan	ISCB Award for Appreciation for Chemical Science (2014)
Jeet Kalia	Wellcome-DBT India Alliance Intermediate Fellowship (2015)
Krishanpal Karmodiya	DBT Innovative Young Biotechnologist Award (IYBA) 2014
Sunil Mukhi	Fellow, The Academy of Sciences for the Developing World (TWAS), Trieste (2014)
Angshuman Nag	Young Scientist Platinum Jubilee Award, National Academy of Sciences, Allahabad (2014) • Young Associate, Indian Academy of Sciences, Bengaluru (2014)
Gayathri Pananghat	Young Scientist Medal, Indian National Science Academy, New Delhi (2014)

Publications in 2014

Research Papers

Chemical Biology

1. Sultane, P.R., Mete, T.B. and **Bhat, R.G.** (2014). Chemoselective N-deacetylation under mild conditions. *Organic & Biomolecular Chemistry* 12:261-264.
2. Sankar, R.K, Kumbhare, R.S., Dharmaraja, A.T. and **Chakrapani, H.** (2014). A phenacrylate scaffold for tunable thiol activation and release. *Chemical Communications* 50:15323-15326.
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- glycosides and application to the pentaarabinofuranoside of the mycobacterial cell surface. *Organic & Biomolecular Chemistry* 12:9914-9920.
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(Publication from work done elsewhere)
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Number Theory, Analysis, and Applicable Mathematics

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for pricing and hedging in a regime switching market. *Cogent Economics & Finance* 2(1):1-11.

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Books and Book Chapters

1. **Chugh, J.** (2014). Determining Transient Nucleic Acid Structures by NMR. In: Chemical Biology of Nucleic Acids: RNA Technologies. Editors: Erdmann V.A.; Markiewicz, W.T.; Barciszewski, J. Springer 181-198.

2. **Kulkarni, S.K.** (2014). Nanotechnology: Principles and Practices, Capital Publishing, New Delhi

3. **Ratnaparkhi, G.S.** and Courey, A.J. (2014). Cascades, gradients and gene-networks in dorsoventral patterning. In: Principles of Developmental Genetics. Editor: Moody, S. Elsevier.

4. **Watve, M.,** Kunhunu, A. and Jog, M. (2014). Diseases and parasites of wild mammals. In: Mammals of South Asia. Editors: Johnsingh, A.J.T., Manjarekar, N. University Press, Hyderabad.

Publications of IISER Pune Faculty Members with Research carried out elsewhere

1. Woolley, S.C., **Rajan, R.,** Joshua, M. and Doupe, A.J. (2014). Emergence of context-dependent variability across a basal ganglia network. *Neuron* 82:208-223.

2. **Athale C.A.,** Dinarina A., Nedelec F. and Karsenti E. (2014). Collective behavior of minus-ended motors in mitotic microtubule asters gliding toward DNA. *Physical Biology* 11:016008.

3. Glaetzle, A.W., Dalmonte, M., **Nath, R.,** Rouschatzakis, I., Moessner, R. and Zoller, P. (2014). Quantum spin ice and dimer models with Rydberg atoms. *Physical Review X* 4:041037.

4. Shchyrba, A., Wäckerlin, C., Nowakowski, J., Nowakowska, S., Björk, J., Fatayer, S., Girovsky, J., Nijs, T., Martens, S.C., Kleibert, A., Stöhr, M., **Ballav, N.,** Jung, T.A., Gade, L.H. (2014). Controlling the dimensionality of on-surface coordination polymers via endo- or

exoligation. *Journal of the American Chemical Society* 136(26):9355-9363.

5. Girovsky, J., Tarafder, K., Wäckerlin, C., Nowakowski, J., Siewert, D., Hählen, T., Wäckerlin, A., Kleibert, A., **Ballav, N.,** Jung, T.A. and Oppeneer, P.M. (2014). Antiferromagnetic coupling of Cr-porphyrin to a bare Co substrate. *Physical Review B* 90(22):220404.

6. Girovsky, J., Buzzi, M., Wäckerlin, C., Siewert, D., Nowakowski, J., Oppeneer, P.M., Nolting, F., Jung, T.A., Kleibert, A. and **Ballav, N.** (2014). Investigating magneto-chemical interactions at molecule-substrate interfaces by X-ray photo-emission electron microscopy. *Chemical Communications* 50(40):5190-5192.

Invited Lectures

At conferences/workshops and at colleges/universities/institutes/outreach events

G. Ambika	<i>Chaos in astrophysics</i> National Seminar on Astrophysics, KKTM College, Pullut, November 20-21, 2014 • <i>Evolution of topological states in a dynamic network of FitzHugh-Nagumo systems</i> Dynamic Days, Asia Pacific, July 21-24, 2014 • <i>Characterization and time series analysis</i> DST SERC School on Nonlinear Dynamics, Central University of Rajasthan, December 2014 • <i>Characterization and synchronization of chaos</i> Science Academies Lecture Workshop on Basics of Nonlinear Dynamics, January 21-22, 2015 • <i>Recurrence networks and analysis of chaotic time series</i> Conference on Nonlinear Systems and Dynamics, CNSD 2015, IISER Mohali, March 13-15, 2015
V.G. Anand	<i>Tryst with antiaromaticity</i> RSCWIS, Amaravati University, Amaravati, September 19, 2014 • <i>$(4n+1)\pi$ Expanded isophlorin: Molecule at the crossroad of aromaticity and antiaromaticity</i> Asian Photochemistry Conference 2014 (APC 2014), November 10-13, 2014
Sudarshan Ananth	International Workshop on Exceptional Symmetries and Emerging Space-time, Institute for Advanced Studies, Nanyang Technological University, Singapore, November, 2014
Collins Assisi	<i>Sequence generation in the hippocampal formation</i> University of California, Riverside, CA, U.S.A., May 2014 • <i>Computational neuroscience</i> Welingkar Institute of Management, Mumbai (Popular Talk) • <i>Finding your way down memory lane</i> MES Ratnam College, Bhandup, Mumbai • <i>Work that led to the 2015 Nobel prize in Physiology and Medicine to John O'Keefe, May-Britt and Edvard Moser</i> National Institute For Research in Reproductive Health, Parel, Mumbai • <i>Work that led to the 2015 Nobel prize in Physiology and Medicine to John O'Keefe, May-Britt and Edvard Moser</i> Science Club, IISER Pune • <i>Navigation and the hippocampus</i> Department of Bioinformatics, Pune University • <i>Conducted a short workshop in computational neuroscience (Hodgkin-Huxley model and lab sessions using InSilico to model neuronal networks)</i> IISER, Mohali • Two lectures at the SERB School for Neuroscience, IISER Pune, December 8-21, 2014
Chaitanya Athale	<i>Collective effects in cytoskeletal dynamics and cell shape</i> IISER Thiruvananthapuram, September 13, 2014 • <i>A model of cell size phenotypic 'noise' in E. coli based on replication stochasticity</i> Gordon Research Conference on Stochastic Physics in Biology, Ventura Beach, USA, January 11-16, 2015 (Poster Presentation) • <i>Microtubule Transport in Spindle Assembly: Modeling a Novel Tug-of-War</i> Symposium on Mathematical and Computational Biology, IIT Gandhinagar, March 21-22, 2015 • <i>Modeling Microtubule Transport</i> Biophysics Paschim 8 (bpb8), IIT Bombay, March 28, 2015
Arjun Bagchi	<i>Fun in flatspace</i> University of Vienna, Austria, June 2014 • <i>Flat holography: A status report</i> Vienna University of Technology, Vienna, Austria, June 2014 • <i>Flat holography: A status report</i> University of Santiago de Compostela, Spain, July 2014 • <i>One symmetry to rule them all</i> Harish-Chandra Research Institute, Allahabad, September 2014 • <i>One symmetry to rule them all</i> University of Santiago de Compostela, Spain, October 2014 • <i>Fun in Flatspace</i> IISER Thiruvananthapuram, January 2015 • <i>Understanding holography</i> IIT Bombay, January 2015 • <i>Understanding holography</i> IISER Thiruvananthapuram, January

	2015 • <i>Understanding holography</i> IIT Kanpur, January 2015 • <i>The many avatars of galilean conformal symmetry</i> International Strings Meeting (ISM-14), Puri, December 2014
Baskar Balasubramanyam	<i>Invited talk in the Mathematics Colloquium</i> IIT Bombay, September 2014 • ICTS Program on p -adic aspects of modular forms, June 2014 • <i>Mini-course</i> ICTS Program on p -adic aspects of modular forms, June 2014 • <i>Talk in Number Theory session</i> Annual Ramanujan Mathematical Society meeting, June 23-27, 2014 • ICM satellite conference on Automorphic forms and arithmetic at Pohang mathematical institute, August 2014 • Indo-China conference on Theoretical and computational aspects of Elliptic curves, BICMR, Peking University, Beijing, China, December 2014
Nirmalya Ballav	Spintronics and Magnetochemistry on the Atomic and Molecular Level (SPINMOL) Switzerland, 2014 • National Conference on Chemistry of Chalcogens and Related Topics (NC3-2015), Pune, 2015
Sudipta Basu	<i>Molecules that changed the world</i> DST-INSPIRE Science Camp, Mysore, January, 2015
Anjan Banerjee	<i>From light to dark: Understanding long distance mobile macromolecular signals that control tuberization and plant development in potato</i> International Conference on Molecular Signaling: Recent Trends in Biomedical and Translational Research 2014, Biotechnology Department, IIT Roorkee, December 17-19, 2014 • <i>Understanding floral organ development and sex expression in C. grandis</i> International Plant and Animal Genome meeting (PAG-2015), San Diego, U.S.A., January 10-14, 2015 (<i>Invited Speaker</i>) • <i>Tuberization - the complex interplay of myriad factors and signals</i> National Symposium on Environmental Impact on Biodiversity and Plant Development, Presidency University, Kolkata, February 20, 2015 • <i>Long distance mobile signals in phloem that control tuberization and plant development in potato</i> International conference on Application of Advanced Technology for Enhancing Quality of Science Education, Modern College, Pune, February 27, 2015 • <i>An information super-highway in plants: A tale of tour and detour</i> (part of Exciting Science Group, Venture Center, CSIR-NCL Innovation Park), June 29, 2014 • <i>Why to study plants</i> K.C. Thackeray Vidyaniketan, Pune (part of Exciting Science Group, Venture Center, CSIR-NCL Innovation Park, Pune), July 25, 2014 • <i>Test tube plants</i> Hutatma Balvir Vidyaniketan, Pune (part of Exciting Science Group, Venture Center, NCL innovation Park), July 26, 2014 • <i>Micro RNAs and their role in plant growth and development</i> UGC-SAP Program, Department of Botany, Tripura University, Tripura, March 17, 2015 • <i>Small RNAs and Systemic Acquired Resistance (SAR) in plants</i> UGC-SAP Program, Department of Botany, Tripura University, Tripura, March 18, 2015
Deepak Barua	<i>Gene function</i> Annual Khandala Retreat, Department of Life Science and Biochemistry, St. Xavier's College, Mumbai, January, 2015
Rabeya Basu	<i>Seminar and Colloquium</i> Department of Mathematics and Computer Science, Central Michigan University, U.S.A., April 29-30, 2014 • Department of Mathematics and Computer Science, Emory University, Atlanta, U.S.A., May 2, 2014 • <i>Workshop on Projective modules and A1-homotopy theory</i> American Institute of Mathematics (AIM), Palo Alto, California, U.S.A., May 5-9, 2014 (<i>Invited Participant</i>)
Chandrasheel Bhagwat	<i>Complex numbers</i> for 11 th standard students at Gokhale College, Kolhapur as resource person in mathematics in the DST-INSPIRE program • <i>Random walk and Ruin problems</i> Kendriya Vidyalaya, Pune (on the occasion of National Mathematics Day), December 22, 2014
Ramakrishna G. Bhat	<i>Lesson from Nature and Asymmetry in Chemistry</i> Workshop on Coalescence of Chemical Sciences to Confront Challenges of Sustainability, RSC-WIS-Amarvati University, Nagpur, September 19, 2014

R. Boomi Shankar	<i>Functional metal-organic materials derived from amino P(V) scaffolds</i> Department of Chemistry, University of Hyderabad, November 11, 2014 • <i>Functional metal-organic materials derived from amino P(V) scaffolds</i> International Conference on Structural and Inorganic Chemistry (ICSIC), CSIR-NCL and IISER Pune, December 4-5, 2014 • <i>Metal-organic functional materials derived from rigid and flexible P-N scaffolds</i> Symposium on New Directions in Chemical Synthesis, IIT Bombay, December 10-11, 2014
Diganta Borah	Mini School in Complex Analysis, AFS-III, Pune University, May 2014 • Mini School in Harmonic Functions and Dirichlet Boundary Value Problem, ASL, Bhaskaracharya Pratishthana, Pune, Nov 2014 • Mini School in Measure Theory, AFS-I, CEMS, Almora, December 2014
Harinath Chakrapani	Recent Approaches in Drug Design, SMBT College of Pharmacy, Igatpuri, Maharashtra, November 20-22, 2014 • Emerging Trends In Chemical Sciences, Padamshri Vikhe Patil College, Pravaranagar, January 21, 2015 • New Directions in Chemical Synthesis-I, Department of Chemistry, IIT Bombay, December 8-9, 2014 • International Symposium on Bioorganic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015
Apratim Chatterji	<i>Self assembly of ordered cylindrical nanostructures - A simple model to elucidate experimental observations</i> Talk in the group of Federike Schmid, University of Mainz, Germany, July 16, 2014 • <i>Self assembly of ordered cylindrical nanostructures - A simple model to elucidate experimental observations</i> Talk in the group of Juergen Horbach, University of Duesseldorf, Germany, July 28, 2014 • <i>Modelling steady state extensional flow</i> Soft Matter-YIM-2, Pondicherry, December 18-20, 2014 • <i>Heirarchical self-assembly: Self organization of nano-structures in a nematically ordered matrix of self-assembled polymeric chains</i> Comp-Flu, Bengaluru, December 21-24, 2014 • <i>Multiscale Simulations in Soft Matter Physics</i> Mumbai-Pune Complex Fluids Meeting, IIT Bombay, Mumbai, January 10, 2015 • <i>Basic notions of soft matter physics</i> Workshop on Driven Soft Matter and Biological Systems, University of Pune, March 18, 2015
Srabanti Chaudhury	<i>Spontaneous clearance of viral infections by mesoscopic fluctuations</i> Workshop on Stochastic Fluctuations in Population Biology, Epidemiology and Evolution, Leiden, The Netherlands, August 2014
Anisa Chorwadwala	<i>Certain shape optimisation problems</i> (a) Harmonic Analysis and PDE Symposium of the 29th annual conference of the RMS, June 25; 2014 (b) Seminaire de Geometrie of IMJ-Universite Paris Diderot, June 30, 2014 • <i>A Glimpse of Shape Optimization Problems through the Problem of Queen Dido</i> National Conference on Mathematics and Computer Applications, Women's Christian College, Chennai, January 12-13, 2015 • <i>Shape optimization problems via the problem of Queen Dido</i> Women in Science: A Career in Science, Karnataka State Women's University, Vijaypur, March 8, 2015
Jeetender Chugh	<i>Visualizing transient structures in A-site RNA of the ribosome: New structures of known molecules for drug target</i> National Symposium on Biophysics and Golden Jubilee Meeting of Indian Biophysical Society, Jamia Millia Islamia, New Delhi, February 14-17, 2015
Neelesh Dahanukar	<i>Freshwater fish conservation and statistical analysis</i> Under the Canopy training program organized by North East Network (NEN), Chizami, Nagaland, April 13-19, 2014 (Key Speaker)
Aloke Das	<i>Probing non-covalent interactions in biomolecules and materials: Gas phase laser spectroscopy and quantum chemistry calculations</i> Inorganic and Physical Chemistry (IPC) Departmental Seminar, Indian Institute of Science, Bengaluru, November 25, 2014 • $n \rightarrow \pi^*$ interaction: Too weak but can compete with strong hydrogen bonding interaction Advances in Spectroscopy and Ultrafast Dynamics, Indian Association for the Cultivation of Science, Kolkata, December 12-14, 2014 • <i>Weak versus strong: A fine interplay</i>

	<i>between $n \rightarrow \pi^*$ and hydrogen bonding interactions</i> 13th Eurasia Conference on Chemical Sciences, Indian Institute of Science, Bengaluru, December 14-18, 2014 • <i>$n \rightarrow \pi^*$ interaction: Can we have a spectroscopic evidence in the gas phase?</i> 11th Discussion meeting on Spectroscopy and Dynamics of Molecules and Clusters (SDMC), Naini Retreat, Nainital, Uttarakhand, February 19-22, 2015
Shouvik Datta	<i>Probing excitons and Mott transitions in semiconductor quantum well laser diodes by electrical measurements</i> 3rd National Seminar on Physics of Materials and Material-based Device Fabrications (NSPM-MDF), Shivaji University, Kolhapur • <i>Probing excitons and mott transitions electrically in laser diodes</i> CEFIPRA-OPV Workshop, National Chemical Laboratory, Pune, October 14-17, 2014 • <i>Electrical investigation of excitons and mott transitions in semiconductor quantum well laser diodes</i> Transport Properties in Low Dimensional Systems: Experiment and Simulation (TransLES-2014), Institute of Advanced Study in Science and Technology, Guwahati, December 11-13, 2014 • <i>Semiconductor Physics @ IISER-Pune</i> Mumbai Pune Semiconductor Meeting, IIT-Mumbai, March 29, 2015
Aditi Deo	<i>Research methods in the study of music: Ethnography</i> Center for Performing Arts, University of Pune, 2014 • <i>Vernacular music in the digital realm: Questions of commons, property, and belonging in Indian contexts</i> Indian Institute of Technology, Gandhinagar, 2015
Sutirth Dey	Two-day National Seminar: Emerging trends and potentials in Life Sciences, Holy Cross College, Hyderabad, September 19-20, 2014 • <i>Controlling the dynamics of populations: an experimental biologist's perspective</i> ICTS-PIMS-IISER Pune Program on Advances in Mathematical Biology, IISER Pune, December 7-16, 2014
C.V. Dharmadhikari	<i>Some aspects of investigation on field emission from vertically grown carbon nanostructures</i> Paul Scherrer Institute, Villigen, Switzerland, July 14-15, 2014 • <i>Scanning Probe Microscopy in nanoscience/nanotechnology</i> Pre-Conference Tutorials, 7th Bengaluru India Nano, December 5-6, 2014 • Two Talks on <i>Scanning Probe Microscopy</i> National Workshop on Characterization Techniques for Nano-materials, School of Physical Sciences, SRTM University, Nanded, February 9-15, 2015
Sanjeev Galande	<i>Linking genome organization with gene regulation: Tale of a genome organizer</i> PGIMER, Chandigarh, June 25, 2014 • Keynote address, Little Scientists conference, IISER Pune, July 7, 2014 • Vedh 2014- Invited as a resource person for Career Perspectives Conference, Thane, December 13, 2014: Addressed a gathering of over 3000 students and parents • <i>Global regulator SATB1: Novel molecular target for cancer therapy</i> International Conference on Translational Nanomedicine (T-NANO 2014), Ahmedabad University, December 15-17, 2014 • <i>From Genome to Epigenome</i> Lecture delivered at the Infosys Foundation Award ceremony for the International Olympiad Medalists of 2014, at the Homi Bhabha Centre for Science Education, Mumbai, December 22, 2014 • Annual Meeting of the Genetics Society of Japan <i>Role of chromatin architecture in cellular senescence</i> at the CEFIPRA Annual Meeting, Kolkata, November 19, 2014 • <i>To pause or not to pause: In search of evolutionary origins of RNA Polymerase II pause in metazoans</i> 5th Meeting of the Asian Forum of Chromosome and Chromatin Biology, JNCASR, Bengaluru, January 15-18, 2015 • <i>From genome to epigenome: A new perspective for understanding complex diseases</i> International Symposium On Genomics In Health And Disease & 40th Annual Conference of Indian Society of Human Genetics, Nehru Centre, Mumbai, January 28-30, 2015 • <i>SATB family homeodomain proteins and evolution of vertebrates</i> XXXIX Mahabaleshwar Seminar on Recent Advances in Zebrafish Genetics and Development, Alibaug, March 21-23, 2015
Krishna Ganesh	<i>Forging chemistry with biology: DNA – From genetics to generics</i> Foundation Day Lecture, Praj Industries, Pune, April 14, 2014 • <i>Making drugs out of nucleic acids: From PNA to PuNA</i> Garware College, Pune, April 18, 2014 • <i>Peptide Nucleic acids (PNA): Structural editing for</i>

	<i>selective binding to DNA/RNA and delivery into cells</i> 80th Birthday Symposium of Prof. Mike Blackburn, Fribush, Edinburgh, June 26, 2014 • <i>NMR solutions to trivial but tricky problems: Some interesting examples from our research</i> NMR Workshop, Andavan College, Trichy, August 8, 2014 • <i>Peptide Nucleic Acid Analogues: Designs for selective binding with DNA / RNA and cell permeation</i> ACS Carbohydrate Chemistry Meeting, San Francisco, U.S.A. August 12, 2014 and at ISIS Pharmaceuticals, San Diego, U.S.A. August 13, 2014 • <i>Travails of a chemist at crossroads: A life in CSIR and beyond</i>, CSIR-NCL Foundation Day Lecture, September 26, 2014 • <i>Grand challenges in Chemistry</i> ICT-ACS Meeting, ICT, Mumbai, November 22, 2014 • <i>Peptide Nucleic Acid Analogues: Designs for selective binding with DNA / RNA and cell permeation</i> Alnylam, Boston, U.S.A., October 10, 2014 • <i>IISER Pune YIM Meeting</i>, Boston, U.S.A., October 12, 2014 • <i>Innovative science education: Melding excellence with relevance in future campuses</i>, Shell R@D, Bengaluru, November 25, 2014 • <i>Structural transitions in spiegelmers of 4(R/S)-amino/hydroxyproline polypeptides from PPII helix to β-structure</i> Chemistry Symposium, IIT Bombay, December 10, 2014 • <i>Making drugs out of Nucleic Acids: The genomic medicine</i> Pharmacy College, Sinhgad, December 14, 2014 • <i>Molecular engineering of conformational transitions in spiegelmers of 4(R/S)-amino/hydroxyproline polypeptides: From PPII helix to β-structure</i> Indian Chemical Engineers Meeting, Panjab University, Chandigarh, December 27, 2014 • <i>Chemical philately: Learning the story of Chemistry with postage stamps</i> CRSI Meeting, CSIR-NCL, Pune, February 5, 2015
Aurnab Ghose	<i>Building neural circuits: a new regulator of actin dynamics at the growth cone</i> IISER Kolkata, 2014 • <i>Peptidergic neuromodulation of the feeding drive: tweaking sensitivity and extending behaviors</i> Current Trends in Management of Lifestyle Diseases, Sinhgad Institute of Pharmacy, Narhe, Pune, 2014 • <i>Cytoskeleton remodelling in neurons</i> Biophysics Paschim 7, ACTREC, Navi Mumbai, India, September 7, 2014 • <i>Representing internal states: neuromodulating peripheral senses and extending behaviours</i> International Meeting on Neuromodulation of Behaviour, National Centre for Biological Sciences (NCBS), Bengaluru, India, 2014 • <i>Peptidergic modulation of the feeding drive</i> 32nd Annual Conference of the Indian Academy of Neuroscience, National Institute of Mental Health and Neuroscience (NIMHANS), Bengaluru, India, 2014 • <i>Tuning internal states to behavioural outputs</i> Molecules to Systems Symposia, Presidency University, Kolkata, India, 2014 • <i>From interoception to behavioural outputs: A case for neuropeptidergic regulation</i> Indian Zebrafish Meeting, Mahabaleshwar, India, 2015
Prasenjit Ghosh	<i>Selective hydrogenation of acetylene to ethylene by PdGa clusters</i> From the chemical bond to the chemical plant: Computational and materials challenges in gas conversion technologies, JNCASR, Bengaluru, August 25-28, 2014 • <i>Stability and reactivity of PdGa (110) and (100) surfaces</i> Theoretical Chemistry Symposium 2014, CSIR-NCL, Pune, December 18-21, 2014 • <i>Understanding materials using high performance computing</i> Workshop on Scientific Applications, Param Yuva II, IITM Pune, January 8-9, 2015 • <i>Tuning properties of supported graphene through chemical functionalization and substrate modification</i> Nanodays 2015, SNBNCBS, Kolkata, February 16-18, 2015 • <i>Computational Near Edge X-ray Absorption Spectroscopy</i> Current Trends in Condensed Matter Physics, NISER Bhubaneswar, February 19-22, 2015
Sujit K. Ghosh	Workshop on Supramolecular Chemistry: Concepts and Perspective, by Indian Academy of Sciences, Bengaluru at Department of Chemistry, MMV, BHU, Varanasi, April 4-5, 2014 • Brainstorming Session on Chemical Coating for Detection of Explosives, by Office of Principal Scientific Advisor, New Delhi at Department of Electrical Engineering, IIT Bombay, May 21, 2014 • Pre-Conference of 4th International Conference on Metal-Organic Frameworks and Open Framework Compounds (MOF2014), Osaka and Kobe, Japan, September 27-October 1, 2014 • Frontiers in Chemical Sciences (FICS-2014), IIT

	Guwahati, December 4-6, 2014 • Eurasia-13 Conference, Indian Institute of Science, Bengaluru, December 14-18, 2014
Pranay Goel	<i>Diabetes: A global health crisis at our doorstep. How can mathematics help?</i> Ratnam College, Mumbai, August 25, 2014 • <i>Oxidative stress in type 2 diabetes</i> Shiv Nadar University, January 19, 2015 • <i>Mathematical questions in modelling insulin secretion from the pancreatic islets of Langerhans</i> International Center for Theoretical Sciences (ICTS), TIFR, February 5, 2015 • <i>Gaping holes: The small worlds of pancreatic islets</i> Mathematical and Computational Methods in Life Science, IISER Pune, April 11-12, 2014 • <i>Partial Differential Equations; Mathematical modelling of bursting in the pancreatic islets of Langerhans</i> First Instructional School on Mathematical and Computational Biology, IISER Mohali, May 15-29, 2014 • <i>Isles within islets: the small worlds of pancreatic bursting</i> Dynamics Days Asia - Pacific 08, IITM and IMSc, Chennai, July 21-24, 2014 • <i>Oxidative stress influences recovery in antidiabetic therapy</i> IFCAM Workshop on Statistics and Mathematical Biology, Bengaluru, July 29 2014 • <i>Oxidative stress markers and the personalization of antidiabetic therapy</i> India Biodiversity Meet 2014, Indian Statistical Institute (ISI), Kolkata, November 21-23, 2014 • <i>Introductory Lectures</i> ICTS PIMS IISER Pune Program on Advances in Mathematical Biology, IISER Pune, December 7-16, 2014 • <i>Mathematical model of pancreatic insulin signaling; and Oxidative stress and type 2 diabetes</i> Applications of Systems and Mathematical Biology in Public Health: An International Workshop, NISER, Bhubaneswar, February 23-24, 2015 • <i>Oxidative stress in type 2 diabetes</i> NNMCB Symposium on Mathematical and Computational Biology, IIT Gandhinagar, March 21-22, 2015
Anindya Goswami	<i>Risk-Sensitive cost for a Markovian multiclass queue with priority</i> Probability Seminar in L-Infinity, Statistics and Mathematics Unit, ISI Kolkata, August 6, 2014 • <i>Risk-sensitive cost for a Markovian multiclass queue</i> TIFR-CAM, Bengaluru September 8, 2014 • <i>Marginalization for rare event simulation in switching diffusions</i> NMI conference on Stochastic Systems and Applications, IISc Bengaluru, September 11, 2014 • <i>Generalization of Black-Scholes-Merton model and risk minimizing pricing (Series of four talks)</i> National Workshop on Financial Data Analytics, C R Rao AIMSCS, Hyderabad, December 2-30, 2014
Anirban Hazra	<i>Theoretical chemistry beyond the Born-Oppenheimer approximation</i> IISER Bhopal, April 25, 2014 • <i>Structural changes in DNA under high pressure</i> Golden Jubilee In-House Symposium, Department of Chemistry, IIT Bombay, October 16, 2014 • <i>The multi-channel mechanism of ortho-nitro toluene phototautomerization</i> Theoretical Chemistry Symposium, Pune, December 20, 2014 • <i>Science beyond the science of science</i> 9 th CRSI-RSC symposium, Pune, February 5, 2015
Partha Hazra	8 th Asian Photochemistry Conference, Kovalam, Kerala, November 10-13, 2014
M. Jayakannan	<i>Mesophase and helical self-assemblies of p-conjugated oligomers and polymers</i> Indo-French Meeting, CSIR-NCL Pune, October 15-17, 2014 • <i>Polymer scaffolds as drug delivery platforms</i> Recent Advances in Chemical Sciences, Dayanand College, Solapur, February 23, 2015
Mukul Kabir	<i>Edge magnetism in graphene flakes: Effect of shape</i> Department of Nuclear Engineering, Massachusetts Institute of Technology, Cambridge, December 19, 2014 • <i>Manipulating edge magnetism in hexagonal graphene nanoflake</i> Workshop in High Performance Computing, IUAC, Delhi, May 5-6, 2014 • <i>Unconventional magnetism in graphene</i> DAE BRNS symposium on Multiscale Modeling of Materials and Devices, Bhabha Atomic Research Center, Mumbai, October 30-November 2, 2014 • <i>Manipulating edge magnetism in hexagonal graphene flakes</i> Materials Research Society Meeting, Boston,

	December 01-05, 2014 • <i>Magnetism in Graphene Flakes</i> Current Trends in Condensed Matter Physics, NISER Bhubaneswar, February 19-22, 2015
Krishanpal Karmodiya	International conference on "Genome Architecture and Cell Fate Regulation", University of Hyderabad in collaboration with TIFR, Hyderabad, December 1-4, 2014 • "Gene networks in chromatin/chromosome function", 5 th Meeting of the Asian Forum of Chromosome and Chromatin Biology, JNCASR, Bengaluru, January 15-18, 2015 • 39 th Mahabaleshwar Seminar on Recent Advances in Zebrafish Genetics and Development, Alibaug, Maharashtra, March 21-24, 2015
Shabana Khan	<i>Live chemistry experiments</i> S.P. College, Pune (Organized by CSIR-NCL Pune and CRSI) September, 2014
Raghavendra Kikkeri	6 th Asian Community of Glycoscience and Glycotechnology, University of Hyderabad, December 9-12, 2014 • MPG Partner group Meeting 2015, IIT Chennai, March 9-10, 2015
Sulabha Kulkarni	BHU, Varanasi, October 17, 2014 • Sant Gadgebaba Amravati University, Marathi Vigyan Parishad, December 6, 2014 • Two talks at Fergusson College, Pune, December 10, 2014 Two lectures in Sant Gadgebaba Amravati University, Staff College, December 15, 2014 Y. C. Institute, Satara, December 17, 2014 • Indian Women Scientist's Association Science Academies Refresher Course on Foundations of Physics, December 22, 2014 • Three lectures at Rashtrasant Tukdoji Maharaj Nagpur University, Academic Staff College, January 15, 2015 • Seven lectures in schools/junior colleges in Amalner, Dhule, Nanded, Kolhapur district (sponsored by INSA, N. Delhi) • Workshop for Engineering College Teachers, COEP, Pune, April 8, 2014
B.S. Madhava Rao	5 th Asia Pacific Symposium on Radiation Chemistry, Tokyo University, Japan, September 6-9, 2014
M.S. Madhusudhan	Mathematical and Computational Methods in Life Sciences, IISER Pune, April 2014 • Emerging Trends in Computational Biology, Bioinformatics Institute, Singapore, June 2014 • Quality Improvement Program at IBB, Pune, February 2015 • Scientific Advisory Board Meeting, Bioinformatics Institute, Singapore, March 2015
Ayan Mahalanobis	Annual conference of the Ramanujan Mathematical Society, IISER Pune, June 23-27, 2014 • <i>Finite p-groups in cryptography</i> GAGTA8, Newcastle, Australia, July 21-25, 2014
Soumen Maity	<i>Covering arrays and its generalizations</i> , 29 th Annual Conference of the Ramanujan Mathematical Society, IISER Pune, June 23-27, 2014
Moumita Majumdar	<i>Application of silicon compounds in their sub-valency</i> New Directions in Chemical Synthesis-II, IIT Bombay, December 10-11, 2014
Pankaj Mandal	<i>Bridging the THz Gap</i> IIT-Madras, Chennai, February 9, 2015 • <i>Molecular Picture of an Azeotrope</i> SDMC-2015, Nainital, February 18-22, 2015
Arnab Mukherjee	<i>Molecular Mechanism of Proflavine Intercalation into DNA</i> IIT Kanpur, February 2015 • <i>On the structural transition of DNA at a local level</i> IMSc Chennai, February 2015 • <i>MD@50</i> JNCASR, Bengaluru, August 2014 (<i>Invited Poster</i>) • <i>On the Mechanism of Intercalation</i> Advances in Spectroscopy and Ultrafast Dynamics (ASUD), IACS, Kolkata, December 12-14, 2014 • <i>Single Water Entropy: Hydrophobic Crossover and Application to Drug Binding</i> Theoretical Chemistry Symposium (TCS), December 2014 • <i>Molecular Mechanism of Intercalation</i> Workshop by Param Yuva II, January 2015 • <i>Variation of single water entropy around hydrophobic, weakly attractive and charged solutes</i> SM-YIM, Pondicherry, January

	5-8, 2015 (<i>Invited Poster</i>) • <i>On the Mechanism of Intercalation</i> International Symposium on Bio-Organic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015 • <i>On the Molecular Mechanism of Intercalation</i> Accelerating Biology 2015: Catalyzing Evolution, C-DAC, Jan 20-22, 2015
Sunil Mukhi	<i>Origins of the Higgs Mechanism</i> Jawaharlal Nehru University, Delhi, September 8, 2014 • <i>Timelike Hopf reduction and multiple M5-branes</i> Harish-Chandra Research Institute, Allahabad, September 29, 2014 • <i>A world of magnets and miracles</i> St Xavier's College, Mumbai, January 10, 2015 • <i>Thoughts on scientific temper</i> Science Day Lecture, National Centre for Cell Science, Pune, February 28, 2015 • <i>The changing face of gravitation</i> Utkal University, Bhubaneswar, March 10, 2015 • DAE Symposium on High Energy Physics, IIT Guwahati, December 8-12, 2014 • Indian Strings Meeting, Puri, December 15-20, 2014 • <i>String theory and quantum gravity</i> Indian Science Congress, Mumbai, January 6, 2015
Suhita Nadkarni	<i>Women in science: A career in science</i> International Women's Day, Indian Academy of Science's WIS panel, Karnataka State Women's University (KSWU), Bijapur, March 8, 2015 • Guest Lecturer, IISER Mohali, February, 2015 • Guest lecturer, Bioinformatics Department, University Pune, April, 2015 • Computational Methods and Modeling of Astrocyte Physiology and Neuron-Glia Interactions, Satellite event of Annual Organization for Computational Neurosciences Meeting, Quebec City, Canada, July 30-31, 2014 (<i>Keynote Speaker</i>) Computational Approaches to Neuronal Plasticity, NCBS Bengaluru, 2014 • Invitation to Strategy Formulation Meeting on Human Simulator, Information Technology Research Academy (ITRA), Ministry of Communication and Information Technology, Government of India, January 15-17, 2015
Angshuman Nag	<i>Colloidal semiconductor nanocrystals with magneto- and opto-electronic properties</i> IIT Madras, Chennai, October 6, 2014 • <i>Colloidal semiconductor nanocrystals for nitro-explosive detection</i> Detection of explosive chemicals, Organized by Office of the Principal Scientific Adviser to the Government of India IIT Bombay, 21 May, 2014 • <i>Colloidal semiconductor nanocrystals with magneto- and opto-electronic properties</i> Annual meeting of Indian Academy of Science Bengaluru, Chennai, November 7-9, 2014 • <i>Colloidal semiconductor nanocrystals with magneto- and opto-electronic properties</i> New Advances and Horizons in Nanoscience and Nanotechnology, DST-IASST Guwahati, December 20-21, 2014 • <i>Magnetically doped ito nanocrystals exhibits plasmonics, electrical conductivity, and carrier-mediated magnetic coupling</i> Nano Days 2015, S. N. Bose National Centre for Basic Sciences, Kolkata, February 16-18, 2015
Rejish Nath	Talk at LPL, Universite Paris-13, France, June 25, 2014 • Discussion Meeting on Frontiers in Light-Matter Interactions, IACS, Kolkata, December 21, 2014 • Workshop on Current Trends in Frustrated Magnetism, JNU Delhi, February 12, 2015
A.A. Natu	<i>Prospects and opportunities in Chemical Sciences</i> , BJS College, Wagholi, Pune, January 29, 2015 • Lectures at Sardar Vallabhbhai National Institute of Technology (SVNIT), Surat, January 2015; Institute of Chemical Technology (ICT), Mumbai, February 2015; S.N. Joshi College, Hadapsar, February 2015; Baburaoji Gholap College, Sangavi, Pune, February 2015; International School, Pondicherry, February 2015; Two Lectures at Shivaji College, Akola, February 2015; Ramnarain Ruia College, Mumbai, April 2014; D.B. College, Chiplun, June 2014; Gogate Jogalekar College, Ratnagiri, June 2014; Moving Academy of Science's Little Scientists Conference, IISER Pune, July 2014; S.P. College, Pune, September 6, 2014 • <i>Research opportunities in India and abroad</i> , Smt. Kashibai Navale College of Pharmacy, September 24, 2014 • <i>IISER mission and implementation</i> : German Chemical Society, Bielefeld University; Chemical Biology Department, Gottingen University, October 2014 • <i>Emerging Trends in Organic Chemistry</i> , M.J.S. College, Shrigonda, December 2014 • Lectures at Delhi Public School, New Delhi, November 2014; Sancheti Senior College,

	Theragaon, Pune, December 5, 2014; Genesis-2014, M.M.M. Pune College of Pharmacy, September 26, 2014
Gayathri Pananghat	<i>Circular dichroism and optical rotatory dispersion spectroscopy</i> D.Y. Patil University, Pune, November 8, 2014 • <i>Understanding biological phenomena using X-ray crystallography</i> (Part of a lecture series during International Year of Crystallography), Fergusson College, Pune, December 9, 2014 • <i>Visualising macromolecular complexes</i> , Biointegration QIP, 2015, Institute of Biotechnology and Bioinformatics, Savitribhai Phule Pune University, February 25, 2015
G.V. Pavan Kumar	Wednesday Colloquium, TIFR-Mumbai, September 2014 • Annual Meeting, Indian Academy of Sciences, Bengaluru, June 2014 • JNCASR Research conference, Thiruv - ananthapuram, October 2014 • Photonics Section, Regional Conference on Radio Science (URSI-RCRS), Pune, January 2015
Thomas Pucadyil	<i>Membrane fission: Analyses using novel assay systems</i> 80 th Annual Meeting of the Indian Academy of Sciences, IIT Chennai, Chennai • <i>Kinetic intermediates in dynamin-catalyzed membrane fission</i> Discussion Meeting on Biological Membranes, Department of Chemical Engineering and Bioengineering Program, Indian Institute of Science, Bengaluru • <i>Reconstitution of clathrin-coated pits</i> X th International Symposium on Biochemical Roles of Eukaryotic Cell Surface Macromolecules, Kolkata
Raghav Rajan	<i>Learning to produce a complex movement sequence – lessons from the zebra finch</i> Computational approaches to Memory and Plasticity- CAMP 2014, NCBS, Bengaluru, July, 2014 • <i>Executing a complex learned movement sequence – what songbirds have taught us about Tendulkar's straight drive</i> ; conducted 2 practicals related to basic electronics and electrophysiology at SERB School in Neuroscience, IISER Pune, December 8-21, 2014 • <i>Neural mechanisms of song sequence generation: how "bird-brains" produce song and Behavioural and neural mechanisms of song learning</i> , SERB School in Avian Biology, Gurukula Kangri University, Haridwar, March, 2015
Shyam S. Rai	<i>Earth Science education and research- Future initiatives</i> Banaras Hindu University, Varanasi, March 14-16, 2015 • <i>Crustal dynamics of India</i> Indian School of Mines, Dhanbad, March 30-31, 2015
M.S. Santhanam	<i>Large matrix diagonalisation: Applications and techniques</i> C-DAC, Pune • <i>Extreme events in physical systems and complex networks</i> Joint ICTP/SISSA seminar, ICTP, Trieste, Italy, September 11, 2014 • Lectures at SERC School on Nonlinear Dynamics, Central University of Rajasthan, Ajmer, December 10-14, 2014 • Lecture at Conference on Nonlinear Systems and Dynamics 2015, IISER Mohali, March 12-15, 2015
Ronnie Sebastian	<i>Construction of the dual abelian variety in characteristic 0</i> (3 lectures) University of Hyderabad, September 2014
Kundan Sengupta	<i>Cancer a disease of the genome</i> Cancer workshop organized jointly by Lady Tata Memorial Trust and IISER Pune, August 22-23, 2014 • <i>Spatial organization of transcriptionally deregulated gene loci in the interphase nucleus</i> International Conference on genome architecture and cell fate regulation (GACFR 2014), Department of Life Sciences, University of Hyderabad, December 1-4, 2014 • <i>Nuclear structure-function relationships in cancer cells</i> Chromosome Stability meeting 2014, JNCASR, Bengaluru, December 14-16, 2014
Anupam Kumar Singh	<i>Row-column operations in (finite) classical groups</i> Colloquium at IMSc, November 2014 • <i>Gaussian elimination in split classical groups</i> Workshop on Probability and Representation Theory, IISc Bengaluru, March 6-7, 2015 • <i>p-adic Reductive Groups</i> TIFR

	Mumbai, May 5-10, 2014 • <i>Structure and Representation theory of Compact Groups</i> , AIS on Lie Groups, IITB, Mumbai, July 7-26, 2014
Kaneenika Sinha	Four lectures in the National Board of Higher Mathematics-Advanced Training School in Algebraic Number Theory, Chennai Mathematical Institute, July 7-26, 2014 • <i>Equidistribution in number theory</i> Young Women and Mathematics 2014, July 27, 2014
S.G. Srivatsan	<i>Functionalized nucleoside probes for studying nucleic acid structure and function</i> Chemical Frontiers-2014, Goa, August 16-19, 2014 • <i>Functionalized Nucleoside Toolbox for Labeling and Imaging RNA</i> Indo-German Conference on Bioinspired Chemistry, IISC, Bengaluru, September 10-12, 2014 • <i>Functionalized Nucleoside Toolbox for Studying Nucleic Acid Structure Dynamics and Function</i> 4 th National Symposium on Functional Application of Colorants, Institute of Chemical Technology, Mumbai, October 16, 2014 • <i>Posttranscriptional Chemical Functionalization of RNA by Bioorthogonal Reactions</i> International Conference on Chemical Biology, Hyderabad, February 6-8, 2015
N.K. Subhedar	<i>Neuroendocrine systems in vertebrates</i> Refresher Course in Life Sciences, UGC-Academic Staff College and Department of Zoology, Savitribai Phule Pune University, Pune, January 23, 2015 • <i>Role of the neuropeptide CART in modulating reward behavior</i> Recent Trends in Biology, Department of Zoology, S. P. Pune University, March 26, 2015
Pinaki Talukdar	<i>Synthetic ion channels for selective anion transport</i> Max Planck Institute of Colloids and Interfaces, Berlin, Germany, February 25, 2015 • <i>Fluorescent chemodosimeters for selective detection of biorelevant species</i> 4 th National Symposium on Functional Applications of Colorants (NSFAC 2014), Department of Dyestuff Technology, ICT, Mumbai, October 16-17, 2014 • <i>Unimolecular and supramolecular artificial ion channel systems</i> Frontiers in Chemical Sciences, FICS-2014, The Department of Chemistry, IIT Guwahati, December 4-6, 2014 • <i>Unimolecular and supramolecular artificial ion channel systems</i> 13 th Eurasia Conference on Chemical Sciences at IISc, Bengaluru, December 14-18, 2014 • <i>Unimolecular and supramolecular artificial ion channel systems</i> German Symposium in Supramolecular Chemistry (SupraChem 2015), Freie Universität Berlin, Germany February 23-24, 2015
Suneeta Vardarajan	Field Theoretic Aspects of Gravity (FTAG) 2014, IISER Mohali, December 2014
Arun Venkatnathan	MD@50 conference, JNCASR, Bengaluru, August 26-28, 2014
Milind Watve	Panel discussion on <i>The geography behind history</i> , August 30, 2014 • Interaction Programme for Ph.D. Scholars, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, September 6, 2014 • <i>Aging in bacteria</i> Colloquium at IBB, University of Pune, September 13, 2014 • <i>Protein aggregation and aging in bacteria</i> Dept. of Biology, Princeton University, October 2014 • <i>Statistics and research</i> Short Term Course in Inspiring and Committed Teachers for Science Faculty, Vidya Pratishthan's Arts, Science and Commerce College, Baramati, February 5, 2015 • 3 talks at Columbia University: <i>Behavioral ecology: the missing link in molecules and medicine</i> (at the Department of Biological Sciences); <i>Science KATTA: doing science differently</i> and <i>Columbia Explores Romare Bearden: A Black Odyssey: My experiments in creativity</i> Columbia University, U.S.A., March 10-11, 2015 • <i>What is wrong with diabetes</i> Biochemistry Department, Shivaji University, Kolhapur, March 27, 2015 • <i>Why type 2 diabetes is incurable</i> Department of Health Sciences, University of Pune • <i>Whether science or technology can cure diabetes</i> Workshop on Nanotechnology: Energy & Health, Fergusson College, Pune, October 10, 2014 • <i>Inferring causation from correlations in a homeostatic steady state: The case of glucose regulation</i> Workshop on Advances in Mathematical Biology at IISER Pune, December 8, 2014 • <i>Statistics and Diabetes; Doing statistics with farmers and wild animals</i> Workshop on Statistics for Everyone, K.T.H.M. College, Nashik, January 23-24, 2015

Contributed Talks and Poster Presentations

G. Ambika Sandip V. George, G. Ambika and R. Misra *Effect of uneven sampling on correlation dimension computed from time series data* Dynamic Days Asia Pacific, July 21-24, 2014 (*Poster Presentation - Best Poster Award*) • R. Jacob, V. Anto, K.P. Harikrishnan, R. Misra and G. Ambika *Fractal dimension of chaotic attractors from recurrence networks* Dynamic Days Asia Pacific, July 21-24, 2014 (*Poster Presentation*) • Kajari Gupta and G. Ambika *Amplitude death in coupled slow and fast systems* Dynamic Days Asia Pacific, July 21-24, 2014 (*Poster Presentation*) • G. Kashyap, G. Ambika and Neelima Gupte *Load transmission in hierarchical networks* Dynamic Days Asia Pacific, July 21-24, 2014 (*Poster Presentation*)

Chaitanya Athale Neha Khetan *The movement of mouse oocyte MTOCs modelled by a random walk model with inhomogeneous drift* Biophysics Paschim 7, ACTREC, Navi Mumbai, September 7, 2014 (*Poster Presentation*) • Neha Khetan *Modeling the motility of radial arrays of microtubules in mouse oocytes* Multi-scale Integration in Biological Systems, Institut Curie, Paris, France, November 13-18, 2014 (*Poster Presentation*) • Manasi Gangan *Study of phenotypic variability in clonal population of E. coli using microfluidics* Biophysics Paschim 8, IIT Bombay, March 28, 2015 (*Poster Presentation*)

Nirmalya Ballav Nanotechnology and Advanced Functional Materials (NTAFM 2013), Pune, 2014 • Organic Photo-Voltaics (OPV), Pune, 2014 • International Conference on Structural and Inorganic Chemistry, Pune, 2014 • Eurasia13 Conference, Bangalore, 2014

Deepak Barua Guha, A., Chhajed, S. and Barua D. *Stem xylem plasticity in sorghum in response to drought: consequences for plant water uptake and growth* Environmental Impacts on Biodiversity and Plant Development, Kolkata, February, 2015

Rabeya Basu National Meeting on Commutative Algebra and Algebraic Geometry, IIT Guwahati, February 5-9, 2015

Sudipta Basu Indo-German Conference on Bio-Inspired Chemistry, IISc Bangalore, September 10-12, 2014 • 10th International Symposium on Bio-Organic Chemistry (ISBOC10), IISER Pune, January 11-15, 2015

Ramakrishna G. Bhat Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), National Chemical Laboratory, Pune, February 6-8, 2015 • International Symposium on Bio-Organic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015

Arijit Bhattacharyay DPG Spring Meeting, Berlin, Germany, March 14-20, 2015

Anup Biswas Conference on Stochastic Systems and Applications, September 8-11, 2014

R. Boomi Shankar A.K. Srivastava, P. Divya, B. Praveenkumar and R. Boomishankar *Tunable ferroelectric and dielectric responses in {CuII(L2)}_n assemblies derived from dipodal phosphoramidate ligands* International Conference on Structural and Inorganic Chemistry (ICSIC), CSIR-NCL and IISER Pune, December 4-5, 2014 (*Poster Presentation - Best Poster Award*) • M.S. Deshmukh, A. Yadav and R. Boomishankar *Thermochromic and mechanochromic luminescence up/down in isostructural metal-organic frameworks based on Cu₆I₆ clusters* International Conference on Structural and Inorganic Chemistry (ICSIC), CSIR-NCL and IISER Pune, December 4-5, 2014 (*Poster Presentation*) A. Yadav, A.K. Srivastava, A. Balamurugan and R. Boomishankar *Tridentate phosphoramidate ligands and their copper(II) iodide cluster-organic frameworks: Ligand assisted thermochromism and selective sensing of picric acid* International Conference on Structural Chemistry of Molecules and Materials, Calcutta University, November 30-December 02, 2014 (*Poster Presentation*)

Diganta Borah Winter School and Workshop on Complex Analysis and Applications (KAWA 6), CRM, Pisa, Italy, March 23-28, 2015

S. Sandanaraj Britto International Symposium on Bioorganic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015 • Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), National Chemical Laboratory, Pune, February 6-8, 2015

Apratim Chatterji *Self assembly of ordered cylindrical nanostructures - A simple model to elucidate experimental observations* 9th Liquid Matter Conference, Lisbon, Portugal, July 21-25, 2014 (Poster Presentation)

Srabanti Chaudhury Theoretical Chemistry Symposium, Pune, December 2014 • Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), National Chemical Laboratory, Pune, February 6-8, 2015

Anisa Chorwadwala Partial Differential Equations and Nonlinearities, Conference in honor of Haim Bresiz, Institut Henri Poincare, Paris, June 30-July 4, 2014 • Workshop on Variational Methods, Tata Institute of Fundamental Research - Centre for Applicable Mathematics (TIFR-CAM), Bengaluru, December 12-16, 2014 • Recent Advances in Differential Equations 2014, Conference at Tata Institute of Fundamental Research - Centre for Applicable Mathematics, Bengaluru, December 17, 2014 • Instructional School for Lecturers (ISL) on Differential Geometry, Banasthali Vidyapith, Rajasthan, December 8-11, 2014

Jeetender Chugh *Visualizing transient structures in A-site RNA of the ribosome: New structures of known molecules for drug target* Advanced Isotopic Labeling Methods for Integrated Structural Biology (AILM2015), Grenoble, France, February 2-5, 2015 • Jeetender Chugh *Expanding current structural understanding of the miRNA biogenesis pathway* 7th Young Investigator Meeting (YIM 2015), Gulmarg, J&K, March 28-31, 2015 (Poster Presentation) Harshad Paithankar, Workshop on NMR/MRI: From molecules to Human Behavior at GNDU, Amritsar, October 6-11, 2014 • Himani Rawat, Harshad Paithankar; Workshop on NMR, IISc Bangalore, December 11-12, 2014

Neelesh Dahanukar Resource person at IUCN Freshwater Biodiversity Review Assessment Workshop, Zoo Outreach Organization (ZOO), Coimbatore, May 16-31, 2014 • Dahanukar, N. *Need for integrative taxonomy in India* 3rd Indian Biodiversity Congress (IBC 2014), School of Public Health, SRM University,

Chennai, December 18-20, 2014 • Modak, N., Padhye, A.D., Dahanukar, N. *Diversity and distribution of the leaping frogs (Ranixalidae: Indirana) in the northern Western Ghats of India* 3rd Indian Biodiversity Congress (IBC 2014), School of Public Health SRM University, Chennai, December 18-20, 2014 • Kumkar, P., Keskar, A., Padhye, A.D., Dahanukar, N. *Diversity and distribution of hillstream loaches (Teleostei: Balitoridae, Nemacheilidae) in the northern Western Ghats of India* 3rd Indian Biodiversity Congress (IBC 2014), School of Public Health SRM University, Chennai, 18-20 December 2014 • Raghavan, R. and Dahanukar, N. *Assessing inland fisheries in remote forest streams: Evaluation of participatory approaches in the Western Ghats freshwater ecoregion, India* Global Conference of Inland Fisheries on 'Freshwater, fish, and the future: cross-sectoral approaches to sustain livelihoods, food security, and aquatic ecosystems', Food and Agriculture Organization of the United Nations (FAO) Headquarters, Rome, Italy, January 26-28 2015

Aloke Das *Interplay between $n \rightarrow \pi^*$ and hydrogen bonding interactions: Gas phase laser spectroscopy and ab initio calculations* Recent Trends in Spectroscopy-2014, IIT Chennai, June 20-21, 2014 (Contributed Talk) • *$n \rightarrow \pi^*$ interaction: Too weak but can compete with strong hydrogen bonding interaction* 23rd International Conference on High Resolution Molecular Spectroscopy, University of Bologna, Italy, September 2-6, 2014 (Contributed Talk) • Santosh Kumar Singh, Sumit Kumar, Jamuna Vaishnav, Aloke Das *Effect of methyl substitution in the complexes of Indole with methylated benzenes: Interplay among electrostatic, dispersion interaction, and steric repulsion* Faraday Discussion meeting on Temporally & Spatially Resolved Molecular Science (FD 177), Indian Institute of Science Bangalore, January 12-14, 2015 (Poster Presentation) • Santosh Kumar Singh, Sumit Kumar, Aloke Das *Structure of saligenin: A metabolized product of a herbal medicine salicin* 11th Discussion meeting on Spectroscopy and Dynamics of Molecules and Clusters (SDMC), Naini Retreat, Nainital, Uttarakhand, February 19-22, 2015 (Poster Presentation)

Aditi Deo *Technologically crafting heritage: The cultural politics of vernacular music documentation in Northern India* The Music Box and its Reverberations: Technology and Music in India Conference, Jawaharlal Nehru University, New Delhi, 2015

C.V. Dharmadhikari C.V. Dharmadhikari, S.K. Kolekar, Vishakha, Kaushik, V.D. Vankar, S.P. Patole and J.B. Yoo

Field emission properties of vertically grown carbon nanotubes, nanoflakes and mechanically exfoliated highly oriented pyrolytic graphite: A comparison 27th International Vacuum Nanoelectronics Conference (IVNC 2014), Engelberg, Switzerland, July 6-10, 2014
 S. Patil, S. Datar, C.V. Dharmadhikari *Temperature dependent electron transport properties of gold nanoparticles and composites: Scanning Tunneling Spectroscopy investigations* XXI International Summer School "Nicolás Cabrera": New Frontiers in Scanning Force Microscopy: From Ultrahigh-Vacuum to Biological Material, Madrid, Spain, July 14-18, 2014

Sourabh Dube India-CMS Upgrade Meeting, BARC, Mumbai, August 2014 • CMS-Upgrade Week, CERN, Geneva, September 2014 • XXI DAE-BRNS High Energy Physics Symposium 2014, IIT-Guwahati, December 2014 • Shubhanshu Chauhan *Tracking in Fast Simulation at CMS* XXI DAE-BRNS High Energy Physics Symposium 2014, IIT-Guwahati, December 2014 (Talk) • Kunal Kothekar *Study of noise in CMS hadron calorimeter* XXI DAE-BRNS High Energy Physics Symposium 2014, IIT-Guwahati, December 2014 (Talk)

Sanjeev Galande Talks by PhD students at 18th Transcription Assembly meeting, IISER Pune, March 12-14, 2015: Rafeeq Gul: *Wnt signaling mediated stabilization of SP1 and role of β -catenin* • Rahul Jangid: *Epigenetic signature of bidirectional promoters* Poster presentations at 18th Transcription Assembly meeting: *Wnt signaling in evolution of eumetazoan body axis* Puli Chandramouli Reddy, Amol Kolte, Akhila Gungi, Farhat Habib, Suyog Ubhe and Sanjeev Galande • *Role of SATB2 in early embryonic development of zebrafish* Saurabh J. Pradhan, Philipp Schmalhorst, Michael Smutny, Ojas Deshpande, Rakesh Mishra, Mahendra Sonawane, Carl-Phillip Heisenberg and Sanjeev Galande • *Role of SATB1 and SATB2 in the mammalian X chromosome inactivation* Rini Shah and Sanjeev Galande • *Chromatin organizer SATB2 plays crucial role in cellular movements during gastrulation via regulation of adhesion and integrin signaling* (Talk) Saurabh Pradhan, XXXIX Mahabaleshwar Seminar on Recent Advances in Zebrafish Genetics and Development, Alibaug, March 21-23, 2015

Aurnab Ghose Sahasrabudhe A, Ghate K, Jacob A, Ghose A. *Fmn2 in neuronal development* EMBO-IndiaBioscience Young Scientist Networking Meeting, Bengaluru, India, 2014 (Poster Presentation) • Sahasrabudhe A, Ghate K, Prashanth Kumar, BS and

Ghose A. *Fromin-2 in neuronal development* Developmental Neurobiology Course, Okinawa Institute of Science and Technology (OIST), Okinawa, Japan, 2014 (Poster Presentation) • Deogade A, Kaniganti T, Maduskar A, Subhedar NK and Ghose A. *Energy status dependent peripheral modulation of olfaction by neuropeptide Y* International Meeting on Neuromodulation of Behaviour, National Centre for Biological Sciences (NCBS), Bengaluru, 2014 (Poster Presentation) • Wakhloo D, Kaniganti T, Bodas D, Subhedar NK and Ghose A. *Neuromodulatory inputs tune excitability of Dm neurons to maintain hunger-satiety bistable states* International Meeting on Neuromodulation of Behaviour, National Centre for Biological Sciences (NCBS), Bangalore, India, 2014 (Poster Presentation) • Sahasrabudhe A, Ghate K, Jacob A and Ghose A. *Fmn2 in neuronal development* American Society for Cell Biology (ASCB) Annual Meeting, Washington DC, USA, 2014 (Poster Presentation)

Prasenjit Ghosh Nandha Kumar *Hydrogen adsorption on PdGa low indexed surfaces* MASTANI Summer School, IISER Pune, June 30-July 12, 2014 (Poster Presentation) • Niharika Joshi *Ab Initio study of freestanding and Ni(111) surface supported h-BN bilayer and manipulation of its properties upon hydrogenation* MASTANI Summer School, IISER Pune, June 30-July 12, 2014 (Poster Presentation) • Subrahmanyam Sappati *First principles study of interactions of conjugated organic molecules with ZnO nanostructures for probable use in photocatalytic water splitting* MASTANI Summer School, IISER Pune, June 30-July 12, 2014 (Poster Presentation, Tutor for a session) • Nandha Kumar *Stability of low indexed PdGa surfaces, A density functional study* From the chemical bond to the chemical plant: Challenges in gas conversion technology JNCASR, Bangalore, August 25-28, 2014 (Poster Presentation) • Nandha Kumar *Stability and Diffusion of Small PdGa Bimetallic Clusters on MgO (100) Surface* ISMC 2014, BARC, Anushakti Nagar, Mumbai, December 9-13, 2014 (Poster Presentation) • Niharika Joshi *Effect of oxygen intercalation on the spin moments at the interface of Graphene and Ni(111) surface* Theoretical Chemistry Symposium 2014, CSIR-NCL Pune, December 18-21, 2014 (Poster Presentation) • Subrahmanyam Sappati *First principles study of interactions of conjugated organic molecules with ZnO nanostructures for probable use in photocatalytic water splitting* 14th Theoretical Chemistry Symposium (TCS), CSIR-NCL Pune from December 18-21, 2014 (Poster Presentation) • Niharika Joshi *Effect of substrate interaction on the selectivity of hydrogen adsorption*

site on transition metal supported hexagonal boron nitride Nanodays 2015, February 16-18, 2015 (*Poster Presentation*) • Niharika Joshi *Tuning properties of supported graphene through chemical functionalization and substrate modifications* Current Trends in Condensed Matter Physics, NISER Bhubaneswar, February 19-22, 2015 (*Contributory Talk*) • Subrahmanyam Sappati *First Principles investigations of solvent effect in photophysical properties of ellipticine* GreeEnvironment by Nano Chemical Technology, Government college for Men, Srikakulam, Andhra Pradesh, March 1-2, 2015 (*Poster Presentation*)

Sujit K. Ghosh Sanjog S. Nagarkar, 4th International Conference on Metal-Organic Frameworks and Open Framework Compounds (MOF 2014), Osaka and Kobe, Japan, September 27-October 1, 2014 (*Poster Presentation*) • Soumya Mukherjee, Biplab Joarder, Biplab Manna Eurasia-13 Conference, Indian Institute of Science, Bengaluru, December 14-18, 2014 (*Poster Presentation*)

Boopathy Gnanaprakasam International Symposium on Bio-Organic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015 • Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), National Chemical Laboratory, Pune, February 6-8, 2015

Hosahudya N. Gopi 8th CRSI Mid-year Symposium in Chemistry at CSIR-NEIST Jorhat, July 10-12, 2014

Anirban Hazra Contributed Talk at Spectroscopy and Dynamics of Molecules and Clusters, Nainital, February 19-22, 2015
 Avdhoot Datar *Applications of the independent electron surface hopping method at the surface-molecule interface* Theoretical Chemistry Symposium, Pune, December 21, 2014 (*Poster Presentation*)
 • Mahesh Gudem *Ab initio study of o-nitrotoluene photo-tautomerization: Exploration of singlet and triplet pathways* Theoretical Chemistry Symposium, Pune, December 21, 2014 (*Poster Presentation*)
 • Meghna Manae *Mechanism of fluorescence quenching in fluorophenylacetylene-methylamine complex* Theoretical Chemistry Symposium, Pune, December 21, 2014 (*Poster Presentation*) • Mahesh Gudem *Theoretical study of the multi-channel mechanism of o-nitro toluene phototautomerization*, Spectroscopy and Dynamics of Molecules and Clusters, Nainital, February 20, 2015 (*Poster Presentation*)

Partha Hazra International Symposium on Bio-Organic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015 (*Poster Presentation*) • Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), National Chemical Laboratory, Pune, February 6-8, 2015 (*Poster Presentation*)

Tejas Kalelkar *Knots and low-dimensional manifolds* Satellite Conference to the International Congress of Mathematicians, Busan, South Korea, August 2014

Jeet Kalia Marshall, C.J., Agarwal, N., Kalia, J., Grosskopf, V.A., McGrath, N.A., Abbott, N.L., Raines, R.T., Shusta, E.V. *Intein-linked yeast surface display: A new platform for protein engineering* 15th Tetrahedron Symposium-Asian Edition, Singapore, October 28-31, 2014

Jeganmohan, M. *Ruthenium catalyzed hydroarylation of heteroatom substituted aromatics with alkynes: An efficient route to trisubstituted alkenes* 13th Eurasia Conference in Chemical Sciences, Indian Institute of Science, Bengaluru, December 14-18, 2014
 • *Ruthenium-catalyzed oxidative cyclization of substituted aromatics with carbon carbon π -components: An efficient route to heterocycles* 22nd National Symposium on Catalysis (CATSYMP 22) - Catalysis for Better Tomorrow, CSIR-Central Salt and Marine Chemicals Research Institute, Bhavnagar, January 7-9, 2015 • *Ruthenium-catalyzed oxidative cyclization of substituted aromatics with carbon carbon π -components: An efficient route to heterocycles* National Symposium on Nanomaterials and Sustainable Synthetic Strategies, Department of Chemistry, Banaras Hindu University, March 21-22, 2015

Kishor. P, Jeganmohan, M. *Ruthenium Catalyzed Chelation-Assisted Alkenylation of Heteroatom Substituted Aromatics and Heteroaromatics with Alkenes and Alkynes* 10th National Organic Symposium Trust (J-NOST10), Indian Institute of Technology, Madras, December 4-6, 2014 (*Poster Presentation*)
 Manikandan. R, Jeganmohan, M. *Ruthenium-Catalyzed Hydroarylation and Cyclization of Anilides with Alkynes: an Efficient Route to Heterocycle* 10th National Organic Symposium Trust (J-NOST10), Indian Institute of Technology, Madras, December 4-6, 2014 (*Poster Presentation*)

Shabana Khan International Conference on Structural and Inorganic Chemistry, CSIR-NCL and IISER Pune, December 4-5, 2014 • New Directions in Chemical Synthesis, IIT Mumbai, December 10-11, 2014
 • International Symposium on Bio-Organic Chemistry (ISBOC-10), IISER Pune, January 11-15,

2015 Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), National
 • Chemical Laboratory Pune, February 6-8, 2015
 (*Poster Presentation by students*)

Mayurika Lahiri Libi Anandi V, Satish Bodakuntla, and Mayurika Lahiri *Alkylolation damage induces transformation in three-dimensional breast acini cultures of non-malignant breast epithelial cells*. GRC Genomic Instability - Mechanisms that cause DNA Damage and Related diseases, Hong Kong University of Science and Technology, Hong Kong, China, July 6-11, 2014 • Libi Anandi and Mayurika Lahiri *Alkylolation damage induces transformation in breast epithelial cells grown as three dimensional cultures* CSHL Asia on Dynamics of Cellular Behavior in Disease and Development, Suzhou, China, November 17-21, 2014 • Libi Anandi and Mayurika Lahiri *Alkylolation damage induces transformation in breast epithelial cells grown as three dimensional cultures* Carcinogenesis 2015, ACTREC, Navi Mumbai, February 11-13, 2015

M.S. Madhusudhan Biophysics Paschim, September, 2014 (*Student Poster Presentations*) • Biophysics Paschim, March, 2015 (*Student Poster Presentations*)

Vivek Mohan Mallick *tt-rings, separability and analogy with étale maps, after Balmer and Separable tt-rings on $D_{qc}(X)$, after Neeman* Discussion Meeting on Algebraic Cycles and Related Topics

Pankaj Mandal *Molecular Picture of an Azeotrope* SDMC-2015, Nainital, February 18-22, 2015 • Sohini Sarkar *THz Spectroscopy of liquid water* SDMC-2015, Nainital, February 18-22, 2015 (*Poster Presentations*)

Muhammed Musthafa International Symposium on Bio-Organic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015

Angshuman Nag *Organic-free colloidal quantum dots for optoelectronics and chemical sensing 30 years of Colloidal Quantum Dots*, ESPCI Paris, France, May 26-28, 2014 (*Contributory Talk*)
 Metikoti Jagadeeswararao *Colloidal ligand-free metal sulphide nanocrystals for optoelectronics* International Conference on Structural and Inorganic Chemistry (ICSIC) CSIR-NCL, Pune, December 04-05, 2014 (*Poster Presentation*) • Bharat Tandon *Doping Controls Plasmonics, Electrical Conductivity, and Carrier-Mediated Magnetic Coupling in Fe and Sn Codoped In_2O_3 Nanocrystals: Local Structure is the Key* International Conference on Structural and

Inorganic Chemistry (ICSIC) CSIR-NCL, Pune, December 04-05, 2014 (*Poster Presentation*) • Kiran Kadlag *Ligand-free Metal Sulfide Nanocrystals for Luminescence and Solar Cell* Nano Days 2015, S. N. Bose National Centre for Basic Sciences, Kolkata, February 16-18, 2015 (*Poster Presentation*) • Abhishek Swarnkar *Demonstration of Electronic Grade and Flexible Semiconductor Film Employing Sintering of Colloidal Ligand-Free PbS and PbSe Nanocrystals at Room Temperature* Nano Days 2015, S. N. Bose National Centre for Basic Sciences, Kolkata, February 16-18, 2015 (*Poster Presentation*) • Wasim Jeelani *Ag_2S magic-sized nanocrystals exhibiting sharp NIR excitonic absorption and emission* Mir Nano Days 2015, S.N. Bose National Centre for Basic Sciences, Kolkata, February 16-18, 2015 (*Poster Presentation*)

Rejish Nath Chinmayee Mishra, Discussion meeting on Frontiers in Light-matter Interactions, IACS, Kolkata, December 21, 2014 (*Poster Presentation*) • Meghana Raghunandan, Quo-vadis BEC Conference, Badhonnef, Germany, December 21, 2014 (*Poster Presentation: Best Poster Award*)

Gayathri Pananghat Symposium on New Advances in X-ray diffraction and Cryo-Electron Microscopy organized by Regional Centre for Biotechnology, New Delhi, December 15-17, 2014
 Jyoti Baranwal, Smarth Lakhnopal, Gayathri Pananghat *Structural studies on MglA, a small GTPase in spatial positioning of Myxococcus xanthus motility* 43rd National Seminar on Crystallography, Central Drug Research Institute, Lucknow, November 13-15, 2014 (*Poster Presentation*)

Pramod Pillai 8th Asian Photochemistry Conference (APC-2014), Thiruvananthapuram, November 9-13, 2014
 • International Symposium on Bioorganic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015
 • Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), National Chemical Laboratory Pune, February 6-8, 2015

Thomas Pucadyil Holkar, S., Pucadyil, T.J. *Physicochemical Determinants for Clathrin Coat Assembly* India UK Frontiers of Science, Khandala (*Poster Presentation*)
 • Kushwah, M.S., Pucadyil, T.J. *Analyzing the Function of Eps15 Homology Domain Protein 1 (EHD1) in Endocytic Recycling* Xth International Symposium On Biochemical Roles Of Eukaryotic Cell Surface Macromolecules, Kolkata (*Poster Presentation*)

Raghav Rajan *Stereotypy and variability: the Dr. Jekyll and*

Mr. Hyde of motor sequence learning and production - insights from the zebra finch INSA-Leopoldina Symposium: Human Evolution towards Language: From Genes to Behavior, IISER Pune, January 2015
 • DBT-Ramalingaswami Fellows Conclave, Bhubaneswar, January, 2015
 Divya Rao, Computational approaches to Memory and Plasticity- CAMP 2014, NCBS, Bangalore, July, 2014 (Participation)

Sudha Rajamani Chaitanya Mungi, Sudha Rajamani* *Lipid catalyzed nonenzymatic synthesis of RNA and its implications for the RNA world* 2nd Joint international conference of ISSOL and Bioastronomy, Nara, Japan, July 6-11, 2014 (Poster Presentation) • **Niraja Bapat**, Sudha Rajamani *Plausible prebiotic role of molecular crowding in template directed nonenzymatic replication of nucleic acids* 2nd Joint international conference of ISSOL and Bioastronomy, Nara, Japan, July 6-11, 2014 (Poster Presentation - Best Poster Award) • **Chaitanya Mungi**, Sudha Rajamani *Characterization of lipid assisted nonenzymatic polymerization reaction of 5'-nucleoside monophosphates*; 2nd Joint international conference of ISSOL and Bioastronomy, Nara, Japan, July 6-11, 2014 (Poster Presentation) • **Niraja Bapat***, Sudha Rajamani *Plausible prebiotic role of molecular crowding in template directed nonenzymatic replication of nucleic acids* Open Questions on the Origin of Life (OQOL 2014), Kyoto, Japan, July 12-13, 2014 (Poster Presentation) • **Chaitanya Mungi**, Sudha Rajamani *Characterization of RNA-like oligomers from lipid-assisted nonenzymatic synthesis: Implications for origin of informational molecules in an RNA world* International Symposium on Bio-Organic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015 (Poster Presentation) • **Niraja Bapat**, Sudha Rajamani *Implications of molecular crowding in enzyme-free template directed replication of nucleic acids* International Symposium on Bio-Organic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015 (Poster Presentation) • **Prasenjeet Kawale**, Sudha Rajamani *Amphiphile-assisted nonenzymatic synthesis reactions of biologically relevant monomers* International Symposium on Bio-Organic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015 (Poster Presentation)

M.S. Santhanam Harshini Tekur, Sanku Paul, Talk at Conference on Nonlinear Systems and Dynamics 2015, IISER Mohali, March 12-15, 2015

Ronnie Sebastian Mumbai Pune Number Theory Seminar, April 2014 Resource person for Algebra at the Annual Foundational School 2, Almora, May 1-28, 2014

Workshop on Algebraic Cycles and Related Areas, TIFR, December 2014 (Speaker)

S.G. Srivatsan *Fluorescence Imaging of Cellular RNA Transcripts by Using Bioorthogonal Chemical Reactions* Fluorescent Biomolecules and their Building Blocks—Design and Applications (FB3), University of California, San Diego, U.S.A., August 6-9, 2014 • *Heavy atom containing fluorescent nucleoside analog probe for the fluorescence detection of nucleic acid-ligand binding and X-ray crystallography* 248th ACS National Meeting & Exposition, San Francisco, U.S.A., August 10-14, 2014

Pinaki Talukdar Tanmoy Saha *Design of BODIPY based colorimetric and fluorometric probes for sensing hydrogen sulfide and aryl thiols* 4th National Symposium on Functional Applications of Colorants (NSFAC 2014), Dept. of Dyestuff Technology, ICT, Mumbai, October 16-17, 2014 (Poster Presentation) • **Arundhati Roy** *Cascade reactions based fluorescent probes for fluoride sensing* 4th National Symposium on Functional Applications of Colorants (NSFAC 2014), Dept. of Dyestuff Technology, ICT, Mumbai, October 16-17, 2014 (Poster Presentation) • **Tanmoy Saha** *Hopping mediated anion transport through a mannitol-based rosette ion channel* Frontiers in Chemical Sciences, IIT Guwahati, December 4-6, 2014 (Poster Presentation) • **Arundhati Roy** *Cascade reactions based fluorescent probes for fluoride sensing* Frontiers in Chemical Sciences, IIT Guwahati, December 4-6, 2014 (Poster Presentation) **Pratyush Kumar Mishra** *Fluorometric probe for H₂S Sensing in vitro as well as in vivo applications* Frontiers in Chemical Sciences, IIT Guwahati, December 4-6, 2014 (Poster Presentation) • **Dinesh Chauhan** *Exploring new chemistry of ketenimine: Formation of acrylamidine via intramolecular amino group migration* Junior National Organic Symposium Trust (J-NOST), IIT Madras, December 4-6 2014 (Poster Presentation) • **Tanmoy Saha** *Hopping mediated anion transport through a mannitol-based rosette ion channel* International Symposium on Bioorganic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015 (Oral Presentation) • **Arundhati Roy** *Cascade reactions based fluorescent probes for fluoride sensing* International Symposium on Bioorganic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015 (Poster Presentation) • **Sharad Deshmukh** *Diastereoselective Construction of syn- α -amino alcohols via three-component coupling reaction: Synthesis of (+)- β -conhydrine, valinocin A and (2S,3R)- α -hydroxy- β -amino acids* International Symposium on Bioorganic Chemistry (ISBOC-10), IISER Pune, January 11-15,

2015 (Poster Presentation) Dinesh Chauhan *Exploring new chemistry of ketenimine: Formation of acrylamidine via intramolecular amino group migration* International Symposium on Bioorganic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015 (Poster Presentation) • Pratyush Kumar Mishra *Fluorometric probe for H₂S Sensing in vitro as well as in vivo applications* International Symposium on Bioorganic Chemistry (ISBOC-10), IISER Pune, January 11-15, 2015 (Poster Presentation) • Tanmoy Saha *Hopping mediated anion transport through a mannitol-based rosette ion channel* Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), CSIR-NCL Pune, February 6-8, 2015 (Poster Presentation) Arundhati Roy *Cascade reactions based fluorescent probes for fluoride sensing* Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), CSIR-NCL Pune, February 6-8, 2015 (Poster Presentation) Sharad C. Deshmukh *Diastereoselective construction of syn- α -amino alcohols via three-component coupling reaction: Synthesis of (+)- β -conhydrine, valinocin A and (2S,3R)- α -hydroxy- β -amino acids* Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), CSIR-NCL Pune, February 6-8, 2015 (Poster Presentation) • Dinesh Chauhan *Exploring new chemistry of ketenimine: Formation of acrylamidine via intramolecular amino group Migration* Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), CSIR-NCL Pune, February 6-8, 2015 (Poster Presentation)

Arun Venkatnathan Praveen Kumar, K.R. Ramya, Arun Venkatnathan *Interplay of phase segregation, tail aggregation and micelle formation in structural reorganization of hydrated imidazolium ionic liquid*

MD@50 conference, JNCASR Bengaluru, August 26 - 28, 2014 (Poster Presentation) • Praveen Kumar, K.R. Ramya, Arun Venkatnathan *Interplay of phase segregation, tail aggregation and micelle formation in structural reorganization of hydrated imidazolium ionic liquid* Theoretical Chemistry Symposium 2014, CSIR-NCL-IISER Pune, December 18-21, 2014 (Poster Presentation) • Praveen Kumar, K.R. Ramya, Arun Venkatnathan *Effect of anion and temperature on nanostructure and dynamics of imidazolium ionic liquids* Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), CSIR-NCL Pune, February 6-8, 2015 (Poster Presentation)

Seema Verma Akula Venu Madhav, Seema Verma *A versatile synthesis of magnetic – plasmonic nanohybrids with tunable magnetic and optical properties* International Conference on Structural and Inorganic Chemistry (ICSIC), CSIR-NCL and IISER Pune, December 04-05, 2014 (Poster Presentation) • 9th CRSI-RSC Symposium, CSIR-NCL and IISER Pune, February 05, 2015 • Chemical Research Society of India (CRSI)'s 17th National Symposium in Chemistry (NSC-17), CSIR-NCL Pune, February 06-08, 2015

Milind Watve *Lancet Author's Meetings, Center for Evolution and Medicine, Arizona State University, U.S.A., October 31-November 1, 2014* • *Foraging theory and the obesity epidemic (Oral Presentation); Evolving microbiota and the co-evolution of sex and aging (Poster Presentation); Bi-stability in type 2 diabetes multi-organ signaling network (Poster Presentation)* 1st General Meeting of The International Society for Evolution, Medicine, & Public Health, Arizona State University, Arizona, U.S.A., March 19-21, 2015

Academic Events Organized

Collins Assisi	Co-organized the 8 th SERB School in Neuroscience (December 8-21, 2014)
Arjun Bagchi	Co-organized "Stringy Days II" (with Sunil Mukhi) (December 22-23, 2014)
Baskar Balasubramanyam	Co-organized ICTS Program on p -adic Aspects of Modular Forms (June 10-20, 2014)
Nirmalya Ballav	Co-organized a session on "On-Surface Magneto-Chemistry" at the International Conference on Porphyrins and Phthalocyanines (ICPP)-8, Istanbul, 2014
Debargha Banerjee	Co-organized Pune-Mumbai Number Theory Seminar (April 4-5, 2014) • Organized Number Theory symposium of the 29th Ramanujan Mathematical Society Meeting (June 23-27, 2014) • Organized Regular number theory seminars (broadcasted to IIT Hyderabad over NKN) (Spring and Fall semesters, 2014)
Rabeya Basu	Organized International Conference on History and Development of Mathematics held at University of Pune in collaboration with Bhaskaracharya Pratishthana (November 27-30, 2014)
Chandrasheel Bhagwat	Was a Member of Organizing Committee for the Annual Meeting of Ramanujan Mathematical Society, 2014 (June 23-27, 2014)
Ramkrishna Bhat	Organized RSC-CRSI-IISER-NCL Safety Workshop (April 2014)
R. Boomi Shankar	Was a Member of Organizing Committee for "International Conference on Structural and Inorganic Chemistry (ICSIC)" at NCL, Pune and IISER, Pune (December 4-5, 2014)
Harinath Chakrapani	Co-organized International Symposium on Bioorganic Chemistry (ISBOC-10) (January 11-15, 2015)
Apratim Chatterji	Co-organized Soft Matter Young Investigators Meet (SMYIM-2), Pondicherry (December 18-20, 2014)
Srabanti Chaudhury	Was a Member, Local Organizing Committee for Theoretical Chemistry Symposium (TCS), jointly organized by IISER Pune and NCL Pune (December 17-21, 2014)
Anisa Chorwadwala	Young Women and Mathematics (July 25-27, 2014) • 29 th Annual Conference of Ramanujan Mathematical Society (June 23-27, 2014)
Aditi Deo	Symposium and Workshop 'Texts, Tunes, Technologies: Perspectives on Indian Musics' (March 20-21, 2015) • International conference on 'The Music Box and its Reverberations: Technology and Music in India,' at School of Arts and Aesthetics, Jawaharlal Nehru University, New Delhi (January 14-17, 2015)
Sutirth Dey	Winter School on "Foundations of Ecology and Evolution" (jointly with IISER Mohali) (December 15-28, 2014)

Sanjeev Galande	Co-organized the 18 th Transcription Assembly Meeting 2015 (March 12-14, 2015)
Aurnab Ghose	Was the Co-ordinator for the 8 th SERB School in Neuroscience (December 8-21, 2014)
Prasenjit Ghosh	Materials Simulations Theory and Numerics (MASTANI) Summer School (June 30 - July 12, 2014) • Co-organized Current Trends in Condensed Matter Physics, NISER Bhubaneswar (February 19-22, 2015)
Pranay Goel	Co-organized NNMCB Symposium on Mathematical and Computational Biology, IIT Gandhinagar, (March 21-22, 2015) • Co-organized ICTS Program on Advances in Mathematical Biology (December 7-16, 2014)
Anindya Goswami	Symposium on Math-Finance (March 5, 2015)
Mukul Kabir	Co-organized a summer school on Materials Simulations Theory and Numerics in association with the International Centre for Theoretical Physics (ICTP Italy) (June 30-July 12, 2014)
Tejas Kalelkar	Co-organized Topology and Geometry of Surfaces Symposium at the 29th Annual Conference of Ramanujan Mathematical Society (June 30-July 7, 2014)
Jeet Kalia	Contributed to organizing International Symposium on Bioorganic Chemistry (ISBOC-10) (January 11-15, 2015)
Krishanpal Karmodiya	Co-organized 18 th Transcription Assembly Meeting (March 12-14, 2015)
Shabana Khan	Contributed to organizing International Symposium on Bioorganic Chemistry (ISBOC-10) (January 11-15, 2015) • Was a Member of Organizing Committee, 9 th CRSI-RSC and NSC-17 (February 5-8, 2015)
Sulabha Kulkarni	Organized a two-day workshop sponsored by Indian Academies in Fergusson College, Pune
B.S.M. Rao	Convener, IISER Pune-University of Melbourne Joint Workshop on Curriculum Development for Blended BSc Program, February 25-27, 2015
M.S. Madhusudhan	Organized Mathematical and Computational Methods in Life Sciences (April 11-12, 2014) (jointly with the Bioinformatics Institute (BII) Singapore)
Moumita Majumdar	Participated in organizing International Conference on Structural and Inorganic Chemistry (December 04-05, 2014) (Jointly with CSIR-NCL, Savitribai Phule Pune University) • International Symposium on Bioorganic Chemistry (ISBOC-10) (January 11-15, 2015)
Sunil Mukhi	Was a Member of the National Organizing Committee, DAE Symposium on High Energy Physics, at IIT Guwahati (December 8-12, 2014) • Was a Member of the National Organising Committee, Indian Strings Meeting at Puri (December 15-20, 2014) • Co-organized (with Arjun Bagchi) "Stringy Days" (December 22-23, 2014) • Co-organized (with Seok Kim, Kimyeong Lee and Costis Papageorgakis) "The Second Workshop on Developments in M-theory", at Gangwondo, Korea (January 12-16, 2015)
Suhita Nadkarni	Co-organized the 8 th SERB School in Neuroscience (December 8-21, 2014)
A.A. Natu	Chemistry Education Teachers Workshop with American Chemical Society (December 16-17, 2015); ISBOC-10 (January 11-15, 2015)
G.V. Pavan Kumar	FCS 2014 National Workshop on Fluorescence and Raman Techniques (December 15-22, 2014)

Shyam S. Rai	India - Taiwan Earth Science Cooperation visit (March 20-21, 2014)
Raghav Rajan	Co-organized INSA-Leopoldina Symposium on "Human Evolution towards Language: From Genes to Behaviour" (January 15-16, 2015)
Girish Ratnaparkhi	Organized "A Banquet of Biological Research", IISER Pune-Biology Annual Talks (July 28-30, 2014)
Kundan Sengupta	Co-organized 18 th Transcription Assembly Meeting 2015 (March 12-14, 2015)
Kaneenika Sinha	Co-organized 29 th Annual Conference of Ramanujan Mathematical Society (June 23-27, 2014)
S.G. Srivatsan	Was a Core Organizing Committee Member, International Symposium on Bioorganic Chemistry (ISBOC-10) (January 11-15, 2015)
N.K. Subhedar	Co-organized, 8 th SERB School in Neuroscience (December 8-21, 2014)
Pinaki Talukdar	Contributed to organizing the International Symposium on Bioorganic Chemistry (ISBOC-10) (January 11-15, 2015) • Contributed to organizing the 17 th CRSI National Symposium in Chemistry at CSIR-NCL, Pune (February 6-8, 2015)
Arun Venkatnathan	Was the Co-Convenor for Theoretical Chemistry Symposium 2014 held at CSIR-NCL, Pune (December 18-21, 2014)

Memberships and Affiliations

G. Ambika	Visiting Associate, IUCAA, Pune • Life Member, Indian Science Congress • Member, Indian Association of Physics Teachers • Member of Academy of Physics Teachers
V.G. Anand	Life Member, Chemical Research Society of India (CRSI) • Member, International Advisory Board, <i>Macroheterocycles</i>
Sudarshan Ananth	Member, National Academy of Sciences India (NASI), Allahabad
Collins Assisi	Member, Organization of Computational Neuroscience • Member, Society for Neuroscience
Chaitanya Athale	Member, Biophysical Society of U.S.A.
Ramana Athreya	Member, Arunachal Pradesh State Wildlife Advisory Board • Trustee, EcoSystems-India, Guwahati, India (a conservation NGO)
Arjun Bagchi	Fulbright Fellow and Visiting Faculty Member, Center of Theoretical Physics, Massachusetts Institute of Technology, U.S.A. (From January 2015) • Lise Meitner Fellow, Vienna University of Technology, Austria (May 2014 to November 2014) • Visiting Faculty Member, University of Santiago de Compostela, Spain (July 2014) • Max Planck Visiting Fellow (2015-2018)
Sudipta Basu	Member, The Indian Science Congress Association
Nirmalya Ballav	Editorial Board Member of the Journal <i>ISRN Spectroscopy</i> • Member, American Chemical Society • Member, American Vacuum Society • Visiting Scientist in the group of Prof. Thomas A. Jung at Paul Scherrer Institute (ETH Domain) Switzerland
Anjan Banerjee	Member, Indian Society of Cell Biology • Member, Indian Society of Developmental Biology • Member, Plant Tissue Culture Association of India • Member, American Society of Plant Biologists (ASPB) • Elected Executive Committee Member, Indian Society of Cell Biology • Executive International Scientific Program Board Member, International Plant Molecular Biology (IPMB) Congress to be held in Brazil in 2015
Deepak Barua	Member, Bombay Natural History Society • Executive Member of Steering Committee to establish the Indian Society of Evolutionary Biology
Ramakrishna Bhat	Life Member, Chemical Research Society of India
R. Boomi Shankar	Life Member, Chemical Research Society of India • Member, American Chemical Society
Sandanaraj Britto S.	Member, Chemical Research Society of India • Member, American Chemical Society • Member, World Molecular Imaging Congress
Harinath Chakrapani	Life Member, Chemical Research Society of India
Srabanti Chaudhury	Life Member, Chemical Research Society of India

Jeetender Chugh	Life Member, Nuclear Magnetic Resonance Society (NMRS) of India
Aloke Das	Life Member, Chemical Research Society of India • Life Member, Indian Society for Radiation and Photochemical Sciences
Shouvik Datta	Member Ad-hoc Board of Studies on Nanoscience and Nanotechnology, Shivaji University, Kolhapur
Aditi Deo	Member, Society for Ethnomusicology, U.S.A. • Member, British Forum for Ethnomusicology, U.K.
Sourabh Dube	Member, India-CMS collaboration, CERN, Geneva
Sanjeev Galande	Life Member, Society of Biological Chemists, India • Honorary Associate, Sydney Medical School, Sydney, Australia 2013-16
Krishna Ganesh	Chairman, FIST Expert Committee in Chemical Sciences, DST, New Delhi • Member, FIST Advisory Board (FISTAB) on FIST Program, DST, New Delhi • Chairman, Programme Advisory Committee in Organic Chemistry, DST, New Delhi (till July 2015) • Honorary Professor, JNCASR, Bangalore • Member, Board of Directors, Venture Centre, NCL Innovation Park, Pune • Member, Nanoscience Advisory Group, DST, New Delhi (2011-2014) • Chairman, Indian Advisory Committee, Lady Tata Memorial Trust, Mumbai • Member, Research Council, CSIR-Institute of Genomics & Integrative Biology (IGIB), New Delhi • Member, Empowered Committee, Science and Engineering Research Board (SERB), DST New Delhi (till July 2015) • Member, Maharashtra State Innovation Council (MSInC) • Member, DBT-IISc Partnership Program's Scientific Advisory Committee • Chairman, DBT Task Force on Human Resource Development • Member, Oversight /Umbrella Committee for DBT's Bioenergy Centres and New Centre (Pan-IIT) Member, Nano Mission Council (NMC), DST New Delhi • Chairman, Nano Science Advisory Group-Biological Sciences (NSAG-II) • Member, Governing Body of the GSFC University, Vadodara • Member, Board of Directors, Innovassynth Technologies (I) Ltd. • Member, Board of Directors, Bharatiya Reserve Bank Note Mudran Private Limited (BRBNMPL), Bengaluru • Member, Centre for Materials for Electronics Technology [C-MET] Apex Bodies • Member, Board of Management, DIAT Pune • Member, Board of College & University Development (BCUD), Swami Ramanand Teerth Marathwada University, Nanded <i>Memberships of Editorial Boards of Journals</i> <i>Journal of Organic Chemistry</i> (ACS–International Editorial Advisory Board) <i>Chemistry – An Asian Journal</i> (Wiley, Germany) Member, International Advisory Board <i>Beilstein Journal of Organic Chemistry</i> (Germany) <i>Artificial DNA:PNA, XNA</i> (Landbiosciences, U.S.A.) <i>Oligonucleotides</i> (Mary Ann Liebert Inc, U.S.A.) <i>Nature: Scientific Reports</i> (Nature Publishing Group)
Aurnab Ghose	Life Member, Indian Society for Cell Biology • Life Member, Indian Academy of Neurosciences • Life Member, Society for Neurochemistry (India) • Member, Society for Neuroscience (U.S.A.)
Prasenjit Ghosh	Regular Associate of the Abdus Salam International Centre for Theoretical Physics Jan 2012 to Dec 2017 • Member, Chemical Research Society of India
Sujit Ghosh	Life Member, Chemical Research Society of India • Life Member, Materials Research Society of India (MRSI) • Life Member, Society of Materials Chemistry (SMC), India
Boopathy Gnanaprakasam	Life Member, Chemical Research Society of India

H.N. Gopi	Member, American Chemical Society
Anirban Hazra	Member, Indian Society for Radiation and Photochemical Sciences
Partha Hazra	Life Member, Chemical Research Society of India • Life Member, American Chemical Society, U.S.A.
M. Jayakannan	Life Member, Society for Polymer Science India (SPSI) • Member, Chemical Research Society of India (CRSI)
M. Jeganmohan	Life Member, Chemical Research Society of India
Mukul Kabir	Member, Materials Research Society, U.S.A.
Krishanpal Karmodiya	Member, Malaria Research and Reference Reagent Resource Center (MR4)
Shabana Khan	Life Member, Chemical Research Society of India (CRSI) • Life Member, American Chemical Society (ACS)
Avinash Khare	Associate Editor, <i>Pramana (Journal of Physics)</i> , Indian Academy of Science, Bengaluru
Raghavendra Kikkeri	Life Member, Chemical Research Society of India
Sulabha Kulkarni	Member, Indian Physics Association (IPA) • Member, Materials Research Society of India (MRSI) • Member, Indian Association of Physics Teachers (IAPT) • Member, INS
G.V. Pavan Kumar	Life Member, Optical Society of India • Member, Optical Society of America
Mayurika Lahiri	Life Member, Indian Association for Cancer Research • Life Member, Indian Society of Cell Biology
Ayan Mahalanobis	International Association for Cryptologic Research • American Mathematical Society
Soumen Maity	Member, Institute of Electronics, Information and Communication Engineers (IEICE) • Program Committee Member for International Conference on Mathematics and Computing, Jan 5-10 2015
Moumita Majumdar	Life Member, Chemical Research Society of India (CRSI)
Pankaj Mandal	Member, Chemical Research Society of India, Bengaluru • Member, Optical Society of America
Rama Mishra	Member, Editorial Board for the <i>American Journal of Mathematical Analysis</i> , Science Education Publishing, U.S.A. • Member, Mathematical Reviews
Arnab Mukherjee	Life Member, Chemical Research Society of India (CRSI)
Sunil Mukhi	Fellow, Indian Academy of Sciences • Fellow, Indian National Science Academy • Fellow, The Academy for Developing World (TWAS, Trieste)
Musthafa Muhammed	Member, Chemical Research Society of India (CRSI)
Suhita Nadkarni	Member, The Society for Neuroscience • Member, Organization for Computational Neurosciences
Angshuman Nag	Member, Chemical Research Society of India (CRSI)
Rejish Nath	2014 (June - July): Academic Fellow/Professor, Laboratoire de Physique des Lasers (LPL), Villetaneuse, Paris, France

Arvind A. Natu	Board of Directors, Bakul Pharmaceutical Research Centre, Mumbai • Member, Research Programme Committee, DRDO Chemical Sciences • Member, National Coordination Committee of Olympiads • Research Ambassador, DAAD • Visiting Professor, Bielefeld University, Germany • Member, PMC Scientists Awards Committee • Senate Member, SVNIT, Surat • Academic Council, DY Patil University, Pune • Scientific Advisory Committee, ICMR, Belgaum • Member, International Junior Science Olympiad • UGC-SAP Committee, Chemical Sciences • PMC of DRDO HEMRL Panel • Board of Directors, PCMC Science Park, Pune • Chairman, URDIP, Admission Committee • Editorial Board, Indian Drugs
Pramod Pillai	Life Member, Chemical Research Society of India (CRSI)
Thomas Pucadyil	Member, Indian Society for Cell Biology • Member, Biophysical Society, U.S.A. • Member, American Society for Cell Biology
Shyam S. Rai	Senior Associate, the Abdus Salam ICTP, Trieste • UGC Expert, Indian School of Mines, 2014-17 • Fellow, Indian National Science Academy • Fellow, Indian Academy of Sciences • Fellow, National Academy of Sciences of India
Sudha Rajamani	Member, International Society for Astrobiology (previously known as ISSOL)
V.S. Rao	Member Institutional Biosafety Committee, Syngenta, Pune • Member, Monitoring and Assessment Committee of USERS program, DST, New Delhi • Adjunct Visiting Professor, University of Pune • Life Member, Indian Society of Genetics and Plant Breeding and Indian Society for Plant Biochemistry and Biotechnology
Girish Ratnaparkhi	Member, Society of Developmental Biology • Member, Genetics Society of America
M.S. Santhanam	Member, Editorial Board of Physics Education
Ronnie Sebastian	Member, Ramanujan Mathematical Society
L.S. Shashidhara	Member, Council, Indian National Science Academy • Member, Advisory Board, Science Express, DST-NCSTC • Member, Management Board/Research Council, NCBS, Bengaluru • Chairman, DBT's Expert Group on Research on Technology Development in Silk and its Applications in Biomaterials • Co-Chair, Selection and Review Committee on DBT's Star College Scheme • Member, Scientific Advisory Council, RGCB, Trivandrum • Member, Screening Committee, DST-Swarnajayanthi Fellowship • Member, Research Advisory Committee, NCCS, Pune • Member, Executive Council (elected), International Union of Biological Sciences (IUBS) • Chair, National Committee of International Union of Biological Sciences (IUBS) • DST-INSa Apex committee, INSPIRE Faculty scheme • Member Asia-Pacific Drosophila Board • Member, Selection Committee, DBT Ramalingaswamy Fellowships • Member, Board of Studies, Centre for Integrated Studies, University of Hyderabad
S.G. Srivatsan	Life Member, Chemical Research Society of India • Member, AvH Foundation, Pune Chapter • Member, American Chemical Society
Pinaki Talukdar	Life Member, Chemical Research Society of India
Arun Venkatnathan	Member, Chemical Research Society of India • Member, Indian Society for Radiation and Photochemical Sciences • Member, American Chemical Society
Seema Verma	Member, Materials Research Society of India (MRSI)
Milind Watve	Founder Member, International Society for Evolutionary Medicine and Public Health

International and National Visits

G. Ambika	Visited Potsdam Institute for Climate Impact Research, PIKS, Potsdam, Germany under DST DAAD project, August 2014
Collins Assisi	Invited to visit University of California, Riverside for collaborative research with Prof. Maxim Bazhenov • Invited to visit IISER Mohali to conduct a short course on Computational Neuroscience
Chaitanya Athale	Visited Prof. Rob Philips, Professor of Biophysics and Biology, Caltech, U.S.A.
Arjun Bagchi	Massachusetts Institute of Technology, U.S.A., January 27, 2015–present (On extended academic leave)
Deepak Barua	Attended DBT-JNTBGRI Brainstorming Session, Jawaharlal Nehru Tropical Biological Gardens, Thiruvananthapuram, June, 2014
Anup Biswas	Visited Technion-ILIT, Haifa, Israel, November 23-December 5, 2014
Apratim Chatterji	Visited Germany for collaboration: Group of Peter Virnau, University of Mainz, Germany, July 11-19, 2014; Group of Juergen Horbach, University of Duesseldorf, Germany, July 26-August 2, 2014
Sanjeev Galande	Attended Editorial Board Meeting of the Journal 'Genes and Genetic Systems' in Japan during September 15-22, 2015
Krishna Ganesh	Visited London, U.K. to attend and deliver talk at the International Symposium, Fribush Conference Centre, University of Edinburgh, June 19-23, 2014; and to attend U.K.-India Chemistry Symposia-2014, June 22-24, 2014 • Visited San Francisco, U.S.A. to deliver a lecture at the 248th ACS National Meeting and to attend International Advisory Board Meeting of the Journal of Organic Chemistry (ACS Journal), August 9-16, 2014 • Visited Boston, U.S.A. to attend Young Investigator Meeting jointly organized by Faculty of Harvard Medical School and MIT Boston, U.S.A., October 8-16, 2014 • Visited Japan as part of the IISERs' Directors delegation for a joint workshop/collaborative discussion between IISERs and 7 Imperial Universities of Japan, February 21-26, 2015 • Visited University of Melbourne, Australia, June 7-11, 2015
Mukul Kabir	Visited the Department of Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, U.S.A. December 5-28, 2014
Krishanpal Karmodiya	Visited Gulmarg, Srinagar to participate at the Young Investigator meeting held during March 28-April 1, 2015
M.S. Madhusudhan	Visited Bioinformatics Institute, Singapore to participate at a conference as well as to supervise the research group at the institute
Sunil Mukhi	Visited International Centre for Theoretical Physics (ICTP), Trieste, June 1-July 4, 2014 • NISER, Bhubaneswar, August 18-19, 2015 • CERN, Geneva, July 6-11, 2015

Gayathri Pananghat	Visited the European Synchrotron Research Facility (ESRF), Grenoble, France to carry out X-ray diffraction experiments, July 4-15, 2014
Shyam Rai	Visited IIT- Roorkee to participate at the IIT- Roorkee Distinguished Alumni Meet, November 16-18, 2014
Ronnie Sebastian	Visited Universitat Wien, Austria during January 2015
Kaneenika Sinha	Visited Princeton University from December 15-19, 2014 to attend the conference "Analysis, Spectra and Number Theory" held in honor of Peter Sarnak

Discipline Review Committees of the Institute

The institute has constituted Research Review Committees for various disciplines with members of international repute from institutions from India and abroad. During 2014-15, the Review Committees for the disciplines of Chemistry, Mathematics, and Physics have visited the institute to assess and provide feedback on the research of individual members as well as on the overall departmental improvement.

Chemistry

Prof. Anthony K. Cheetham

Department of Materials Science & Metallurgy, University of Cambridge, U.K.

Prof. Mike Klein

Department of Chemistry, College of Science and Technology Temple, University, U.S.A.

Prof. T.V. Rajan Babu

Department of Chemistry, The Ohio State University, Columbus, U.S.A.

Prof. M.G. Finn

School of Chemistry & Biochemistry, Georgia Tech University, Atlanta, U.S.A.

Prof. Prashant Kamath

Department of Chemistry & Biochemistry and Radiation Laboratory
University of Notre Dame, Notre Dame, U.S.A.

Prof. Peter Seeberger

Max Planck Institute of Colloids and Interfaces, Potsdam, Germany

Prof. D.D. Sarma

Solid State and Structural Unit, Indian Institute of Science, Bengaluru, India

Prof. N. Periasamy

Senior Professor (Retd.) from Tata Institute of Fundamental Research, Mumbai, India

Prof. R. Murugavel

Department of Chemistry, Indian Institute of Technology Bombay, Mumbai, India



At the Research Review Committee meeting in Chemistry held in January 2015

Mathematics Research Advisory Council members Profs. Ram Murty, T.R. Ramadas, and Manindra Agarwal (*the first three members from the left*) and Prof. Dinesh Thakur (*extreme right*) with PhD students in Mathematics at IISER Pune

Mathematics

Prof. Manindra Agarwal

Department of Computer Science and Engineering, Indian Institute of Technology Kanpur, India

Prof. T.R. Ramadas

Chennai Mathematical Institute, Kelambakkam, Chennai, India

Prof. Ram Murty

Department of Mathematics, Queen's University, Kingston, Canada

Prof. Dinesh Thakur

Department on Mathematics, University of Rochester, Rochester, U.S.A.

Prof. S.R.S. Varadhan

Courant Institute of Mathematical Sciences, New York City, U.S.A.



Physics

Prof. Joseph Incandela

Physics Department, University of California, Santa Barbara, U.S.A. and CERN, Geneva, Switzerland

Prof. Ashoke Sen

Harish-Chandra Research Institute, Allahabad, India

Prof. T. Senthil

Massachusetts Institute of Technology, Cambridge, U.S.A.

Prof. Ajay Sood

Department of Physics, Indian Institute of Science, Bengaluru, India

Prof. Gunter Werth

University of Mainz, Germany

The Physics Review Committee members visited IISER Pune in January 2015: (*Left to Right*): Profs. Ajay Sood, Guenter Werth, T. Senthil, Ashoke Sen, Joseph Incandela





Conferences, Events and Activities

Conferences, Symposia and Workshops

News and Events

International Relations

Outreach Activities

Colloquia

Research Seminars

Conferences, Workshops and Symposia

Mathematical and Computational Methods in Life Sciences

April 11-12, 2014

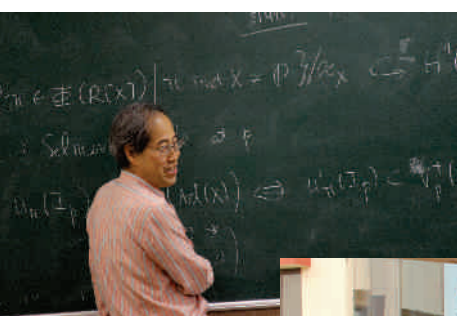
This meeting was jointly organized by IISER Pune and the Bioinformatics Institute (BII) Singapore. The broad intent of the meeting was to showcase the breadth of scientific problems in biology that could be mathematically modeled or computationally enumerated. Speakers at this 2-day event showed how modeling/simulation complemented experimental work. The BII contingent was headed by the Director Frank Eisenhaber and included 8 other principal investigators. Local speakers included faculty from IISER Pune, TCS and CSIR-NCL. Experimental biologists and computational specialists connected over the course of the event and plausible new collaborative ventures were discussed.

ICTS Program on p -adic Aspects of Modular Forms

June 10-20, 2014

The aim of this program was to focus on the p -adic aspects of modular forms and related topics. The program consisted of two components, an instructional workshop followed by a discussion meeting. There were seven mini-courses in the workshop that focused on two broad themes: on p -adic families of automorphic forms with some modularity lifting applications in mind and on the construction of p -adic L-functions in various situations and their applications. The final part of the program was a three day discussion meeting in which the state of current research in these topics was discussed.

The event was organized by Drs. A. Raghuram (IISER Pune), Baskar Balasubramanyam (IISER Pune), Haruzo Hida (UCLA, U.S.A.), and Jacques Tilouine (Paris 13, France). Invited speakers for the workshop were R. Sujatha (University of British Columbia,



Canada), Jacques Tilouine (Paris 13, France), Baskar Balasubramanyam (IISER Pune), David Geraghty (Boston College, U.S.A.), Mladen Dimitrov (University of Lille, France), Haruzo Hida (UCLA, U.S.A.), A. Raghuram (IISER Pune) and Debargha Banerjee (IISER Pune); and invited speakers for the advanced discussion meeting were Jeanine van Order (Hebrew University, Israel), Haruzo Hida (UCLA, U.S.A.), Baskar Balasubramanyam (IISER Pune), Olivier Fouquet (Paris-Sud, France), Chandrakant Sharma (IISER Mohali), Giovanni Rosso (University of Paris 13, France), Riccardo Brasca (Mathematical Institute of Jussieu, France), Denis Benois (University of Bordeaux, France), Mahesh Kakde (King's College), David Geraghty (Boston College, U.S.A.), Ming-Lun Hsieh (National Taiwan University, Taipei), Devika Sharma (TIFR, Mumbai), Fabian Januszewski (Karlsruhe, Germany), Eknath Ghatge (TIFR, Mumbai), Tadashi Ochiai (Osaka University, Japan), Mladen Dimitrov (University of Lille, France), Sudhanshu Shekhar (University of Heidelberg, Germany), Ashay Burungale (UCLA, U.S.A.), Jacques Tilouine (Paris 13, France).

The 29th Annual Conference of Ramanujan Mathematical Society

June 23-27, 2014



The RMS meeting is an annual event organized by RMS to promote mathematical research in India. With an attendance of more than 300 people, including junior and senior researchers from a wide range of institutions and universities across India, this is possibly the biggest annual mathematical event in India. Local organizers for this year's meeting were Drs. A. Raghuram (Convener), Anisa Chorwadwala, Chandrasheel Bhagwat, Kaneenika Sinha, and S.A. Katre (Co-convener).

Apart from plenary talks by highly accomplished researchers and educators from across the world like Hyman Bass (University of Michigan, U.S.A.), Amiya Mukherjee (ISI Kolkata), K.B. Athreya (Iowa State University, U.S.A.), Dinesh Thakur (University of Rochester, U.S.A.) and K. Shiohama (Fukuoka University, Japan), Weintraub (Lehigh University, U.S.A.), S.S. Sane (IIT Bombay), G. Rangarajan (IISc, Bengaluru) and S. Thangavelu (IISc, Bengaluru), there were parallel symposia in several exciting research areas like Number Theory, Partial Differential Equations, Harmonic Analysis, Riemannian and

Finsler Geometry, Complex Function Theory, Finite Groups, Logic, Discrete Mathematics, Topology and Geometry of Surfaces.

An entire day was devoted to talks by experts on many recent advances in Mathematics which originate from Ramanujan's work. There were also several opportunities for graduate students to present their research work to a wide audience during contributed talk sessions.

Topology and Geometry of Surfaces Symposium at the 29th Annual Conference of Ramanujan Mathematical Society

June 30-July 7, 2014



This symposium, organized by Drs. Tejas Kalelkar (IISER Pune) and Ravi Kulkarni, was part of the 29th Annual Conference of the Ramanujan Mathematical Society and was held in the week after the conclusion of the main events. Other local organizers of the event were Drs. A. Raghuram (Convener), Anisa Chorwadwala, Chandrasheel Bhagwat, Kaneenika Sinha and S.A. Katre (Co-convener). It consisted of a mini-course on "Computer driven theorems and questions in geometry" by Prof. Moira Chas (Stonybrook University, U.S.A.) and a mini-course on "Identities of Hyperbolic surfaces" by Prof. Ara Basmajian (CUNY, U.S.A.). Apart from students of IISER Pune, the symposium also had participants from IISER Mohali, Pune University, Fergusson College and from industry.

Number Theory Symposium of the 29th Ramanujan Mathematical Society Meeting

June 23-27, 2014

Dr. Debargha Banerjee organized this symposium of the Ramanujan Mathematics Society. This event was a gateway for young people (college teachers and students) to see advanced topics in number theory. The symposium received enthusiastic participation from students. Some of the invited speakers at this symposium were V.G. Narasimha Kumar Cheraku (IIT, Hyderabad), Baskar Balasubramanyam (IISER Pune), B. Ramakrishnan (HRI, Allahabad), K. Srinivas (IMSc, Chennai), M. Manickam (Kerala School of Mathematics), S.A. Katre (University of Pune), and Supriya Pisolkar (IISER Pune).



Materials Simulations Theory and Numerics (MASTANI) Summer School

June 30-July 12, 2014

Dr. Prasenjit Ghosh organized this international summer school jointly with Prof. Shobhana Narasimhan, (JNCASR, Bengaluru) and Prof. Ralph Gebauer (ICTP, Trieste, Italy). Dr. Mukul Kabir was the local organizer. The aim of the school was to introduce graduate students and young researchers to basic concepts as well as new developments in the field of computational materials theory, with the emphasis being on density-functional theory (DFT) based methods.



The first week of the school was devoted to the basics of density functional theory while in the second week more advanced topics focused on computational spectroscopy were taught. The morning sessions consisted of lectures by leading scientists in the field,

namely Prof. Stefano Baroni, SISSA, Italy, Prof. David Vanderbilt, Rutgers University, U.S.A., Prof. Dilip Kanhere, Pune University, India, and many others. The post lunch sessions comprised of hands-on session at the IISER Pune Computer lab. A special feature of this school was that each lecture on the theory was complemented by two application lectures where experimentalists and DFT practitioners showed (a) how theory is used to understand and predict materials and (b) to highlight how theory and experiments complement each other in understanding the science of materials.

Additionally there were two special lectures by Prof. Sourav Pal, Director, CSIR-NCL on "Electron correlation in excited states: Challenges to the electronic structure theory" and by Prof. David Vanderbilt, Rutgers University, U.S.A. on "Topological insulators and the quantum anomalous Hall Effect". Eighteen lecturers, 6 tutors and 73 students from different countries attended the summer school.

Young Women and Mathematics

July 25-27, 2014

The Symposium Young Women and Mathematics (YWM-2014) was a follow-up of the Indian Women and Mathematics (IWM) symposia held twice in the past. The first one was IWM-2012 held at Institute of Mathematical Sciences, Chennai during January 8-10, 2012 and the next was IWM-2013 held at IISER Pune during July 26-28, 2013. The earlier IWMs were modeled to facilitate interaction between women mathematicians who are established researchers, and college teachers, and undergraduate and graduate students.

Keeping in mind the increasing number of young women researchers in India in the recent years, the current meet, the third in the series, was named as "Young Women and Mathematics (YWM) Symposium". This symposium was organized by Dr. Anisa Chorwadwala of IISER Pune along with other organizers and scientific committee members, Anita Naolekar, Jaya Iyer (Chair), Mousumi Mandal, and Pooja Singla Thakur.



With National Board for Higher Mathematics (NBHM) India offering support for this venture, over 70 young women mathematicians from all over the country participated in the symposium. There were a few participants who were of Indian origin, either working or pursuing their doctoral studies abroad.

The symposium had (i) 2 mini-courses, which introduced advanced areas of mathematics, (ii) 9 plenary talks by prominent researchers and (iii) 15 contributory talks by researchers and post doctoral students together covering varied fields of mathematics.

A poster presentation session by participants showcased some interesting areas in mathematics. There was also a panel discussion on a career in Mathematics in India in the current scenario. The discussion focused on the funds and opportunities available to women, present research/job opportunities in India etc. The young audience comprising of graduate/undergraduate students benefited highly from this discussion.

International Conference on Inorganic and Structural Chemistry

December 4-5, 2014

This was jointly organized by IISER Pune, CSIR-NCL and SP University of Pune. There were over 190 registered participants, which included 9 international speakers and 9 national speakers. The conference itself was a satellite to the main conference held at Kolkata. The speakers were from diverse areas of Inorganic and Structural Chemistry but all had a common theme of working on advanced materials using inorganic-organic hybrid systems (eg. photovoltaics, water-splitting, gas storage, proton conduction, sensing, drug and fertilizer delivery using redox active materials, self-assembly, porous hosts etc). Importantly, many students (over 150) from all over the country participated and some of them presented the posters. Poster prizes were sponsored by the Royal Society of Chemistry. Excellent interactive sessions between the research faculties and the students was the highlight of the conference.

ICTS Program on Advances in Mathematical Biology

December 7-16, 2014

In addition to ICTS and IISER Pune, this Program was also supported by the Pacific Institutes of Mathematical Sciences (PIMS), Canada. The Program brought together leading mathematical biology researchers from Canada together with Indian scientists to deliver a series of pedagogical lectures on contemporary topics of interest.



Over 65 participants attended the Program from both Pune and all over India. The participants were drawn from varied backgrounds, rooted in theoretical science in some form or another, be it physics or mathematical biology or bioinformatics and so on. The participants were mostly at the early PhD level although some faculty and younger students also attended. The conference was organized by Prof. L.S. Shashidhara (IISER Pune), Dr. Pranay Goel (IISER Pune) and Prof. Sujatha Ramdorai.



National Workshop on Fluorescence and Raman Spectroscopic Techniques

December 15-22, 2014

This workshop provided hands-on training to students, post-doctoral researchers and young faculty in the state-of-the-art laser based spectroscopic techniques present at IISER Pune. Theoretical and experimental concepts in spectroscopy were taught by practicing research scientists from India and abroad, along with IISER Pune faculty. A novel concept implemented at IISER Pune was a round-table discussion session on each technique. These discussions were led by practicing researchers and were aimed at providing advice on problems faced by participants in various applications. Other highlights of the meeting were the teaching sessions on three different techniques of super-resolution spectroscopy and training in assembling cost-effective fluorescence and Raman instrumentation. Thirty five senior scientists taught and presented their research to over a hundred participants from all over the country. This workshop was organized by Dr. Mrinalini Puranik, Dr. G.V. Pavan Kumar and colleagues.

Theoretical Chemistry Symposium

December 18-21, 2014

This fourteenth Theoretical Chemistry Symposium (TCS) was organized by CSIR-National Chemical Laboratory (CSIR-NCL), Pune and IISER Pune. IISER Pune organized all the talks of the symposium on December 20th. Held biennially, TCS is the largest platform for theoretical and computational chemistry research in India. The focus of this symposium is to converge a large number of researchers working in diverse areas involving quantum mechanics, statistical mechanics, computational sciences, algorithm development and encompassing numerous applications including chemical reaction mechanisms and pathways, materials science and nanotechnology, polymer physics and chemistry, biological systems and bio-nano interfaces. The symposium was attended by 10 international speakers, 65 national speakers, 400 students and other faculty participants. Approximately 300 posters were presented during the symposium.

Brain Circuits: SERB School in Neuroscience

December 8-21, 2014

This 8th edition of SERB School in Neuroscience focused on the development, organization, plasticity and computation of brain circuits. The School had talks

along with sessions on experiments and analysis. Participants included undergraduate Ph D scholars, postdoctoral fellows and young faculty members from diverse disciplines. Twenty-seven faculty members with expertise in research and teaching skills, from India and abroad, were invited to deliver pedagogical talks and share their excitement in science.

Winter School on Foundations of Ecology and Evolution

December 15-28, 2014

IISER Pune and IISER Mohali jointly organized this School the aim of which was to give a broad introduction in ecology and evolution to II and III year undergraduates from all over the country. 286 students applied for this workshop. Out of this, 154 were invited to take an online test. Based on their performance in this test, 16 students from all over India were invited for the workshop.

The workshop involved 7 resource persons and 4 guest lecturers. The resource persons were: Prof. Amitabh Joshi (JNCASR), Dr. T.N.C. Vidya (JNCASR), Dr. N.G. Prasad (IISER Mohali), Dr. Sutirth Dey (IISER Pune), Mr. Sudipta Tung (IISER Pune) and Mr. Syed Zeeshan Ali (IISER Mohali). The four guest lecturers were Dr. Sayajit Rath (NII, Delhi), Dr. Umashankar (GKVK), Dr. Milind Watve (IISER Pune) and Dr. Ullasa Kodandaramiah (IISER TVM).



The workshop involved 12 days of teaching. Each day consisted of three hours of lectures, three hours of hands-on practical sessions, and another hour devoted to guest lectures or exams. Although the official contact hours were only 7-8 per day, due to the hands-on nature of the workshop, students had to work late into the night almost every day to finish the practical tasks and enter data.

The details of the syllabus are on the website: <https://sites.google.com/a/acads.iiserpune.ac.in/ecolevolwinterschool/home> At the end of the workshop, feedback was taken from all students and in general extremely positive comments were received.

Stringy Days

December 22-23, 2014

This meeting, organized by Dr. Arjun Bagchi and Prof. Sunil Mukhi, featured a topical survey of a variety of contemporary research topics in String Theory including connections to Strongly Correlated Systems in Condensed Matter, Cosmology and Inflation, and the mathematical theory of Mock Modular Forms. The meeting brought together researchers from Stanford University, University of Cambridge, Princeton, London and Groningen as well as researchers from India. There were a couple of public lectures as well.

10th International Symposium on Bioorganic Chemistry (ISBOC-10)

January 11-15, 2015

The ISBOC series of symposia, organized once every three years, brings together leading researchers in the field of chemical biology to exchange ideas and share their latest scientific findings. The tenth one in this series has been held at IISER Pune and has been co-convened by Prof. K.N. Ganesh (Director, IISER Pune). More than sixty plenary and invited lectures were given by prominent chemical biologists from 17 countries across the globe. The ongoing research in diverse areas of biological chemistry was presented and discussed. The five-day event was well-attended by scientists from various parts of the country. The keynote address was given by 2013 Nobel Laureate in Chemistry, Prof. Arieh Warshel (University of Southern California, U.S.A.) and several other distinguished scientists such as Prof. Michael Klein (Temple University, U.S.A.); and Prof. P. Balaram (IISc, Bengaluru) gave talks at the symposium. Nearly 200 students from IISER Pune and other organizations presented their data in the form of posters.



INSA - Leopoldina Symposium: Human Evolution Towards Language – From Genes to Behaviour

January 15-16, 2015

A two-day symposium sponsored by the Indian and German National Science Academies (INSA and Leopoldina) was organized by Prof. Shashidhara (IISER Pune) and Prof. Angela Friederici (Max Planck Institute for Human Cognitive and Brain Sciences, Germany). The main theme of the symposium was human language. The symposium consisted of 5 sessions and a total of 13 talks. The talks were aimed at



understanding the neural origins of human language from many different perspectives - sequence learning in animals, sequence learning in humans, reward pathways in animals pertaining to motivation for learning, role of experience in modifying neuronal structures etc. The conference speakers included 7 speakers from India and 7 speakers from Germany, Netherlands, France and United Kingdom. The conference was attended by a total of 35 registered participants and a number of students from IISER Pune.

Symposium on Math-Finance

March 5, 2015

This half-day in-house symposium on Math-Finance was organized by Dr. Anindya Goswami to give students an overall knowledge of research works in Math-finance being done in the Math discipline at IISER Pune.



There were three sessions with two short breaks. The sessions were chaired by Dr. Anup Biswas, Prof. Uttara Naik-Nimbalkar and Dr. Anindya Goswami respectively. Four students (Sanket Nandan, Shirish Kulhari, Nimit Rana and Akash Krishna) presented their Master's project work. This was the first symposium organized in the department where students had an opportunity to present their ongoing research. The talks in the symposium were on advanced research topics; nevertheless, efforts were made to make basic ideas tangible. A good number of students from within and outside IISER Pune attended the event. Home page: <https://sites.google.com/site/anindyagoswami/home/symp2015>

18th Transcription Assembly Meeting 2015

March 12-14, 2015

Investigators interested in studying various modes of gene regulation at transcription/chromatin level and their biological implications in prokaryotic and eukaryotic model systems attended this meeting. This national meeting is being organized every year for over one and a half decades to discuss the recent advancement in the field and to share the expertise among all researchers working in India. This 18th episode of the meeting was organized by Dr. Sanjeev Galande, Dr. Krishanpal Karmodiya and colleagues at IISER Pune.

Texts, Tunes, Technologies: A Scientific Review of Indian Musical Traditions

March 27-28, 2015

This two-day event included a talk, a half-day symposium, and a workshop. The proceedings opened with a talk on "Towards a "Scientific" History of Music: Understanding Music Discourse in Southern India" by Prof. Lakshmi Subramanian (Centre for Studies in Social Sciences, Kolkata). The half-day symposium on "Music in Representation, Music in Practice" included two sessions both chaired by Prof. Lakshmi Subramanian. Other experts who initiated and participated in discussions were Justin Scarimbolo (SSLA, Pune); Saroja Ganapathy (IIT Bombay); Sushruti Santhanam (University of Pune) and Aditi Deo (IISER Pune).

A workshop on "A Journey from Swara to Raaga: The Architecture of Carnatic Music" was conducted by Sushruti Santhanam in an interactive format and included explanations, music demonstrations and audio clips.

The event saw the participation of senior scholars and musicians such as Prof. Milind Malshe (IIT Bombay), Prof. Ram Gambhir (University of Pune), Sandeep Bagchee and Vikas Kashalkar. Altogether, nearly 70 people attended some part or the other of the event, with a lot of audience participation that led to very interesting interactions.



News and Events

RSC-CRSI-IISER-NCL Safety Workshop

April 2, 2014

Under the banner RSC (UK)–CRSI, IISER Pune arranged first of its kind one day Safety Workshop on "Safety in Chemical Lab" for college/university students and faculty. There were around 100 participants for this workshop. Director, IISER Pune and Director, CSIR-NCL inaugurated the workshop with initial remarks. Morning session had lectures by experts from RSC members, U.K. and by experts from India. Practical sessions were conducted in the afternoon. The local organizer for the event was Dr. Ramakrishna Bhat.



DST-INSPIRE Internship Camp

May 12-16, 2014

This five-day residential camp was held for 139 students (96 girls and 43 boys) who registered (out of 150 who were selected) from 37 schools in and around Pune. Students selected had enrolled for studying Science subjects in Class XII, and were selected on the basis of their performance in Class X examinations. The program consisted of 10 invited talks by eminent scientists, 4 workshops, 3 laboratory sessions, screening of science movies, a panel discussion with senior students at IISER Pune on Research Life at IISER Pune and an interactive session on Opportunities in Science.

Workshop on Drupal

May 29-31, 2014

Drupal, an open source software for website design with many developers and users, has a large number of modules that can provide a wide variety of functionalities to a website. The goal of this workshop was to familiarize users with Drupal's features and with its usage for website design. Dr. Sunita Barve (NCL, Pune) conducted this workshop while Dr. Aditi Deo (IISER Pune) facilitated the

workshop along with the Science Media Centre at the institute. About 8 students and 4 faculty members from IISER Pune participated at the workshop. Topics ranging from installation to downloading and activating themes to modules, blocks and the structure and architecture of database and administering the website based on a database were discussed and demonstrated.

Prof. K.N. Ganesh Endowment Lecture

May 30, 2014



Prof. Dipankar Chatterji (Indian Institute of Science) delivered the first Prof. K.N. Ganesh Endowment Lecture on May 30, 2014 at IISER Pune. He spoke on step-wise assembly of an enzyme-generating biological activity with silent mutation.

Prof. K.N. Ganesh Endowment Trust was formed during early 2014. It has been established by the research students, collaborators and associates of Prof. K.N. Ganesh and the activities are coordinated by Dr. A.A. Natu. The mission of this trust is to spread the message of science in symbiotic ambience of research and education and to impart education to underprivileged children.

Inauguration of the Main Building

June 15, 2014

The Main Building of IISER Pune housing research labs and offices was inaugurated and dedicated to the nation by the President of India Shri Pranab Mukherjee. Other dignitaries present during the event were Shri K. Sankaranarayanan (Governor of Maharashtra); Shri Prithviraj Chavan (Chief Minister of Maharashtra); and Smt Smriti Irani (Union Minister, HRD). Following the inauguration by unveiling the plaque, the invitees were shown around the laboratory facilities. As a part of this, a poster exhibition of research and outreach activities of IISER Pune and that of awards and

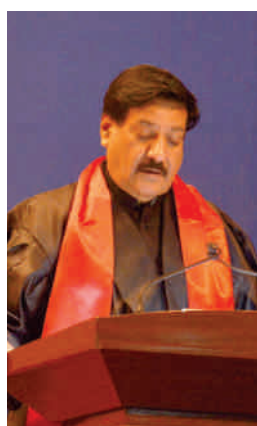


achievements of IISER Pune students and faculty members was organized. Some of the students associated with the institute's Disha outreach program gave a presentation to the dignitaries.

3rd Convocation

June 15, 2014

The convocation address was delivered by the Visitor and President of India Shri Pranab Mukherjee in the august presence of dignitaries Shri K. Sankaranarayanan (Governor of Maharashtra), Shri Prithviraj Chavan (Chief Minister of Maharashtra), and Smt. Smriti Irani (Union Minister, HRD). Along with the dignitaries, the academic procession included Members of IISER Pune's Board of Governors and the Senate. Shri Pranab Mukherjee emphasized the role of IISERs in developing scientific manpower and the importance of internationalization and collaboration with top global institutions. Shri Prithviraj Chavan assured state support for IISER Pune. During her address, Smt. Smriti Irani lauded the outreach activities conducted by IISER Pune students. During this convocation 95 students were awarded BS MS degree and 13 students were awarded PhD degree.



2nd Little Scientists Conference

July 7-8, 2014

IISER Pune has hosted the 2nd Little Scientists Conference of the Moving Academy of Medicine and Biomedicine, Pune where students studying in classes X-XII presented their research findings on projects they carried out in the rural and tribal areas. The projects were carried out during summer vacation with guidance from faculty members of the Moving Academy. Topics of research included survey of the incidence of malaria, thalassemia, diabetes, and anemia in the population, and determination of different parameters in soil and water samples from their villages. There were 6 interactive talks by scientists from IISER Pune and other institutions, 34 platform presentations and 30 poster presentations by the students.



A Banquet of Biological Research: IISER Pune-Biology Annual Talks

July 28-30, 2014

The Biology discipline conducted its Annual Seminars where faculty members presented seminars while students and post-doctoral fellows presented posters. All members of the department, including newly joined Ph.D., Integrated-Ph.D., and project staff attended the talks. The goal of the talks was to share ideas and communicate research done within the laboratories during the past year.

Lady Tata Memorial Trust – IISER Pune Mentorship Program and Workshop for College Teachers on Cancer Biology

August 22-23, 2014

During this event hosted by IISER Pune, about 11 JRFs and 1 Young Research Awardee (post-doc) gave presentations of their work undertaken toward a PhD /



post-doc while availing the Lady Tata Memorial Trust scholarship. A few faculty members from IISER Pune offered their suggestions as mentors. Discussions and lab visits followed.

Participants at the day-long workshop on cancer biology included 44 UG and PG college teachers from 15 institutions in Pune and Mumbai, including Pravara Institute of Medical Sciences, Loni, and Vidyapratishthan, Baramati. About 10 different Biology streams and the Physics discipline were represented. Three faculty members from IISER Pune gave talks on their research in cancer and linked them with college curricula. The last talk was given by a cancer survivor who talked about cancer from a patient's perspective: the physical and emotional stresses, behavioral upheavals, social complications, and financial implications that a cancer patient goes through.

In the afternoon session, teacher participants were taken to the laboratories for demonstrations of advanced research techniques like FISH, SKY, 2D and 3D imaging, and Comet assay.



Hindi Day and Hindi Week

September 17-24, 2014

Staff and students of IISER Pune observed Hindi week during September 17-24, 2014. On September 14, 2014, students organized a Hindi Day program which included information about Hindi Diwas, poetry recitation, dance performance, debate, stand-up comedy, drama, songs and Antakshari. Prizes and certificates were distributed to participating students.

During the Hindi Week, the following programs were organized. Poetry recitations; Essay competition (Topic: Effect of environment leading to natural calamities); debate (Topic: Does being a working woman affect the family); Hindi dictation and general knowledge; vocabulary; typing and translation. On the last day there was a workshop on "Successful implementation of National Language policy". This was followed by distribution of prizes and certificates to participants.

Workshop on Science Writing

September 29 - October 10, 2014

This workshop was supported by Vigyan Prasar also and was open to any Indian having a Masters degree, either in Sciences or in Mass Communication or Journalism background. The announcement received a large number of applicants, many with PhD, and quite a few scientists with many publications to their credit. Among the 20 participants selected, 18 had participated in the event.

Dr. T.V. Venkateswaran (Vigyan Prasar), Mr. Hasan Jawaid Khan (Editor, *Science Reporter*) and Mr. K.P. Madhu (IISER Pune) were the lead trainers. Resource people – Giridhar Madras from *Current Science*, Kaushik Dasgupta from *Down to Earth*, R. Ramachandran from *The Hindu* – also contributed to the content of the workshop.

The first week was spent on discussing the ways of researching for scientific content, on various tips and tricks on writing and editing. The participants were exposed to issues related to layout and design. Some time was spent in discussing the kinds of content and the variations in the layout.

The second week was spent in writing, editing and layout of the material in a magazine format. A dummy magazine called SciGest was produced during the workshop as planned. The participants were confident about researching and writing articles and news items at the end of the workshop.

Evening Workshop on Writing a Research Paper and a Workshop on Ethics in Science

November 13, 2014 & January 9, 2015

IISER Pune hosted an evening workshop conducted by Acheiver's League USA, on "How to write a research paper" on November 13, 2014 for UG and PG students from IISER Pune as well as the neighboring research institutions in Pune. Nearly 200 students attended the talk and participated in the exercises. A workshop on "Ethics in Science" was held on January 9, 2015 by Cactus Global, a science writing and editing organization from Mumbai.

Workshop on Chemistry Education

December 16-17, 2014

Three eminent scientists, Norbert Pienta (U.K.), Rick Moog (U.K.) and Pratibha Varma-Nelson (U.S.A.) conducted this two-day interactive workshop for teachers. About 40 participants availed the workshop.





Republic Day Celebration

January 26, 2015

IISER Pune celebrated India's 66th Republic Day by hoisting the tricolour atop the magnificent new 100-foot tall flagpole. The flagpole, a recent addition to the campus, is one of the three such flag posts in Pune.

Director Prof. K.N. Ganesh initiated the proceedings. Flag hoisting was followed by a march-past of a contingent of the IISER security personnel. The army band from Maratha Light Infantry played patriotic tunes.

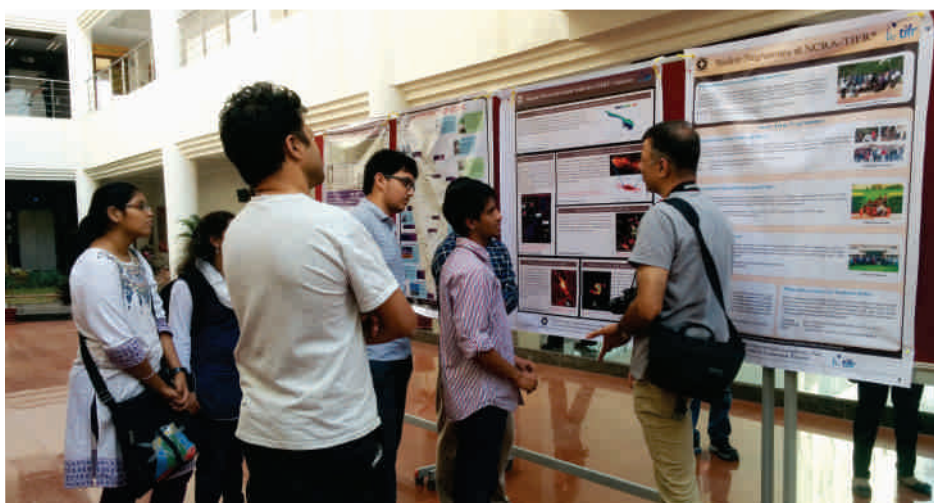
Prof. Ganesh thanked faculty and administrative staff for their contribution to the institute. He exhorted the scientists and students to put in their best efforts, reiterating the institute's commitment to nurturing and training the best talent to carry out scientific research in service of the nation. Later, IISER Pune students presented a cultural program showcasing the in-house talent.



Public Poster Exhibition as part of the Pune Astronomy Fortnight

February 7, 2015

As a part of the Pune Astronomy Fortnight (February 1-15, 2015), *Aakashganga*, the students' Astronomy and Astrophysics club at IISER Pune organized a poster exhibition for the public on February 7, 2015. The posters were based on topics ranging from the history of Astronomy in India to the recent discoveries in the field and from basic Astronomy to the Physics behind pulsars. The event was attended by college students from and outside the institute and the general public as well.



Mimamsa 2015

February 14-15, 2015

This year the preliminary round of *Mimamsa*, the science quiz of IISER Pune was conducted across nine centres: Ahmedabad, Bangalore, Chennai, Delhi, Hyderabad, Kolkata, Mumbai, Pune, and Thiruvananthapuram. Four teams were selected for the final round: IIT Madras; IIT Bombay; IISc, Bengaluru; and UM DAE-CBS Mumbai. The final round was conducted over two days in topics in biology, chemistry, mathematics, and physics. The team from IISc Bengaluru received the top scores, for the fourth year in a row, followed by IIT Madras.



Public Sky Watching Session

February 15, 2015

As a part of the Pune Astronomy Fortnight (February 1-15, 2015), *Aakashganga*, the students' Astronomy and Astrophysics club at IISER Pune organized a sky watching session for the public on February 15, 2015. Around 100 schoolchildren and another 200 general public of all age groups participated in the event that was held at the Central Cricket Ground in the institute campus. From observing the bands and the moons of Jupiter to taking a glance at the beautiful yet mystifying Orion nebula, the session also featured a detailed explanation of the night sky to young children.



Day-care Centre Inaugurated

February 27, 2015

Hullabaloo, the day-care facility for the children of IISER Pune employees was inaugurated by Prof. K.N. Ganesh. On this occasion, Prof. Ganesh lauded the efforts of the Day-care Committee and others who were instrumental in setting up the facility. The centre is well-equipped with a kitchen, dining room, nap rooms and well-designed areas for activities like reading, music and art. Separate outdoor play areas for younger and older children are available at the centre.

2015 Science Day

February 28, 2015

The 2015 Science Day with the theme "Science for Nation Building" was celebrated in the recently built C.V. Raman Auditorium on the IISER Pune campus. Prof. L.S. Shashidhara in his inaugural address stressed upon the fact that integration of

science and technology was the key to development and betterment of the society. The events consisted of an interactive talk and demonstration on "Supercapacitors"; a poster exhibition on "History of Science"; a video presentation by the Media Centre; an inter-school 1st Pauling Memorial Science Quiz (nearly a hundred teams participated) put up by the Quiz Club of IISER Pune; a play on the "Life of Einstein" put up by the Drama Club of IISER Pune; a book exhibition; and a public talk in Marathi on Science Communication. The events of the Science Day were organized by Dr. Sheela Donde with support from student volunteers of the Science Club.



2015 Pi Day

March 14, 2015

Pi Day is the annual event organized by the mathematics discipline of IISER Pune to celebrate the fun side of math. The new home of the mathematics discipline, third floor of the main building on IISER Pune campus was inaugurated by Prof. Raghuram, a beginning which he said, 'gives us new energy'. Prof. L.S. Shashidhara commenced the day's events by cutting apple pies at 9.26 am sharp. The 2015 Math Book, which is a glimpse into what comprises the department, was also released on the occasion.

Several fun events were held at the Lecture Hall Complex (LHC) through the day: Math Relay Race, in which answers to math puzzles changed hands instead of batons; painted posters of mathematical tricklers woven into fantastic stories being put every 30 minutes; a Rubik's cube workshop called 'Plato meets Rubik'; a code-breaking event; the 'not-so-dumb' charades; and the 'Crafty Math' stalls that used arts and crafts to illustrate mathematical concepts. Later in the day, Prof. Nitin Nitsure (TIFR Mumbai) gave a colloquium on sets in mathematics. Among the other events were also a skit, a math quiz and an essay writing competition.



Foundation Stone of IISER Tirupati

March 28, 2015

The Ministry of Human Resource Development, Govt. of India has announced the start of a new IISER in Andhra Pradesh at Tirupati. This will be the sixth IISER and the first one after 2008, by which time 5 IISERs were established. It is a proud moment for IISER Pune that MHRD entrusted the responsibility to IISER Pune for mentoring this Institute which has been called as IISER Tirupati. The Andhra Pradesh Government is in the process of identifying about 100 hectares land at Yerpedu Mandal near Tirupati for the campus of IISER Tirupati.



The foundation stone of IISER Tirupati, together with IIT Tirupati and IIIT, was laid on March 28, 2015 in a glittering function attended by over 50000 students from the area, by Smt. Smriti Zubin Irani, Union Minister for HRD. The function was attended by Shri Venkaiah Naidu (Union Minister for Urban Development); Shri Y.S. Chowdary (Minister of State for Science and Technology & Earth Sciences); Shri Chandra Babu Naidu (Chief Minister of Andhra Pradesh); Ganta Srinivasa Rao (HRD Minister of Andhra Pradesh); B. Gopala Krishna Reddy (Minister for Environment & Forests, Science & Technology, Cooperation), V. Varaprasad Rao, M.P. (Lok Sabha), Tirupati and several other officials of local administration. From IISER Pune, Prof. K.N. Ganesh (Director); Col. G. Raja Sekhar (Retd.) (Registrar); and Dr. Srinivas Hotha (Associate Professor) attended the function.

BS MS Students' Visit to IITM, Pune

An academic trip to the Indian Institute of Tropical Meteorology (IITM), Pune was organized for selected (second-year) BS MS students. The main goal of this trip was to introduce students with cutting-edge research programs in climate sciences and to highlight significance of these researches toward monsoon prediction and global climate change. This trip allowed students to observe various on-going research programs/experiments at the IITM, which includes climate modeling, paleoclimate, and state-of-the-art Mass spectrometer facility.

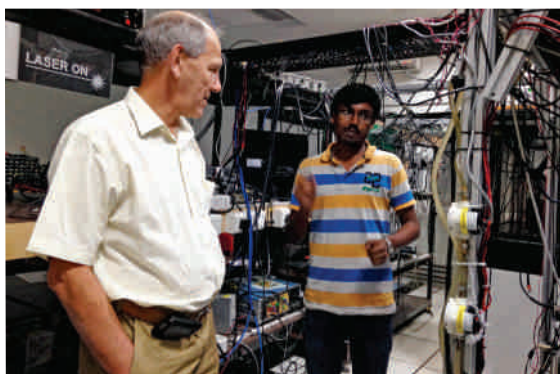


(Left): IISER Pune 2nd year BS MS students at the IITM auditorium; (Right): An IITM Scientist is describing to IISER Pune students the details of a mass spectrometer and its application toward isotopic analysis of environmental samples

IISER Pune joins CMS Collaboration, Large Hadron Collider, CERN

This year IISER Pune has successfully become a part of the CMS Collaboration at the Large Hadron Collider (LHC), CERN (The European Organization for Nuclear Research). The LHC, located at CERN, Geneva is the highest energy accelerator in the world. CMS is one of the two general-purpose experiments at the LHC, and the CMS experiment is one of the largest international scientific collaborations in history, involving over 3500 particle physicists, engineers, and students from over 180 institutes in 42 countries. IISER Pune is one of the 12 institutes from India that are part of the CMS Collaboration, the others being NISER, Bhubaneswar; IIT Bhubaneswar; IIT Bombay; IIT Madras; Panjab University, Chandigarh; University of Delhi, Delhi; Saha Institute of Nuclear Physics, Kolkata; Bhabha Atomic Research Centre, Mumbai; Tata Institute of Fundamental Research, Mumbai; Visva Bharti, Shantiniketan, West Bengal; and Shoolini University, Himachal Pradesh. IISER Pune scientists will now participate in the successful running of the CMS experiment, and use the collected collision data to probe for phenomena beyond the Standard Model along with focusing on extending our deep understanding of particles such as the Higgs boson and the top quark.

National and International Visitors to IISER Pune



The first Homi Bhabha Distinguished Lecture took place on November 18, 2014. Academician Prof. Valery Rubakov spoke on "The Universe Before the Hot Big Bang".

Prof. Valery Rubakov visiting an IISER Pune research laboratory



Prof. David Tong (Trinity College and Cambridge University) and Prof. Shamit Kachru (Stanford University) visited on December 22-23, 2014 and gave public lectures on "Extra Dimensions and Topological Insulators" and "The Small, and Large, Scale Structure of Space-Time", respectively.

Prof. David Tong answers questions after his public lecture



Prof. Ram Shankar Katheria (Minister of State (Higher Education), MHRD, Govt. of India) visited IISER Pune on January 3, 2015. He had discussions with senior professors of the Institute and visited the research laboratories and other facilities.

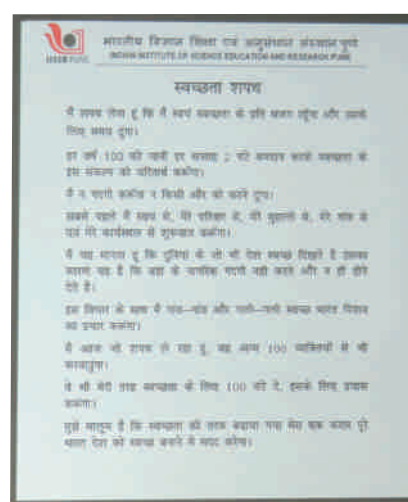


Smt. Vandana Chavan (MP from Pune), Mr. Dattatraya Dhanakawade (Mayor, Pune) and Dr. Rajendra Jagadale (Director General, Science and Technology Park, Pune) visited the Institute on January 6, 2015 to discuss the possibility of establishing a Science Exploratorium.

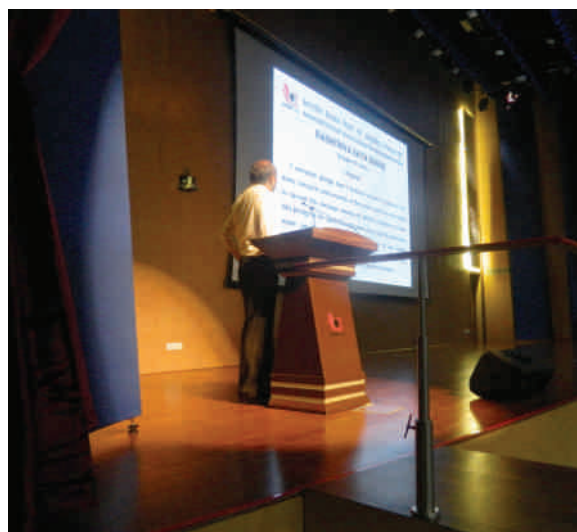
Other distinguished visitors were: Prof. Atul Gurtu (India-CMS) and Prof. Nandini Trivedi (Ohio State University, U.S.A.); Arie Warshel (Nobel Laureate in Chemistry, 2013); L. Mahadevan (Harvard University, U.S.A.), Paul Matsudaira (NSU, Singapore), and Mike Klein (Temple University, U.S.A.)



Flag hoisting by Prof. L.S. Shashidhara (Dean, Faculty and Research) on the occasion of Independence Day (August 15, 2014)



Oath taking and felicitation of housekeeping personnel on the occasion of Swachh Bharat Abhiyan (October 2, 2014)



Celebration of National Unity Day
(October 31, 2014)



On the occasion of Good Governance Day
(December 24, 2014)



International Relations

India – Taiwan Earth Science Cooperation

A team of researchers from Taiwan led by Prof. Li Zhao, Associate Director and Academician, Institute of Earth Science and 3 colleagues from his institute and Prof. Yin- Min Wu, National Taiwan University & Taiwan Academy of Science, visited the institute on March 20-21, 2014 for a discussion meeting to develop long term cooperation in research and education in Earth Science. Profs. Rai and Zhao made detailed presentation of the avenues of research cooperation between the two countries. For submission of research program to the council, it was decided to hold a joint India – Taiwan cooperation meeting at IISER Pune during August/September 2015 for finalizing the details of the program.

Memorandum of Understanding (MoU) with University of Glasgow, U.K. Renewed



(Left to Right) Prof. Vivienne Baumfield, Prof. James Conroy and Prof. K.N. Ganesh during renewal of MoU with University of Glasgow, U.K.

The MoU with University of Glasgow (U.K.) has been renewed for a second term for pedagogy development and expanding the scope with research collaborations. In the previous years, IISER Pune and University of Glasgow had organized a workshop on pedagogy and exchanged faculty delegation visits.

As a follow up on the ongoing relationship, Prof. Vivienne Baumfield, International Dean, Eurasia and South Asia, from the University of Glasgow visited IISER Pune in September 2014. Future steps of collaboration and cooperation were discussed. Prof. James Conroy, Vice Principal (Internationalisation) at the University of Glasgow and Prof. Vivienne Baumfield visited IISER

Pune on March 31, 2015 to sign and renew the MoU. Representing the British Council, Ms. Gunjan Narula, Head, British Council, Pune, also visited IISER Pune to attend the event.

The Memorandum aims to promote student and faculty exchange between IISER Pune and University of Glasgow; to identify funding opportunities for joint research projects; and to conduct joint conferences or symposia to exchange information on research and pedagogy.

New MoUs Initiated during the year

This year the following new MoUs have been established:

1. University of Bath (U.K.) for participation in Doctoral Training Center
2. University of Melbourne (Australia) for development and implementation of a blended B.Sc. course

3. University of Parma (Italy) for students' exchange and joint research programs
4. Leibniz University (Hannover, Germany) for students' exchange and joint research programs

Visits by International Delegations

Several delegations from abroad have visited the Institute to develop future collaborations, some of the major ones being Bioinformatics Institute (Singapore), CNRS (France), British Council (U.K.), ENS de Lyon (France), European Union Commission, Binghamton University-State University of New York and Arkansas State University (U.S.A.).

NAMASTE Program



NAMASTE (Networking and Mobility Actions for Sustainable Technology and Environment in India) was a program between European Union-Partners and different universities and institutes in India. The NAMASTE project was initiated during 2013 and was jointly coordinated by IISER Pune and University of Goettingen, Germany.

The NAMASTE project provided scholarships to Indian students, scientists and staff to spend a mobility period in Europe on a wide variety of academic fields at different levels of study (Undergraduate, Master, PhD, Post-Doc, and Staff). The project has now concluded after successful completion of two rounds of calls for applications and selection procedures between 2014 and 2015. Altogether, over 150 applicants were selected to be awarded the scholarship. The first batch of awardees was to activate their scholarship before December 2014 and the second batch by December 2015.

Visits by International Students and Researchers

As a part of understanding with universities and institutes abroad, the following students and researchers from outside India pursued research activities at the institute.

Visitor	Affiliation	Host at IISER Pune	Duration
Vanessa Carle	Martin Luther University	Saikrishnan Kayarat	April 2014-February 2015
Alexandra Wells	Ohio State University, U.S.A.	L.S. Shashidhara	May-July 2014
Teena D'Cruz	Ohio State University, U.S.A.	Kundan Sengupta	May-July 2014
Sofa Elizarova	University of Gottingen, Germany	Akanksha Chaturvedi	November 2014-January 2015
Cornelia Hanna Panse	Experts4Asia Postdoctoral Fellow	S.G. Srivatsan	December 2014-October 2015
Casper Groth	Senior Visiting Fellow from University of Copenhagen, Denmark	L.S. Shashidhara	January 2015-December 2015
Kev Da	Royal University of Phnom Penh (RUPP), Cambodia	Anup Biswas	February-March 2015
Mohd. Zuhair	Graduate student, UCLA, U.S.A.	Baskar Balasubramanyam	

Outreach Activities

IISER Pune's academic and social outreach efforts are focused on the following outcomes: contributing to and improving primary education and teaching methods; informing the public about career and research opportunities in science; and spreading awareness about the impact of science on the society.

Visits by school and college students: During 2014-15, nearly 1700 students and teachers from 31 schools / colleges / universities from Aurangabad, Solapur, Baramati, Nasik, Mumbai, Bhandara, Sindhudurg, Mysore, and Bengaluru, besides Pune, have visited IISER Pune. In an effort to convey the concept of IISERs to students and teachers and to inform them of the available study options at the institute, each batch of students was given information related to academic programs offered at IISER Pune, admission policies, research areas, infrastructural facilities, life on campus, and co- and extracurricular activities at IISER Pune. Students were then given a tour of research facilities and the institute library, along with explaining certain equipments and shown a few specimens / experiments.

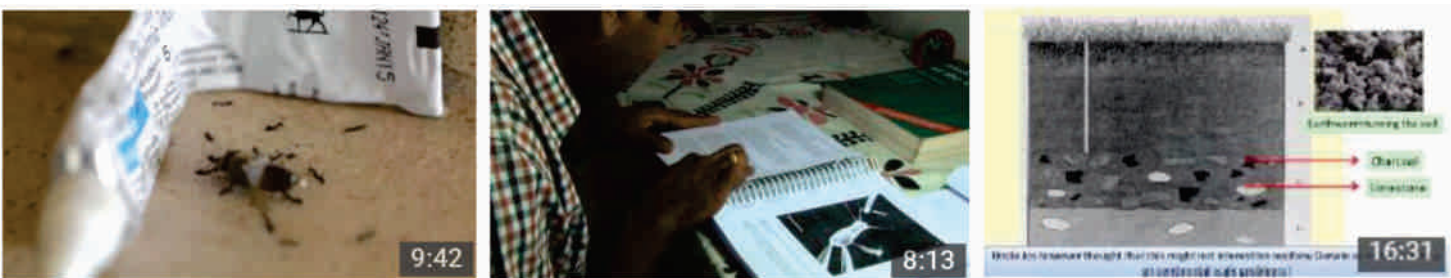
Workshops on inquiry-based teaching and learning: A five-day workshop on Rational Inquiry for school students was organized by Prof. K.P. Mohanan at IISER Pune in May 2014. The whole workshop was recorded and subsequently edited to create 3 DVDs. They are available on youtube as well at <https://www.youtube.com/watch?v=NfkQl4LZekM&list=PLHAcFL720685n3xeEg5WmPxQaS-3Elok4>



This year, along with the other members of ThinQ, Prof. Mohanan conducted a six-day workshop in early May 2015 on Inquiry for the Royal Academy in Bhutan, and a three day workshop later in May in the Indian International School.

Guest lectures: IISER Pune faculty members have given invited guest lectures at various schools and colleges and at INSPIRE science camps both on research topics as well as on a career in science.

Science videos for public consumption: Mr. K.P. Madhu along with team members at the Science Media Centre of IISER Pune has shot and edited the following videos, the common theme among them being conveying the practice of science to a non-specialist audience and informing the public about opportunities in science.



Snapshots of some of the science videos prepared by IISER Pune Science Media Centre: (Left to Right) LabReports Episode 1: Ants and Robots; LabReports Episode 3: Measuring feeding behaviour in Hydra; Darwin's Earthworms Part 2

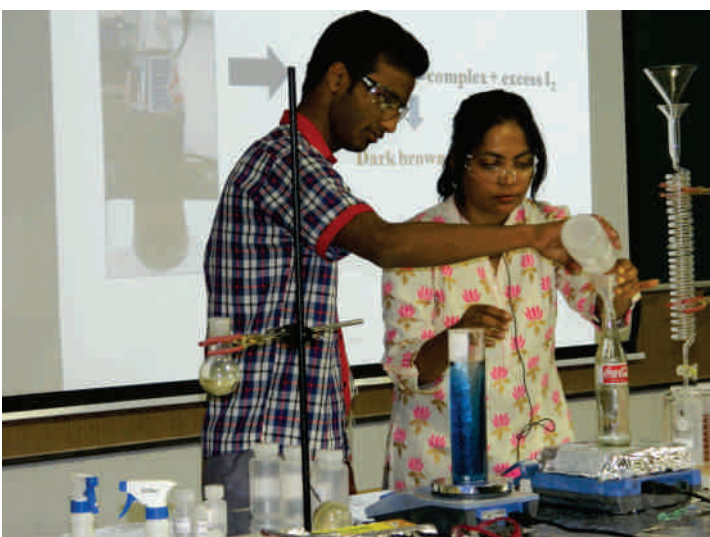
- INSPIRE: A three part video report on a program of the DST is available at <http://vimeo.com/112884247> A supplement to the report that focuses on case studies is available at <https://www.youtube.com/user/dstINSPIREprogramme>
- A History of IISERs available in 3 parts at <https://www.youtube.com/user/iiserpunemedia>
- Physics Experiments for undergraduate and post graduate levels – 15 episodes available in a channel called Physics IISER Pune, available at <https://www.youtube.com/channel/UCQHf17k6kdGX6ljEh-OV9cw>
- Darwin's Earthworms – a 4 part series from a presentation made by Uma Shaanker on the work done by Darwin on Earthworms. This series is also available at <https://www.youtube.com/user/iiserpunemedia>
- Science for Nation Building – 1. Agriculture
- LabReports: Episode 1 – Ants and Robots and Episode 2 – Measuring feeding behavior in hydra available at <https://www.youtube.com/user/KPMadhu2000>
- Rational Inquiry – the series production that started two years ago has now resulted in 15 episodes available on www.youtube.com/channel/UCCj0KCNddf95Ba3hcKYjxzw

Community radio programs: The following episodes, aired on Savitribai Phule Pune University online community radio station Vidyavani 107.4 FM, were generated at the Science Media Centre by Ms. Nita Belliappa with team members comprising of IISER Pune undergraduate students Sourajit Basu, Sharvaree Vadgama, and Adithya Rajagopalan. The audio episodes are available on the youtube links listed below.

1. Aired on April 2, 2014: Prof. Krishna Athreya's remarkable journey from a small town in Tamilnadu to Stanford University and beyond. <https://www.youtube.com/watch?v=8tv2bsoJ-mc>
2. Aired on April 9, 2014: The concluding part of the interview with Prof. Krishna Athreya where he shared his views on Indian mathematics and music. <https://www.youtube.com/watch?v=mx8nNQvvZYs>



3. Episode Series covering the workshop on Next Generation Sequencing (NGS) held at IISER Pune during February 24-27, 2014:
 - Aired on April 16, 2014: Features a conversation with Prof. Sanjeev Galande and Dr. Farhat Habib, the local coordinators of the workshop.
<https://www.youtube.com/watch?v=kT9VxN3HsYQ>
 - Aired on April 23, 2014: Researchers describe how NGS has made an impact on their research and share their views on where India stands in the world in terms of this research.
<https://www.youtube.com/watch?v=SBdOkqV0Wbs>
 - Aired on April 30, 2014: Researchers and participants talk about their expectations and experiences from such workshops. The coordinators share their views too.
https://www.youtube.com/watch?v=TObpqj_OfuM
4. Aired on Sept 5, 2014: Nobel Laureate Venkatraman Ramakrishnan speaks about science, life and the Nobel prize.
<https://www.youtube.com/watch?v=cD9Fe5NZ6Kk>
5. Aired on February 6, 2015: Prof Thanu Padmanabhan (IUCAA, Pune) chats about physics, research and his other interests.
<https://www.youtube.com/watch?v=cfgbJ5qDRiY>



Demonstration of chemistry experiments: Dr. Shabana Khan has demonstrated a set of experiments in chemistry to demonstrate chemical phenomena. This year she has organized this session at the Mukhtangan Exploratory Science Centre (April 19, 2014) and at the DST INSPIRE Camp organized by IISER Pune (May 2014).

Social Outreach

Disha, *Prarambh* and *Prutha*, voluntary organizations at the institute, run primarily by the IISER Pune student community in association with faculty coordinators, have seen increased participation during 2014-15. Some of the activities initiated and organized by these groups are described here.



Disha is a voluntary organization that works toward bringing quality education to children from underprivileged sections of the community. Disha has been running *Abhyasika* study sessions in the Sanjay Gandhi Vasahat & Lamanvasti of Pune and has organized *Talk for Twenty* series of talks through the year. This year Disha students had an opportunity to demonstrate a science experiment in front of the President of India Shri Pranab Mukherjee and other dignitaries who visited the institute on June 15, 2014. Three of Disha's students from Abhyasika centers also got a chance to present their models at the GMRT science exhibition in Khodad, Pune. Through an annual science fest, Vigyan Mela, Disha brings in a broader section of the society while providing an opportunity to Disha Children to showcase their work. The 2015 Vigyan Mela was conducted during March 27-28, 2015 for the students of Laman Vasti and Sanjay Gandhi Vasahat.

Along with the annual month-long Spread the Smile program, where Disha reaches out to school students in villages near Pune, this year, Disha has initiated the Mind Spark program. This aims to prepare about 25 selected 6th standard students from 5 different Pune municipal schools for "7th class scholarship exam" conducted by the Maharashtra State government every year.

Prarambh is a non-profit organization that IISER Pune has been associated with since 2011. Prarambh's goals are to provide children from less privileged

backgrounds with basic education and skills. Sessions are held on weekends and are focused on improving Math and English skills for a group of school children mostly from near Ambedkar Chowk of Pune. Prarambh has recently secured a grant from Credit Suisse to start a circulating library of books for the kids. A few of the students from Prarambh are now successfully enrolled in professional courses and Prarambh continues to work with them in their specialized area of interest.

Prutha, the green initiative at the institute, has organized cleanliness drives on the Panchavati Hill and on Pune city's J.M. Road; a plastic premier league to raise awareness about collecting and recycling plastic while reducing the use of plastic; and has set up a paper, plastic and tin can segregation and recycling system for the institute. During the year, Prutha has organized part of the Kirloskar Vasundhara International Film Festival with the screening of three films on issues related to the environment and a talk by the environmentalist Mr. Dunu Roy (Director, Hazards Centre, New Delhi). The group has also organized a talk on sustainability by Dr. Aneeta Gokhale Benninger, a renowned geographer and co-founder of the Centre for Development Studies and Activities (CDSA), Pune.



Prutha Volunteers during a scavenger hunt event: In this event about fourteen teams collected more than 100 kg of garbage from Panchavati Hill of which more than 40 kg of plastic were sent to be recycled.

Colloquia

Speaker	Affiliation	Title	Date
M.S. Valiathan	Former Director, Sree Chitra Tirunal Institute, Former and First Vice-Chancellor of the Manipal University	Ayurveda and Modern Science	Apr 09, 2014
R. Rajaraman	Emeritus Professor of Physics, JNU, New Delhi	India's Nuclear Energy Program: Prospects and Problems	Apr 16, 2014
Atanu Basu	Deputy Director & Head, Electron Microscopy and Pathology Group, NIV, Pune; Adjunct Professor, School of Basic Sciences, IIT, Mandi	The Changing Face of Ebola Virus: A Tale of Two Cities	Sept 17, 2014
Anindya Sinha	Professor, National Institute of Advanced Studies, Bengaluru and Senior Scientist, Nature Conservation Foundation, Mysore	When is a Species a Species? The Tail and other Stories of the Arunachal Macaque, a recently discovered Indian Primate	Nov 05, 2014
P.K. Srivastava	Dy. Director, Medicinal and Process Chemistry Division, Central Drug Research Institute, Lucknow	Safety First: Please Take Care as Lab is Your Home Away From Home	Jan 21, 2015
P. Sreekumar	Director, Indian Institute of Astrophysics, Bengaluru	The New Excitement in Space Sciences: An Indian Perspective	Mar 04, 2015
D.P. Sen Gupta	Visiting Professor, School of Natural Sciences and Engineering, National Institute of Advanced Studies (NIAS), IISc, Bengaluru	The History of Time, Time Keeping and Indian Standard Time	Apr 15, 2015

Research Seminars

April 2014

Speaker	Affiliation	Title	Date
Sachin Kotak	Swiss Institute for Experimental Cancer Research, Lausanne, Switzerland	Mechanisms of spindle positioning and elongation in human cells	Apr 01, 2014
Ramanan	CMI, Chennai	Mini-course	Apr 01, 2014
Parameswaran Sankaran	IMSC, Chennai	Twisted conjugacy in R. Thompson's groups	Apr 04, 2014
Nikhil R. Jana	Centre for Advanced Materials, IACS, Kolkata	Development of nanoparticle based cellular imaging probe	Apr 07, 2014
Subrata Pradhan	Institute of Plasma Research, Gandhinagar	Steady state superconducting Tokamak (SST-1)	Apr 07, 2014
Kashyap Rajeevsarathy	IISER Bhopal	Multicurves and primitivity in $\text{Mod}(\text{Sg})$	Apr 07, 2014
Vikrant Naik	Department of Materials, ETH Zürich, Zurich, Switzerland	Organic chain assemblies in surface monolayers, confined intercalates and freestanding delaminates	Apr 07, 2014
Monika Patel	Raytheon BBN Technologies, MA, U.S.A.	Enabling optical technologies for quantum information processing	Apr 08, 2014
Jyothilakshmi Vadassery	Max Planck Institute of Chemical Ecology, Germany	Calcium signaling in plant perception of insect attack	Apr 08, 2014
Sahana Roessler	Max Planck Institute for Chemical Physics of Solids, Dresden, Germany	Phase transitions and magnetic precursor state in Fe_{1+y}Te	Apr 08, 2014
Piyali Chatterjee	High Altitude Observatory, Boulder, U.S.A.	Occurrences of fast and possibly cannibalistic solar coronal mass ejections: insights from flux rope simulations	Apr 09, 2014
Kesavan Lokesh	School of Chemical Technology, Aalto University, Finland	Designer supported metal nanoparticles for heterogeneous catalysis applications	Apr 09, 2014
C.S. Aravinda	TIFR-CAM, Bengaluru	Homotopy type and volume of locally symmetric spaces	Apr 10, 2014
Kunal Rai	UTMD Anderson Cancer Centre, Texas, U.S.A.	Functional epigenomics of melanoma progression	Apr 10, 2014
C.S. Aravinda	TIFR-CAM, Bengaluru	Dynamics of geodesic conjugacies	Apr 11, 2014

Speaker	Affiliation	Title	Date
Apala Majumdar	University of Bath, U.K.	Biaxial defect cores in nematic equilibria: An asymptotic result	Apr 11, 2014
R. Rajaraman	JNU, New Delhi	Indistinguishability in Quantum Physics	Apr 15, 2014
Daniel Baumann	Bruker Cryomagnet Division, Switzerland	Newest technologies with superconducting NMR magnets	Apr 15, 2014
Fred Gent	University of Sheffield, U.K.	Supernova regulated ISM: the multiphase structure, magnetic field and the dynamo	Apr 16, 2014
Irishi N. N. Namboothiri	Department of Chemistry, IIT Bombay	Unexplored avenues to bioactive heterocycles	Apr 21, 2014
T. Saha Dasgupta	SNBNCBS, Kolkata	Correlation effects in real material	Apr 21, 2014
Raju George	IIST Thiruvananthapuram	Controllability of systems described by differential equations using tools of functional analysis	Apr 21, 2014
Nishita Desai	ITP, Heidelberg, Germany	What the LHC has to say about dark matter	Apr 22, 2014
Krishna Kaipa	IISER Bhopal	Linear codes and Grassmannians	Apr 22, 2014
Rajat Varma	National Institute of Allergy & Infectious Diseases, NIH, U.S.A.	Illuminating immune receptor signaling in T cells	Apr 22, 2014
Bibhuti B. Das	University of California, San Diego, U.S.A.	Membrane protein structure from rotational diffusion	Apr 24, 2014
Uttara Naik-Nimbalkar	University of Pune	Statistical tests for comparing the fatality of an epidemic in two groups	Apr 25, 2014
Ajay Sriram Matharu	Institute of Molecular and Cell Biology, A*STAR, Singapore	Towards understanding the neural basis of natural behavior	Apr 25, 2014
Pramod K. Kandoth	University of Missouri, Columbia, U.S.A.	Resistance to phytopathogenic nematodes: A soybean story	Apr 30, 2014

May 2014

Shanta Laishram	ISI Delhi	Grimm's conjecture and smooth numbers	May 02, 2014
Rahul Das	University of California, Berkeley, U.S.A.	Structural basis for conformational coupling across the plasma membrane in activation of EGFR	May 06, 2014
Vidisha Tripathi	University of Illinois, Illinois, U.S.A.	Mammalian long noncoding RNAs: Regulators of gene expression	May 12, 2014
Atul Gurtu	TIFR, Mumbai	Looking beyond the Higgs and the Large Hadron Collider	May 21, 2014

Speaker	Affiliation	Title	Date
Amit Kumar	Indian Institute of Technology (BHU), Varanasi	Andreev bound states in a superconductor coupled CNT-quantum dot	May 21, 2014
R. Parthasarathy	Bharathiar University, Coimbatore	On the modules $A_{\{\frac{q}{\lambda}\}}$	May 22, 2014
Deepti Ramadoss	John Hopkins University, Baltimore, U.S.A.	Cognitive science approaches to studying speech perception and categorization	May 26, 2014
Arjun Guha	Boston University Medical School, U.S.A.	Developmental origins and regulation of airway progenitors in the lung	May 29, 2014

June 2014

Souvik Roy	TIFR-CAM, Bengaluru	A vorticity-velocity formulation for incompressible 2-D Euler flows using discontinuous finite element methods	Jun 05, 2014
Mahan Maharaj	Ramakrishna Mission Vivekananda University, Belur Math, Kolkata	3-manifolds and (quasi)projective varieties	Jun 06, 2014
Jagadis Gupta Kapuganti	Department of Plant Sciences, University of Oxford, U.K.	Nitric oxide in plants: the biosynthesis and emerging roles of a fascinating molecule in plants	Jun 12, 2014
G. Dan Pantos	University of Bath, U.K.	Naphthalenediimides: From molecules to materials	Jun 17, 2014
Aravind Penmatsa	Vollum Institute, Oregon Health and Science University, U.S.A.	Structure of the dopamine transporter unravels mechanism of neurotransmitter transport inhibition	Jun 25, 2014

July 2014

Sumana Annagiri	IISER Kolkata	House hunting in ants	Jul 02, 2014
Amit Shukla	TIFR, Mumbai	Implications on particle acceleration from SSC modeling in TeV blazars	Jul 10, 2014
John Mathew	Duke University, U.S.A.	History of taxonomic zoology in India	Jul 10, 2014
Moiria Chas	Stonybrook University	Topology and geometry of curves on surfaces	Jul 11, 2014
Srinivasa Subramaniam	The Scripps Research Institute, U.S.A.	The novel regulators of motor behaviors	Jul 14, 2014
Debasish Borah	Tezpur University	Connecting neutrino mass, baryon asymmetry and dark matter with Type II Seesaw	Jul 17, 2014
Sankar Maiti	IISER Kolkata	Glu γ 2 receptor interacting protein nPIST is a novel actin nucleator	Jul 18, 2014

Speaker	Affiliation	Title	Date
Dibyendu Roy	Los Alamos National Laboratory, U.S.A.	Strongly interacting photons in one-dimensional free space	Jul 21, 2014
Asilata Bapat	University of Chicago, U.S.A.	Strongly interacting photons in one-dimensional free space	Jul 23, 2014
Jeffrey Adler	American University, Washington DC, U.S.A.	Morse theory and intersection cohomology	Jul 24, 2014
Amitabh Lath	Rutgers University		Jul 25, 2014
Jeffrey Adler	American University, Washington DC, U.S.A.	Lifting representations of finite reductive groups	Jul 30, 2014

August 2014

Tiziana Venturi	Institute of Radio Astronomy, Bologna, Italy	Galaxies and galaxy clusters at radio frequencies: An observational overview	Aug 04, 2014
Raghav Kulkarni	Centre for Quantum Technologies, NUS, Singapore	Decision trees, evasiveness, solvable groups, and music of primes	Aug 04, 2014
Dipan Sengupta	CNRS, Grenoble, France	Supersymmetry at the end of run I at LHC and towards a public analysis database for new physics searches	Aug 04, 2014
Utpal Chatterjee	University of Virginia, U.S.A.	Phase incoherence driven melting of CDW order across quantum and thermal phase transitions in intercalated 2H-NbSe ₂ system	Aug 05, 2014
Satishchandra Ogale	CSIR-NCL, Pune	Novel hybrid interface systems in energy and optoelectronics devices	Aug 11, 2014
Sudipta Dutta	NIMS Tsukuba, Japan	Electronic properties of atomically thin nanomaterials	Aug 12, 2014
Manoj Gopalkrishnan	TIFR, Mumbai	The geometry of reaction networks	Aug 12, 2014
Supratim Sengupta	IISER Kolkata	Origin of the genetic code	Aug 12, 2014
Anurag Tripathi	University of Turin, Italy	Resummed transverse momentum distribution of the Higgs bosons: Summing up a divergent series	Aug 13, 2014
Krishanu Ray	DBS, TIFR, Mumbai	Molecular cell biology of spermatogonial proliferation and sperm release in <i>Drosophila</i>	Aug 21, 2014
Joël Riou	Université Paris-Sud, France	Purity and duality in étale cohomology (after O. Gabber)	Aug 22, 2014
Srimanta Middey	University of Arkansas, U.S.A.	Artificial quantum crystals with correlated electrons	Aug 22, 2014
Renu V.	Raman Research Institute, Bengaluru	Role of actin filaments in enhancing cell spreading by nuclear compression	Aug 25, 2014

Speaker	Affiliation	Title	Date
Ashok Ganguli	Institute of Nano Science and Technology, Mohali	Design of nanostructures for energy and environmental applications	Aug 26, 2014
Anandam Banerjee	TIFR, Mumbai	Equivalence relations on algebraic cobordism	Aug 26, 2014
Shashank Dravid	Creighton University, U.S.A.	Regulation of cortico-limbic circuits by ionotropic glutamate receptors: implications for treatment of neuropsychiatric disorders	Aug 27, 2014
Anandam Banerjee	TIFR, Mumbai	Tensor structure on smooth motives	Aug 28, 2014

September 2014

Rajesh Gupta	ICTP Trieste, Italy	Some developments in computation of quantum entropy of extremal black hole	Sept 02, 2014
Krishnan Raghunathan	Vanderbilt University, U.S.A.	Insights into regulation by plasma membrane	Sept 03, 2014
Darshan Joshi	TU Dresden, Germany	1/d expansion for coupled dimer magnets	Sept 04, 2014
Sivakumar	University of Hyderabad	Higher spin particles: Past, Present and Future	Sept 11, 2014
Nandini Trivedi	Ohio State University, U.S.A.		Sept 19, 2014
Usha Vijayaraghavan	Indian Institute of Science, Bengaluru	Functions for some evolutionarily conserved transcription factors in rice inflorescence and flower development	Sept 19, 2014
Sebastian Wuester	MPI Dresden, Germany	Towards quantum simulations of chemical and biological processes using ultra-cold Rydberg atoms	Sept 22, 2014
Devanjan Sinha	Indian Institute of Science, Bengaluru	Evolving role of mitochondrial protein transport machinery in cellular well-being	Sept 23, 2014
Debdip Ganguly	TIFR-CAM, Bengaluru	Partial differential equations on hyperbolic space	Sept 25, 2014
Radhika Nair	The Kinghorn Cancer Center & Garvan Institute of Medical Research, Australia	Tumour progression - Molecular and cellular determinants of breast cancer	Sept 25, 2014
Arnab Mitra	Ben-Gurion University, Negev, Israel	Norm correspondence for unipotent radicals in classical groups	Sept 26, 2014
R. Umashankar	University of Agricultural Sciences, Bengaluru	Darwin's earthworms	Sept 29, 2014
Subi George	JNCASR, Bengaluru	Supramolecular helical polymers: Chiroptical probing and amplification of chiroptical functions	Sept 29, 2014

October 2014

Speaker	Affiliation	Title	Date
Shachi Gosavi	National Centre for Biological Sciences, Bengaluru	Understanding the folding of RNase-H domains	Oct 01, 2014
Shamik Banerjee	IPMU, Japan	Con formal anomaly matching and exact results for entanglement entropy	Oct 01, 2014
Pralay Kanti Santra	Stanford University, U.S.A.	Strategies to boost efficiencies of quantum dot solar cells	Oct 07, 2014
Soumya De	The University of British Columbia, Vancouver, Canada	Regulation of the ETV6 (TEL) transcription factor: Dynamics and auto- inhibition of DNA-binding	Oct 07, 2014
Arnab Ray Chaudhuri	National Cancer Institute, NIH, U.S.A.	Coping with Stress: How replication forks contend with genotoxic insult -â implications for cancer chemoresistance	Oct 08, 2014
Vivek M. Rangnekar	University of Kentucky, U.S.A.	A novel strategy to activate tumor suppressors and conquer cancer	Oct 10, 2014
Tamoghna Das	OIST Graduate University, Japan	Geometric universality of two-dimensional aggregates	Oct 14, 2014
Rahul Garg	Technion, Israel	The lattice point counting problem on the Heisenberg groups	Oct 14, 2014
Namita Goel	GSI Hemholtz Center, Darmstadt, Germany		Oct 14, 2014
Sharanya Sur	Arizona State University, U.S.A.	Mixing in turbulent magnetized media	Oct 15, 2014
Prathima Nalam	University of Pennsylvania, U.S.A.	Mechanics of soft materials: Understanding the influence of structural properties on the mechanical behavior of polymeric materials	Oct 16, 2014
Venkatesh	TIFR, Mumbai	Unique factorization of tensor products for finite dimensional simple Lie Algebras	Oct 24, 2014
Ramray Bhat	Lawrence Berkeley National Laboratory, U.S.A.	Disentangling Galectin-1-based patterning functions in organogenesis	Oct 27, 2014
Debakanta Samal	Max Planck Institute for Solid State Research, Stuttgart, Germany	Atomic reconstruction in ultrathin cuprates: novel structural, electronic, and magnetic phenomena	Oct 28, 2014
Samir Kumar Biswas	Biomedical Photonics Group, Twente, Netherlands	Developing opto-acoustic based diagnostic devices: theory, measurement, design, optimization and tissue diagnosis	Oct 29, 2014
Siegfried Boecherer	Universität Mannheim, Germany	Congruence primes for Siegel modular forms via twisted L-functions	Oct 29, 2014
Uttam Manna	University of Chicago, U.S.A.	Optical-matter: Light mediated self-organization on meso-scale	Oct 29, 2014
Siegfried Boecherer	Universität Mannheim, Germany	Siegel modular forms mod p	Oct 31, 2014

November 2014

Speaker	Affiliation	Title	Date
Rabindra Nath Mahato	University of Twente, Netherlands	Ultrahigh magnetoresistance at room temperature in molecular wires	Nov 03, 2014
Jose Ignacio Burgos Gil	ICMAT, Madrid, Spain	Arakelov geometry of toric varieties - Lecture 1	Nov 04, 2014
Jose Ignacio Burgos Gil	ICMAT, Madrid, Spain	Arakelov geometry of toric varieties - Lecture 2	Nov 05, 2014
Jose Ignacio Burgos Gil	ICMAT, Madrid, Spain	Arakelov geometry of toric varieties - Lecture 3	Nov 06, 2014
David O' Hagan	University of St. Andrews, U.K.	Studies on multivicinally fluorinated cyclohexanes: New polar motifs in organic chemistry	Nov 06, 2014
Jean-Pierre Wintenberger	University of Strasbourg, France	Ramification and Iwasawa theory	Nov 06, 2014
Jose Ignacio Burgos Gil	ICMAT, Madrid, Spain	Arakelov geometry of toric varieties - Lecture 4	Nov 07, 2014
Siddhartha Bhattacharya	TIFR, Mumbai	A brief introduction to ergodic theory - Lecture 1	Nov 10, 2014
E.D. Jemmis	IISc, Bengaluru	Perspectives on the Structure, Bonding and Reactivity of Metallacyclocumulenes	Nov 10, 2014
Siddhartha Bhattacharya	TIFR, Mumbai	A brief introduction to ergodic theory - Lecture 2	Nov 11, 2014
Massimo Taronna	AEI Potsdam, Germany	From higher spins to strings: A constructive approach	Nov 12, 2014
Uday N Maiti	Institute for Basic Science, Daejeon, Korea	Novel graphene gelation technology for practical energy storage and beyond	Nov 13, 2014
K.R. Mahendran	University of Oxford, U.K.	Molecular basis of antibiotic translocation through bacterial membrane porins	Nov 13, 2014
Harish Joshi	Dept. of Cell Biology, Emory University, U.S.A.	A brief story of microtubules, small plant derived molecules, and uncontrolled cancer cell division	Nov 17, 2014
Valery Rubakov	Russian Academy of Sciences, Moscow	The universe before the hot big bang	Nov 18, 2014
N.D. Hari Dass	Chennai Mathematical Institute	Varieties of quantum measurements	Nov 19, 2014
Samrat Pawar	Imperial College, London, U.K.	How do thermal fluctuations propagate from cells to populations?	Nov 20, 2014
Tuhin Ghosh	IAS, Orsay, France	Planck dust B-modes and the recent BICEP2 results	Nov 20, 2014

Speaker	Affiliation	Title	Date
Roger Smith	University of Newcastle, Australia	Initiation of Human Labour	Nov 20, 2014
Aravind Natarajan	University of Pittsburgh, U.S.A.	Searching for dark matter with microwave and radio telescopes	Nov 24, 2014
Stéphane Noselli	Institute of Biology, CNRS, Nice, France	Left-Right asymmetry: Lessons from <i>Drosophila</i>	Nov 25, 2014

December 2014

Raghavan Rangarajan	Physical Research Laboratory, Ahmedabad	Gravitinos, reheating and the matter-antimatter asymmetry of the universe	Dec 03, 2014
Aditya Chopra	Australian National University, Canberra, Australia	The habitability of our earth and other earths	Dec 04, 2014
Manoj Kumar Yada	HRI, Allahabad	Automorphisms of groups preserving conjugacy classes	Dec 05, 2014
Sethu Pichiaya	University of Michigan, U.S.A.	Spatiotemporal dissection of non-coding RNA pathways using intracellular single molecule microscopy	Dec 05, 2014
Mukund Sundararajan	Research Scientist at Google Inc.	Summarizing changes in markets	Dec 08, 2014
Indraneel Mittra	Department of Surgical Oncology, ACTREC, Navi Mumbai	Chromatin from dead cells induce epigenetic changes, stemness and cancer in living cells	Dec 10, 2014
Maitreyi Das	University of Tennessee, U.S.A.	Design principles of cell growth and division	Dec 10, 2014
Ana Rogulja-Ortmann	Institute of Genetics, Mainz, Germany	Hox gene-mediated regulation of neural stem cell number in <i>Drosophila</i>	Dec 11, 2014
Ronald Calabrese	Emory University, U.S.A.	Constancy and variability in a neuronal network: Consequences for motor performance	Dec 12, 2014
Aswani Yella	Laboratory of Photonics and Interfaces, EPFL, Switzerland	Sensitized mesoscopic solar energy conversion systems	Dec 12, 2014
Tanveer Ahmed	National Institutes of Health, U.S.A.	Membranous tunnelling nanotubes and the engineered stem cells: Cellular medicide	Dec 12, 2014
Mani Ramaswamy	Trinity College, Dublin, Ireland	Inhibitory plasticity in implicit memory	Dec 15, 2014
Gerhard Technau	Johannes Gutenberg University, Mainz, Germany	Generation of cell diversity and segmental pattern in the developing CNS of <i>Drosophila</i>	Dec 16, 2014

Speaker	Affiliation	Title	Date
Suresh Jesuthasan	Institute of Molecular and Cell Biology, Singapore	The control of brain state by sensory stimuli	Dec 17, 2014
Hitoshi Okamoto	RIKEN Brain Science Institute, Japan	Evolutionarily conserved role of the habenula in control of fear and self-confidence in aggression	Dec 18, 2014
Michel Waldschmidt	Institut de Mathématiques de Jussieu , Paris VI, France	Continued fractions: Introduction and applications	Dec 18, 2014
Michio Iwaoka	Tokai University, Japan	Modelling selenoenzyme active sites using short selenopeptides	Dec 19, 2014
Santosh Atanur	University of Edinburgh, Scotland	Use of NGS to understand genetics basis of complex diseases	Dec 22, 2014
Jahnavi Puneekar	Princeton University, U.S.A.	The Cretaceous - Tertiary boundary mass extinction : Paleo-environment reconstruction	Dec 23, 2014
Pritam Rajan	Acadia University, Canada	Sequential design schemes for efficient estimation of pre-specified process features in computer experiments	Dec 23, 2014
Alok Srivastava	Enhanced Precision Oncology Case Hub, CancerCommons.org	Knowledge as protocol - Discovering chemical basis of biological specificity in DNA in 1949	Dec 29, 2014

January 2015

Anupreeta More	IPMU, Japan	Space warps : Crowd sourcing the discovery of gravitational lenses	Jan 02, 2015
Siddhesh S. Kamat	Skaggs Institute for Chemical Biology and The Scripps Research Institute, U.S.A.	Finding homes to orphan enzymes	Jan 02, 2015
Shibasish Dasgupta	Department of Information Systems and Analytics - Miami University, Ohio, U.S.A.	A Bayesian predictive approach to design studies for comparing biomarkers	Jan 02, 2015
Elisabeth Knust	Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany	Integration of cell polarity, signaling and morphogenesis	Jan 03, 2015
Surhud More	IPMU, Japan	Cosmological constraints from the Sloan Digital Sky survey III galaxies	Jan 05, 2015
Sushant N. More	The Ohio State University, Columbus, OH, U.S.A.	Harmonic oscillator basis extrapolations in nuclear physics	Jan 05, 2015
Swarnava Mukhopadhyay	University of Maryland, U.S.A.	Rank-level duality and conformal blocks divisors	Jan 06, 2015
Amit Sachdeva	MRC Laboratory of Molecular Biology, University of Cambridge, U.K.	Designer biomolecules: From artificial DNA catalysts to orthogonal ribosome	Jan 06, 2015

Speaker	Affiliation	Title	Date
Amogh Deshpande	University of Liverpool, U.K.	On the role of Follmer-Schweizer minimal martingale measure in risk sensitive control asset management	Jan 07, 2015
Nikhil Savale	Lumpkins Visiting Assistant Professor, University of Notre Dame, IN, U.S.A.	Asymptotics of the eta invariant	Jan 07, 2015
Anamitra Mukherjee	The University of Tennessee, Knoxville, Tennessee, U.S.A.	Some aspects of correlated material phenomena	Jan 08, 2015
L. Mahadevan	Harvard University, U.S.A.	Of flags and fishes	Jan 09, 2015
Abhishek Saha	University of Bristol, U.K.	Siegel modular forms of degree 2: Fourier coefficients, L-functions, and functoriality	Jan 12, 2015
Ramakrishnan Natesan	University of Pennsylvania, U.S.A.	Protein-Membrane interactions and active curvature remodeling processes - Multiscale modeling of membrane morphogenesis	Jan 13, 2015
Florian Sprung	Princeton University, U.S.A.	Rational points of modular abelian varieties in towers of number fields: How to bound the rank	Jan 15, 2015
Ashoke Sen	HRI, Allahabad	Technical string theory talk-- Off-Shell formulation of superstring theory	Jan 16, 2015
Sujay Chattopadhyay	University of Washington, Seattle, U.S.A.	Adaptive evolution in microbial genomes	Jan 19, 2015
Kiritkumar Makwana	University of Chicago, U.S.A.	Turbulence in space and astrophysical plasmas - From fluid to kinetic scales	Jan 21, 2015
Vijay K. Yadav	Wellcome Trust Sanger Institute, Cambridge, U.K.	Molecular and genetic dissection of skeletal physiology	Jan 23, 2015
Mridusmita Saikia	Cornell University, Ithaca, U.S.A.	The many talents of tRNA: Exploring novel mechanisms of stress response and translation regulation	Jan 27, 2015
Sampa Saha	Prochem Solutions, Singapore	Anisotropic particles with surface patches and polymer brush - A combination of chemistry and technology	Jan 28, 2015
Umesh Dubey	Indian Institute of Science, Bengaluru	Twisted sheaves and twisted integral transforms	Jan 30, 2015

February 2015

Shilpa Gondhali	University of Haifa, Israel	Higher Toda brackets and Massey products	Feb 03, 2015
Ritajyoti Bandyopadhyay	Assistant Professor in History, Centre for Studies in Social Sciences, Kolkata	The state on the street: The hawker's question in Calcutta	Feb 03, 2015

Speaker	Affiliation	Title	Date
Sameer Sahasrabudhe	Tata Institute of Social Sciences, Mumbai	Visual design and animation in eLearning	Feb 04, 2015
Keiji Tanaka	RIKEN Brain Science Institute, Japan	Functional division among prefrontal areas of macaque monkeys	Feb 06, 2015
R. Loganayagam	Institute for Advanced Study, Princeton, NJ, U.S.A.	Entropy current and eightfold way	Feb 12, 2015
R. Loganayagam	Institute for Advanced Study, Princeton, NJ, U.S.A.	Fluids: Effective theory and Schwinger-Keldysh	Feb 13, 2015
Arun Madhav Thalappilil	Rutgers University, U.S.A.	The Higgs as a probe for new physics : Higgs portals, soft yukawas and extended gauge mediation	Feb 16, 2015
B.J. Rao	Department of Biological Sciences, Tata Institute of Fundamental Research, Mumbai	Chromosome territories relocate during DNA-damage-response in mammalian nuclei: Regulation, signaling and transcriptional connection	Feb 16, 2015
Xavier Viennot	Emeritus Research Director at CNRS	Trees in various sciences	Feb 17, 2015
Iswar Hariharan	University of California, Berkeley, U.S.A.	Genetic regulation of developmental and regenerative growth	Feb 19, 2015
M. Ashok Kumar	Indian Institute of Science, Bengaluru	Statistical inference based on a parametric family of divergences	Feb 19, 2015
Satya Majumdar	University of Paris-Sud, France	Random convex hulls and extreme value statistics: Applications to ecology and animal epidemics	Feb 20, 2015
Gwen Fewell	Chief Commercial Officer and Co-Founder, TransOMIC Technologies Inc	Optimized shRNA designs in combination with an improved miR backbone allows for more effective RNAi screens	Feb 23, 2015
Sebastian Wuester	Max-Planck-Institute, Dresden, Germany	Exploring links between chemical and biological processes and ultra-cold Rydberg atoms	Feb 24, 2015
G.P. Das	Dept. of Materials Science, IACS, Jadavpur, Kolkata	Half a century of Density Functional Theory and its role in <i>ab initio</i> design of materials	Feb 25, 2015
M. Ashok Kumar	Indian Statistical Institute, Bengaluru	Statistical inference based on a parametric family of divergences	Feb 25, 2015
Neena Joseph Mani	Jet Propulsion Laboratory, CalTech, CA, U.S.A.	Predictability of atmospheric flow: From weather to intra-seasonal time scale	Feb 26, 2015
Abhishek Banerjee	IISc, Bengaluru	Hecke operators on Line bundles over Modular curves	Feb 27, 2015

March 2015

Speaker	Affiliation	Title	Date
Hiromi Utsunomiya	Olympus Corporation, Japan	Advanced multi photon microscopy with extended IR range at high speed	Mar 02, 2015
Kapil Hari Paranjape	IISER Mohali	Lindel's Theorem: A vector bundle on $X \times A^1$ comes from X .	Mar 03, 2015
Kapil Hari Paranjape	IISER Mohali	The work of Grothendieck: Some aspects of his work	Mar 04, 2015
Kausik Chakraborty	CSIR-Institute of Genomics and Integrative Biology, Delhi	Genetic buffering, penetrance, and protein folding	Mar 10, 2015
Srikanth Sastry	Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru	Jamming in Sphere Packing	Mar 11, 2015
Koyeli Mapa	CSIR-Institute of Genomics and Integrative Biology, Delhi	Quality control and communication in cellular power house	Mar 11, 2015
Nitin Nitsure	TIFR, Mumbai	Euclidean Geometry and Physics	Mar 13, 2015
Varun Bhalariao	IUCAA, Pune	Seeing what we hear: Finding electromagnetic counterparts for gravitational wave sources	Mar 16, 2015
V. Ramamurthy	University of Miami and Senior Editor of Langmuir (ACS Publications)	Science and Scientists	Mar 17, 2015
Gopinath Krishnan	Vision Research Foundation, Sankara Nethralaya Eye Hospital, Chennai	Müller glial cell innate immune regulation by endocannabinoids	Mar 18, 2015
Kavita Shah	Department of Chemistry, Purdue University, U.S.A.	Chemical genetic dissection of signaling pathways in cancer and Alzheimer's Disease	Mar 19, 2015
Yoganarasimha Doreswamy	National Brain Research Center, Manesar	Neural mechanisms underlying spatial navigation	Mar 23, 2015
Gaurav Das	Oxford University, U.K.	Drosophila remembers the components of its food	Mar 25, 2015
Nishad Matange	IISc, Bengaluru	Moonlighting functions of a mycobacterial cyclic AMP phosphodiesterase	Mar 26, 2015
Dietmar Stalke	University of Goettingen, Germany	A world of difference - Alkali metal organic frameworks from ammonia	Mar 27, 2015
Sudhir Ghorpade	IIT Bombay	Counting solutions of systems of polynomial equations over finite fields	Mar 27, 2015
Angela Giangrande	Directeur de Recherche CNRS, C. U. Strasbourg, France	The long journey from stem cells to glia	Mar 27, 2015
Soumya Bhattacharya	CIRM, Trento, Italy	Factorization of holomorphic eta quotients	Mar 31, 2015



Academic Programs

Phd Program
Integrated PhD Program
BS MS Program

PhD Program

During the year 2014-15, with August 2014 and January 2015 sessions put together, 75 students enrolled for PhD program at IISER Pune (19 in Biology; 46 in Chemistry; 2 in Mathematics; and 8 in Physics).

With this the total number of students pursuing research towards PhD degree has gone up to 312 (Men: 216, Women: 96)

Students enrolled into IISER Pune PhD Program in August 2014 and January 2015 sessions

Biology

Nair Krutula Purushothaman
Mihir Trivedi
Ramtirtha Yogendra
Madhumita Chakladar
Mallampatti Naresh Babu
Kendre Gajanan Bhujangrao
M. Vidyadhari
Simran Kaur Juneja
Shweta Tendulkar
Inchanalkar Siddhi Maruti
Pallavi Agarwal
Dhruv Mishra
Akanksha Ojha
Prajna Nayak
Debayan Sarkar
R.L. Praveena
Sanket Sandeep Nagarkar
Rutuja Mukund Diwan
Ravi Umadi

Chemistry

Ashok Kumar B.
Ambhore Madan Digambar
Walunj Manisha Balasaheb
Shinde Rameshwar Sudhakar
Bhaisare Rupal Dinesh

Patil Sohan Dilip
Preeti Chauhan
Ajay Kumar Sharma
Mohan M.
Balamurugan S.
Bhandari Pavankumar Janardan
Manoj Kumar Gupta
Sanjit Dey
Bhingardve Pramod Prabhakar
Shinde Ganesh Punjaram
Nisal Rahul Rajendra
Basu Nabaruna
Wasim Jeelani Mir
Kamal Kumar Mishra
Prakash Prabhat
Bappa Ghosh
More Yogeshwar Dnyaneshwar
Raut Ravindra Krushnaji
Mollick Samraj
Akula Naveenkumar
Rajarshi Dasgupta
Debanjan Chakraborty
Rahul Maity
Rishabh Gupta
Nasrina Parvin
Sivakumar G.
Gopal Ch. Samanta
Pooja

Kasuladevu Jagannadharao
Javid Ahmad Malla
Nalawade Sachin Ashokrao
Manish Kumar
Walke Gulab Sudam
Toraskar Suraj Uttamrao
Chaudhari Moreshwar Bhagwan
Devatha Gayathri
Saleem Yousf
Sachin Kumar Singh
Alagar Raja K.
Soumendu Roy
Pardeep Kumar

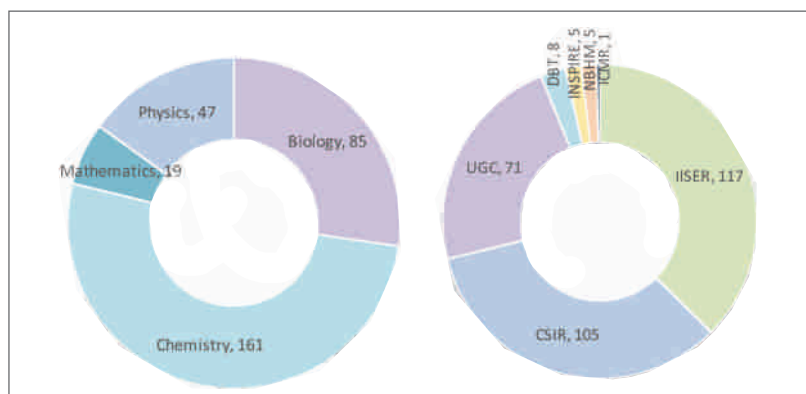
Mathematics

Ambi Chaitanya Vishnu
Phanse Advait Sudhir

Physics

Vinay Hegde
Aakanksha Kapoor
Sucheta Majumdar
Chinmayee Mishra
Rane Aditee Prabhakar
Chandan Kumar Singh
Shatruhan Singh Rajput
Singh Shakti

For a total of 312 PhD students, the pie chart on the left shows PhD student numbers across disciplines and the one on the right shows sources of Fellowship for PhD students.



During the year 2014, a total of 13 students were awarded PhD degree the details for which are given below. With this, a total of 16 (Men: 13, Women: 3) students have been awarded PhD Degree by the Institute by the end of March 2015.

Student	Discipline	Supervisor	Title of Thesis
Mohite Amar Ramchandra	Chemistry	Ramakrishna G. Bhat	Novel synthetic approaches to aza-heterocycles, oxo- α -amino acids and (E)- α,β - unsaturated carboxylic acids/esters
Naveen Prasad	Biology	L.S. Shashidhara	Hox genes and evolution of arthropod body plan: A comparative analysis of targets of Ultrabithorax in <i>Drosophila melanogaster</i> and <i>Apis mellifera</i>
Kamal Vishnu Prasad G.	Biology	Sanjeev Galande	Role of SATB1 during T cell development and differentiation
Sunita Singh	Biology	Sanjeev Galande	Comparative study of SATB family proteins
Jain Deepak Ramesh	Chemistry	K.N. Ganesh	γ -C-Substituted multifunctional peptide nucleic acids: Design, synthesis and bioevaluation
Anurag Prakash Sunda	Chemistry	Arun Venkatnathan	Atomistic investigation of polymer electrolyte membrane nanostructure and dynamics of molecular transport in fuel cells
Jadhav Sandip Vilas	Chemistry	Hosahudya N. Gopi	Design, synthesis and conformational analysis of hybrid γ -peptide foldamers comprised of proteinogenic side chains and their utilization in the design of novel biomaterials
Mali Sachitanand Madhavrao	Chemistry	Hosahudya N. Gopi	Chemistry on unnatural amino acid peptide building blocks and bioinspired peptide synthesis
Ramya K.R.	Chemistry	Arun Venkatnathan	Electronic structure characterization of molecular interactions in clathrate hydrates
Sultane Prakash Ramdas	Chemistry	Ramakrishna G. Bhat	Total synthesis of 1-deoxy-6,7,8a-epi-castanospermine, (+)-epiquinamide, (+)-CP-99,994 and orthogonal N-deacetylation and N-Cbz deprotection

Student	Discipline	Supervisor	Title of Thesis
Appala Venkata Ramana Murthy	Physics	Shivprasad Patil	Photo physical properties of single semiconductor nano-structures using fluorescence correlation spectroscopy
Arvind Kumar Gupta	Chemistry	R. Boomishankar	Synthesis and functional studies of transition metal complexes derived from amino and imido P(V) ligands
Shivaji Ashokrao Thadke	Chemistry	Srinivas Hotha	Stereoselective glycosidations and application to the mycobacterial arabinogalactan by gold catalysis

Integrated PhD Program

In August 2014 the Institute has enrolled the following 34 students (Men: 21, Women: 13) as the fourth batch of post-BSc Integrated PhD program. Of these, 6 have joined in Biology, 11 in Chemistry, and 17 in Physics disciplines.

With this, the total strength of Integrated PhD students of the Institute has gone up to 86 (Men: 51, Women: 35); 26 each in Biology and Physics and 34 in Chemistry).

Integrated PhD Students enrolled in August 2014

Biology Palshikar Mukta Girish Malankar Nilam Namdeo Punita Bathla Nair Sanjana Santosh Shikha Kalra Yashaswi Singh	Konoya Das Kriti Gupta Omshanker Tiwari Prashant Jain Shalini Pandey Vikash Kumar Ravi	Patwardhan Nishant Vijay Bhatkar Sayali Atul Projjwal Kanti Kanjilal Rajesh Mandal Deepak Sharma Mohit Kumar Singh Shende Mayur Bhaskar Chougale Yashwant Kerba Kumar Saurabh Vikhyaat Ahlawat Ankita Niranjana Tejal Agarwal
Chemistry Arunabha Sen Bandana Kumari Girish Singh Bisht Kingshuk Roy	Physics Arnab Sen Deepak Kumar Sharma Dipti Shubham Pandey Soham Pal	

20 students from 2012 Batch (2nd Batch) of Integrated PhD program registered as Junior Research Fellows in Fall 2014.

BS MS Program

During the year 2014-15, 189 students (124 Boys and 65 Girls) have taken admission into IISER Pune's BS MS program. Of these, 31 were from IIT-JEE stream, 7 from KVPY and the rest were from State and Central Boards.

List of Students Enrolled in 2014

Anupam Prasoon
Sunil Choudhary
Vaibhav Singh
Devasoth Ramesh
Nenavath Parvathalu
R. Rammohan
Komal Gupta
Deepraj Pandit
K. Sravan Kumar
Vivek Vishwakarma
Jainendra Singh
Wadikur Rahman
Amar Alok
Mohidh K.M.
Sruthy J. Das
Aswathi. K.T.
Seethalakshmi K.
Supriya Tiwari
A. Vamshi Krishna
N. Jayanth Kumar
Yogesh Mahor
Patel Vishrut Yogesh
Aditya Kar
Meshram Akshata Vikas
K.M. Ranjana Yadav
Rahul Mistry
Sandeep Chowdhary
Aniket Khairnar
Satendra Birana
Nitesh Verma

Devika Varma
Wagh Neel Vidyadhar
Jadhav Rohitkumar Himmatrao
Kumar Aanjaneya Ajay
Hiwase Shweta Sunil
Bhargavi Parthasarathy
A. Janani
Sharada Kailas Sarjane
Sarah Peneena K.J.
Renu Raveendran
Harsha G.
Keerthi Raj B.S.
Rajat Patel
Ankur Biswas
Manjari Prakash
Shraddha Lall
Bhaskar Saha
Rushil Balasubramanian
Devendra Singh
Pratyush Raj
Swastik Mishra
Satyam Mohla
Sambit Ratha
Akash Maji
Vikram Ravindranath
Bachimanchi S.S. Harshith
M.B. Harsha
Nasit Darshan Prafulbhai
Dhameliya Hiren Jayantibhai
Komal Sah

Dhavale Athang Ujjwal
Malusare Sarthak Pravin
Haritha S. Rajeev
Sumana Chetia
Dhruba Bora
Manoj M. Hegde
Sri Ramesh Chandra Ammanamanchi
Shilbhushan J. Shambharkar
Daspute Mangesh Pandharinath
Shaghamreddy Spandana
Sidharth Adithyan P.B.
Akshat Yadav
Mane Shrinal Suryakant
Naman Kalra
Ektare Aboli Milind
Joshi Chinmay Chandrashekhar
Dimple Adiwal
Adikrishna K.K.
B. Kaarthik Abhinav
Sooraj S. Das
Meera Mohan
Daman
Shirsat Aniruddha Vidyadhar
V. Sowmya
Mukul Rai Choudhuri
Ayush Kumar Singh
Sukanya Pandey
Salvi Adwait Bhalchandra
Kannan Nivedhika
Raghuram H.V.

Malavika Sekhar	Karanjekar Kshitij Narendra	Shubham Vivek Pawar
Suraj Sharma	Vrushali Rajesh Sarwan	Kumbhar Vrushali Manohar
Aayush Vijayvargia	Rasika V. Daware	P.V.S. Pavan Chandra Vamsi
Shubhalakshmi S.	Poornima B.	Prakash Kumar
Surabhi K.S.	Samikshakiran Deepak Agham	Dharmendra
Anwesh Bhattacharya	Jadhav Shekhar Sanjay	Abhishek Ojha
Ankit Verma	Prasad Narendra Gaikwad	Bharat Chand Bathu
Steenu Johnson	Tilva Abhishek Kantilal	Gaikwad Ajinkya Ramdas
Prajwal Udupa V.	Sayan Sarkar	Hinge Amol Sahebrao
Vishnu Vardhan V.M.	Pawar Vipul Dinesh	P. Sravya
Anuvind K.G.	Katke Chinmay Vijaykumar	Niranjana Thejaswi S.
Aniket Prashant Bhagwat	Bhagwat Pankaj Uttam	Shraddha Bhurkunde
Yash Arora	Ingale Vaibhav Vijay	Nikhil Horo
Reema Jamal Abdul Nassar	More Kaushik Shailesh	Gudapati Hrithik
Mudi Sanchayeta Ranajit	Sanjay N.S.	Tamboli Suhel Tajmohammad
Anurag Singh	Thatte Mitali Alhad	Dilip V.
Thasneem Musthafa U.K.	Kadam Aditee Sanjay	Dakare Amey Ajit
Shubham Gupta	Sneha Manda	Chougule Megha Suryakant
Ghosh Sourath Tarun	Upadhyay Bhumika Sumesh	Amit Singh
Mrutyunjay Nair	Danish Kaur Pannu	Ghaste Prayas Jalindar
Gunda Spoorthy	Bagale Rupali Prakash	Wable Minal Pravin
Joshi Gaurav Shrikant	Kirtikesh Kumar	Vivek Kumar
Parkhi Durga Makarand	Nida Farheen	Muluk Komal Dilip
Tamhankar Sharvari Rajeev	Nishad Bapat Dhar	Bhoite Vishwajeet
Sandeep Joy	Goutham Sukumaran	Basila M.A.
Namitha Pradeep	Anjali Nambudiripad	Vyshnav V.
Nishant Raina	Abhishek Choudhary	Nilam Balasaheb Lembhe
Avik Mukherjee	Amit Choudhary	Rahate Praful Jaydeo
Ameya Pore	Arkendu Roy	Sohan Pal Meena
Deshpande Sanyukta Parag	Kokani Anuradha Mukesh	Prashant Deshwal
Godey Darmika Vagdevi Sree Keerthi	Iyer Rahul Narayanan	Nikita Paliwal
Vimanshu Chanda	Rahul Dhurkunde	Megha Maheshwari
Tayade Lokesh Ashok	Rokade Shrutika Sachin	Sagar Gupta

Category-wise Distribution of Students Enrolled in 2014

	GE	OBC	SC	ST	PD	Total
Boys	56	36	23	8	1	124
Girls	34	18	10	2	1	65
Total	90	54	33	10	2	189

Overall Category-wise Distribution of Existing BS MS Students

Category	Boys	Girls	Total	%
GE	195	105	300	50.42
SC	58	26	84	14.12
ST	23	2	25	4.20
OBC	116	69	185	31.09
PD	1	0	1	0.17
Total	393	202	595	100

Total Student Strength during 2014-15

Batch	Boys	Girls	Total
2008	1	0	1
2009	11	0	11
2010	52	36	88
2011	48	25	73
2012	70	36	106
2013	90	43	133
2014	121	62	183
Total	393	202	595

Details of Fifth Year Projects carried out by the Outgoing Batch of BS MS Students in 2014-15

	Name	Thesis Supervisor	Discipline	Host Institute	Title of Thesis
1	Abhijit Awadhiya	L.S. Shashidhara	Biology	IISER Pune	Comparative analysis of targets of the Hox gene Ultrabithorax in <i>Drosophila melanogaster</i> and <i>Apis mellifera</i>
2	Shashwat Antony	Prasad Subramanian	Physics	IISER Pune	Statistics of bursts in the solar corona at X-ray wavelength
3	Sachit	Sutirth Dey	Biology	IISER Pune	Simulating the interaction of genotype phenotype maps and mutation rates in evolution
4	Shweta Singh	Sujit K. Ghosh	Chemistry	IISER Pune	Structure-property correlation studies of nitrogen donor ligand based metal-organic framework
5	Arya Gaurav Ramlal	Sudha Rajamani	Biology	IISER Pune	Lipid assisted peptide formation under SIPF conditions
6	Ashwin T.A.N.	Venkatraman Krishnan	Maths	TIFR - Centre for Applicable Mathematics - Bengaluru	Microlocal analysis of certain Imaging problems
7	Koturkar Deepali Madhusudan	Sudipta Basu	Chemistry	IISER Pune	Synthesis and characterization of polymeric nanoparticles for dual drug delivery in cancer
8	Vikas Negi	Prasenjit Ghosh	Chemistry	IISER Pune	DFT based study of methanation in the presence of subsurface atomic hydrogen on Co (001) surface
9	Sourajit Basu	Soumen Maity	Maths	IISER Pune	Erdos-Ko-Rado and Kruskal Katona Theorems for Discrete Structures

	Name	Thesis Supervisor	Discipline	Host Institute	Title of Thesis
10	Vikash Kumar	M. Jayakannan	Chemistry	IISER Pune	Development of pi - conjugated polymer sensors and organic phosphors for luminescent materials
11	Adwiteey Mauriya	Amita Das	Physics	Institute of Plasma Research, Gandhinagar	Study of Tokamak equilibria using variational moment method
12	Suryesh Kumar Namdeo	Kundan Sengupta	Biology	IISER Pune	Role of Lamin A and Lamin B2 in chromosome positioning in the interphase nucleus
13	Rupesh Kumar Xaxa	Sudipta Ghosh Dastidar	Chemistry	IISER Pune	Spreading behavior of oil-in-water emulsion on model solid substrates
14	Purvi Tiwari	Amit Apte	Maths	TIFR Mumbai	Parameter estimation problem using Monte Carlo Markov chain method
15	Monika Dash	Sumen Chakraborty	Inter-disciplinary	IIT Kharagpur	Blood flow dynamics on a rotating microfluidic platform
16	Khanale Dhanashree Prakash	L.S. Shashidhara	Biology	IISER Pune	Evolution of divergent functions of the Hox protein Ultrabithorax in insects: comparison in transgenic <i>Drosophila melanogaster</i>
17	Gadekar Akash Ramesh	Satishchandra Ogale	Physics	CSIR-National Chemical Laboratory, Pune	Optoelectronic transient characterization of dye sensitized solar cells
18	Mallikarjuna Mullangi	Gautam Banerjee	Biology	Hindustan Uniliver R & D, Bengaluru	Development and evaluation of in vitro intestinal epithelial models to study ameliorative effects of probiotics on inflammation induced barrier dysfunction
19	Brihaspati Kumar Gaurav	Deepak Barua	Biology	IISER Pune	Seed traits and their correlates in Indian tropical trees
20	Sreejith Varma J.	Pinaki Talukdar	Chemistry	IISER Pune	Synthesis of acryl amidines via intramolecular amino group migration
21	Shreyash Tandon	Pavan Kumar	Physics	IISER Pune	Optical and plasmon based trapping: towards structured light fields
22	Apte Amey Anant	Sulabha Kulkarni	Physics	IISER pune	Ultrasensitive detection of D-glucose and TNT molecules using vertically aligned self-assembled gold nanorods
23	Upendra Singh	Satishchandra Ogale	Chemistry	CSIR-National Chemical Laboratory, Pune	Synthesis of nanomaterials and their composites for energy conversion and storage

	Name	Thesis Supervisor	Discipline	Host Institute	Title of Thesis
24	Rohit Chikkaraddy	G.V. Pavan Kumar	Chemistry	IISER Pune	Emission characteristics of organic meso/nanowires coupled with plasmonic and dielectric substrates
25	Sharad Joshi	T.S. Mahesh	Physics	IISER Pune	Quantum stimulations using NMR
26	Anurag Agrawal	S.G. Srivatsan	Chemistry	IISER Pune	Synthesis incorporation and fluorescence of base modified Peptide Nucleic Acid (PNA) monomers
27	Indra Kumar Mahawar	Boomi Shankar	Chemistry	IISER Pune	Synthesis of thiophosphoramidate and phosphoramidate ligands and reactivity studies with metal ions
28	Sumit Bhatnagar	Satishchandra Ogale	Chemistry	CSIR-National Chemical Laboratory, Pune	Cost effective synthesis of metaloxides/sulphides for enhanced supercapacitor application
29	Vivek Kumar	Partha Hazra	Chemistry	IISER Pune	Biophysical aspects of binding interaction between anti-cancer drugs and G-Quadruplex DNA
30	Montu Patar	Ashok P. Giri	Biology	CSIR-National Chemical Laboratory, Pune	Molecular cloning and characterization of coniferyl alcohol acyltransferase from <i>Orimum sp.</i>
31	Ravi Raja Adhikari Panda	Srinivas Hotha	Chemistry	IISER Pune	Nucleophilic addition on glycosyl 12-orthoesters of pyranose and furanosoyl sugars
32	Amrit Kumar	Sujit Ghosh	Chemistry	IISER Pune	Design synthesis characterization and host-guest interaction studies of triazine based covalent organic frameworks
33	Beeraka Sai Prashanth Kumar	Aurnab Ghose	Biology	IISER Pune	Investigating the role of Arp2/3 and formins in neuronal growth cones
34	P. Sudheer Kumar	Anirban Hazra	Chemistry	IISER Pune	Theoretical study of structural changes in DNA under high external hydrostatic pressure
35	Pravu Prasad Dhal	Surjeet Singh	Physics	IISER Pune	Structural and magnetic properties of the orthoferrite BaFeO _{3-δ}
36	Punya Plaban Satpathy	A. Raghuram	Maths	IISER Pune	p -adic L-functions for modular forms
37	Siddhartha Das	Nita Sinha	Physics	IMSc, Chennai	Semileptonic B-mesons decay
38	Digvijay Porwal	A.Y. Biju	Chemistry	CSIR-National Chemical Laboratory, Pune	Multicomponent reactions involving phosphines arynes and N-substituted isatins

	Name	Thesis Supervisor	Discipline	Host Institute	Title of Thesis
39	Shikari Sravani	Manoj Joshi	Biology	Hindustan Unilever R & D, Bengaluru	Understanding tea and vascular function
40	Shibananda Das	Apratim Chatterji	Physics	IISER Pune	A multi-scale simulation scheme to investigate dynamics of membrane confined polymer
41	C. Gaurav	Prasenjit Ghosh	Physics	IISER Pune	The study of oxygen spacer layer in the interaction between graphone and graphene on the ferromagnetic metal substrate
42	Kaniganti Tarun	Aurnab Ghose	Biology	IISER Pune	Neural mechanisms underlying feeding drive
43	Shada Arun Dixith Reddy	R. Boomi Shankar	Chemistry	IISER Pune	Chloro bridged palladium (II) hexamers supported by tris imido phosphate trianions and studies of their catalytic evaluations
44	Karamshetty Varun	Pranay Goel	Maths	IISER Pune	Experimental and computational study of the association between vitamin B 12 and glutathione in type 2 diabetes
45	Mohit Dixit	Kunj Tandon	Physics	Shell Technology Centre, Bengaluru	Molecular simulations on oil - water interface
46	Tarun Ayitam	R. Ramanujam	Maths	IMSc, Chennai	Resource limited players in large games
47	Avani Gowardhan	Nissim Kanekar	Physics	NCRA-TIFR, Pune	A blind Ka- and Q- band survey for molecular absorption
48	Tirthasree Das	Richa Rikhy	Biology	IISER Pune	Molecular characterization of plasma membrane organization during early <i>Drosophila</i> Embryogenesis
49	Mokashi Aniket Jayrath	Neelesh Dahanukar	Biology	IISER Pune	Evolutionary analysis of freshwater bagrid catfishes from Western Ghats of India
50	Aditi Jakhar	G.J. Sanjayan	Chemistry	CSIR-National Chemical Laboratory, Pune	Novel multi-coded molecular recognition motifs for fully extended programmed molecular self-assembly
51	Patil Pallavi Dilip	Ramana Athreya	Physics	IISER Pune	Search for OH Megamasers at the redshift $z \sim 1.7$ in GOODS-North Field
52	Pranita Somawar	Narendra Kadoo	Biology	CSIR-National Chemical Laboratory, Pune	Proteomic and metabolomic studies in <i>Linum usitatissimum</i>

	Name	Thesis Supervisor	Discipline	Host Institute	Title of Thesis
53	Patil Aashay Prakash	M.S. Santhanam	Physics	IISER Pune	Correlations of categorical data and random matrix theory
54	Bhaves Khamesra	Suneeta Vardarajan	Physics	IISER Pune	Stability analysis of spherically symmetric space-time sourced by anisotropic fluids
55	Shivraj Prajapat	Biswajit Chakraborty, Professor, SNBNCBS Kolkata	Physics	IISER Pune	Noncommutative quantum mechanics and noncommutative geometry
56	Kolagani Sri Haritej	Sunil Mukhi	Physics	IISER Pune	A study of the Higgs mechanism in Yang-Mills and Chern-Simons field theory
57	Akula Venumadhav	Seema Varma	Chemistry	IISER Pune	Design strategy to magnetic-plasmonic nanohybrids
58	Raya Rahul Kumar	Rahul Banarjee	Chemistry	CSIR-National Chemical Laboratory, Pune	Design and synthesis of new porphyrin based covalent organic frameworks for the enhancement of stability and crystallinity
59	Vimlesh Kumar Bind	Nirmalya Ballav	Chemistry	IISER Pune	Supramolecular phthalocyanine aggregates
60	Rashmi Runjhun	Sulabha Kulkarni	Physics	IISER Pune	Synthesis and characterization of transparent and conducting thin films
61	Rajkumar Yadav	V.G. Anand	Chemistry	IISER Pune	Synthesis & characterization of [14]thiatriphyrin(2.1.1) and crystallization & physical properties of thiatripyrrine co-crystals
62	Bhaisare Rupal Dinesh	H.N. Gopi	Chemistry	IISER Pune	Mild and biocompatible synthesis of highly symmetric tetra-substituted pyrazine from amino acid and peptides: a novel strategy for self-stapling of peptide
63	Vemulapalli Louwkhya	Devadas Manwal	Chemistry	Osmania University, Hyderabad-OT	Synthesis and characterization of insulin mimetic vanadyl complexes and their binding studies with BSA
64	Shreya Ray	Urbasi Sinha	Physics	Raman Research Institute, Bengaluru	Precision triple-slot experiment in the microwave regime
65	Ankita Malik	H.N. Gopi	Chemistry	IISER Pune	Synthesis and utilisation of beta - hydroxy gamma-amino acids (statines) in the design of hybrid peptide foldamers and their biological applications

	Name	Thesis Supervisor	Discipline	Host Institute	Title of Thesis
66	Sher Singh Meena	Amitava Pramanik	Chemistry	Hindustan Uniliver R & D, Bengaluru	Nucleation and growth of ZnO on different surfaces and study of their functional properties
67	Shubham Pandey	Praveen C.	Physics	TIFR Centre for Applicable Mathematics, Bengaluru	Numerical schemes for conservation laws on moving mesh
68	Mishra Anurag Ramsuman	Akanksha Chaturvedi	Biology	IISER Pune	Understanding early morphological changes in B cell activation
69	Vivek Verma	K. Balasubramanian	Chemistry	Defence Institute of Advanced Technology, Pune	Synthetic and Botanical mosquito repellent and their antibacterial activity in PAN membrane
70	Ankita Sharma	Pranay Goel	Maths	IISER Pune	Game theoretic analysis to show parasitic cooperation at traffic intersections that encompass conflict
71	Prashant Sharma	Shivprasad Patil	Physics	IISER Pune	Interferometer based small amplitude AFM
72	Sandesh Bhat J.R.	Aninda Sinha	Physics	Center for High Energy Physics, IISc, Bengaluru	Inflation in the light of Planck data 2013
73	Aravind H. V.	Aninda Sinha	Physics	Center for High Energy Physics, IISc, Bengaluru	Path-Integrals and quantum-walks in multi-slit systems
74	Ashok Choudhary	Parameswaran Ajith	Physics	International Centre for Theoretical Sciences, TIFR, Bengaluru	Modelling of gravitational waves from precessing binaries
75	Dinesh Kumar	Ramsubramaniam Rajagopal	Physics/ Interdisiplinary	Hindustan Uniliver R & D, Bengaluru	Study of light transport in multilayer substrates
76	Patil Roshni Namdeo	Prashant Kumar Shrinivasan	Maths	TIFR Centre for Applicable Mathematics, Bengaluru	A survey of direct methods in calculus of variations
77	Kush Kumar Upadhyay	Satishchandra B. Ogale	Chemistry	CSIR-National Chemical Laboratory, Pune	Synthesis of metal oxides/sulfides and porous carbon for energy storage application
78	Devabathini N. Krishna Chowdary	Anjan K. Banerjee	Biology	IISER Pune	Exploring <i>Chara</i> as a model system to know the function of homeobox genes in macroalgae

	Name	Thesis Supervisor	Discipline	Host Institute	Title of Thesis
79	Tanya Kumari	Satishchandra B. Ogale	Physics	CSIR-National Chemical Laboratory, Pune	Synthesis of metal oxides for energy and environmental applications
80	Siddharth Chopra	V.B. Parvatikar	Chemistry	Footwear Design and Development Institute, Noida	Composite materials for shoe soles
81	B. Ananda Deepika	Tapas Kumar Das	Physics	Harish Chandra Research Institute, Allahabad	On the metric independent perturbation scheme and associated relativistic acoustic geometry for spherical accretion
82	Prashant Bhaskar	Sulabha Kulkarni	Physics	IISER Pune	Plasmon-exciton interaction in gold - CdTe nanostructures
83	Sheth Mihir Dilip	Baskar Balasubramanyam	Maths	IISER Pune	Cyclotomic fields and p-adic L-functions
84	Gupta Somil Subhash Chandra	Mukul Kabir	Physics	IISER Pune	Modelling Fe-Cr alloys: A multiscale approach
85	Aparna Pilli	Venkatesh Shankar	Physics	Hindustan Uniliver R & D Bengaluru	Physical and chemical characterization of colloidal floc systems
86	Sharma Sheetal Parasnath	Deepak Barua	Biology	IISER Pune	Variation in Leaf Mass per unit Area (LMA) in evergreen and deciduous species in a seasonally dry tropical forest
87	Pilli Veena	M. Madhusudhan Rao	Chemistry	Shell Technology Centre, Bengaluru	Enhanced dispersion of catalytic phases on metal oxides
88	Alisha Pathak	Sanjay Sane	Biology/ Inter-disciplinary	National Centre for Biological Sciences, Bengaluru	The role of haltere feedbacks during territorial chases in housefly <i>Musca Domestica</i>
89	Bhide Sourabh Jagdish	Mahendra Sonawane	Biology	Tata Institute of Fundamental Research, Mumbai	Role of Epidermal Growth Factor signaling in epidermal homeostasis of <i>Danio rerio</i> (zebrafish)
90	Akash G.	Aurnab Ghose	Biology	IISER Pune	Neuromodulatory circuits of feeding drive

	Name	Thesis Supervisor	Discipline	Host Institute	Title of Thesis
91	Karishma Bansal	Avinsh Deshpande	Physics	Raman Research Institute, Bengaluru	Multi frequency study of PSR B1929+10
92	Abhishek Singh	Harsh Chaturvedi	Chemistry	IISER Pune	Interaction and Fabrication of OPV functionalized SWNT optical sensors
93	Abhishek Meena	Sayam Sen Gupta	Chemistry	CSIR-National Chemical Laboratory, Pune	Fe-TAML encapsulated MSN as Biomimic peroxidase for picomole detection of proteins
94	Aerpula Naveen	R. Venkataraghavan	Physics	Hindustan Uniliver R & D, Bengaluru	Modelling of electrosorption of ions in a flow cell
95	Pramod Kumar	K.N. Ganesh	Chemistry	IISER Pune	Synthesis and evaluation of charged PNA analogues/conjugates for improved DNA/RNA binding selectivity and better cell entry

List of Courses

Fall 2014

Code	Course	Participating Faculty (*Coordinator)	Credits
Semester I			
BIO 101	Introductory Biology I	Kundan Sengupta*, Milind Watve, Thomas Pucadyil, L.S. Shashidhara	3
CHM 101	General Chemistry	R.Vaidhyanathan*, S.G. Srivatsan, Arnab Mukherjee	3
MTH 101	Single Variable Calculus	Amit Hogadi	3
PHY 101	World of Physics I - Mechanics	Sudarshan Ananth	3
MTH 100	Introduction to Proofs	Steven Spallone	3
BIO 121	Biology Lab I: Basic Biology	Raghav Rajan*, Aurnab Ghose, Krishanpal Karmodiya, Anjan Banerjee, Jeet Kalia	2
PHY 121	Physics Lab I	Bhas Bapat*, Ashna Bajpai, Arijit Bhattacharyay, Shouvik Datta	2
HSS 103	Communication, Creative & Technical Writing	Aditi Deo	2
Semester III			
BIO 201	Introductory Biology III	Sutirth Dey*, Milind Watve	3
CHM 201	Inorganic Chemistry	Sujit Ghosh, Nirmalya Ballav*	3
MTH 201	Linear Algebra	Baskar Balasubramanyam	3

Code	Course	Participating Faculty (*Coordinator)	Credits
PHY 201	World of Physics III - Electricity & Magnetism	Seema Sharma*, Sunil Mukhi	3
BIO 221	Biology Lab III: Ecology and Evolution	Neelesh Dahanukar	2
CHM 221	Chemistry Lab II	Shabana Khan*, Seema Verma, R. Vaidhyanathan, R. Boomishankar	2
PHY 221	Physics Lab II	Sunil Nair*, Sulabha Kulkarni, Aparna Deshpande, Sourabh Dube	2
IDC 204	Thermodynamics	Mrinalini Puranik	2
TDC 201	Rational Enquiry II	K.P. Mohanan	2
Semester V & VII			
BIO 310	Biostatistics	Ramana Athreya*, Farhat Habib	4
BIO 311	Advanced Cell Biology	Nagaraj B.*, Thomas Pucadyil	4
BIO 313	Advanced Molecular Biology	Mayurika Lahiri	4
BIO 314	Bioinformatics	M.S. Madhusudhan*, Collins Assisi	4
BIO 320	Genetics	Richa Rikhy*, Girish Ratnaparkhi	4
BIO 322	Biophysics-I	Chaitanya Athale	4
BIO 410	Advanced Biochemistry I	Sudha Rajamani*, Gayathri Pananghat	4
BIO 411	Ecology I	Deepak Barua	4
BIO 301	Lab Training/Theory Project	Collins Assisi	3
BIO 334	Neurobiology I	Suhita Nadkarni	3
BIO 401	Lab Training/Theory Project	Collins Assisi	3
BIO 431	Epigenetics	Sanjeev Galande	3
BIO 454	Structural Biology	Saikrishnan Kayarat	3
BIO 352	Animal Physiology - II	Nishikant Subhedar	3
BIO 353	Immunology - II	Akanksha Chaturvedi	3
CHM 311	Physical Organic Chemistry	Harinath Chakrapani	4
CHM 312	Main Group Chemistry	R. Boomi Shankar*, Shabana Khan	4
CHM 320	Symmetry and Group Theory	Srabanti Chaudhury*, Pankaj Mandal	4
CHM 410	Advanced Molecular Spectroscopy	Aloke Das	4
CHM 411	Organic Synthesis II	Sudipta Basu	4
CHM 413	Bioinorganic Chemistry	V.G. Anand	4

Code	Course	Participating Faculty (*Coordinator)	Credits
CHM 301	Lab Training/Theory Project	Angshuman Nag	3
CHM 331	Self Assembly in Chemistry	Pinaki Talukdar	3
CHM 332	Separation Principles and Techniques	Srinivas Hotha	3
CHM 340	Advanced Organic Chemistry Lab	M. Jeganmohan, Raghavendra Kikkeri	3
CHM 401	Lab Training/Theory Project	Angshuman Nag	3
CHM 430	Advanced Physical Chemistry Lab	Jeetender Chugh*, G.V. Pavan Kumar, Arun Venkatnathan	3
CHM 431	Chemical Biology	Britto Sandanaraj	3
CHM 432	Solid State Chemistry	Seema Verma*, Angshuman Nag	3
CHM 436	Molecular Modeling and Simulation	Arun Venkatnathan	3
MTH 310	Group Theory	Supriya Pisolkar	4
MTH 311	Analysis	Dipramit Majumdar	4
MTH 301	Lab Training/Theory Project	Diganta Borah	3
MTH 313	Combinatorics and Number Theory	Chandrasheel Bhagwat	4
MTH 322	Point Set Topology	Diganta Borah	4
MTH 324	Ordinary Differential Equation	Amlan Barua	4
MTH 334	Numerical Analysis	Anindya Goswami	3
MTH 401	Lab Training/Theory Project	Diganta Borah	3
MTH 410	Galois Theory	Ronnie Mani Sebastian	4
MTH 411	Functional Analysis	Anisa Chorwadwala	4
MTH 413	Algorithms	Ayan Mahalanobis	4
MTH 422	Algebraic Topology	Shane D'Mello	4
MTH 430	Modular Forms	Debargha Banerjee	3
PHY 310	Mathematical Methods in Physics	Suneeta Vardarajan	4
PHY 311	Classical Mechanics	Arjun Bagchi	4
PHY 312	Electrodynamics	Prasad Subramanian	4
PHY 321	Quantum Mechanics I	Rejish Nath	4
PHY 335	Electronics I	Shivprasad Patil	3
PHY 301	Lab Training/Theory Project	Arijit Bhattacharyay	3

Code	Course	Participating Faculty (*Coordinator)	Credits
PHY 330	Physics Lab IV	Umakant Rapol*, Mukul Kabir	3
PHY 410	Physics Lab VI	T.S. Mahesh*, C.V. Dharmadhikari	4
PHY 411	Quantum Mechanics II	Avinash Khare	4
PHY 412	Condensed Matter Physics I	Surjeet Singh	4
PHY 401	Lab Training/Theory Project	Arijit Bhattacharyay	3
PHY 433	Statistical Mechanics II	Anil Gangal	3
PHY 441	Quantum Information	Anil Shaji (IISER TVM) via NKN, T.S. Mahesh*	3
PHY 453	Computational Physics	Prasenjit Ghosh*, Apratim Chatterjee	3
Semester II			
BIO 102	Biology II: Molecular and Cellular Framework of Biological processes	Sudha Rajamani*, Nagaraj B.	3
CHM 102	Chemistry I - Physical Chemistry	Partha Hazra, Pankaj Mandal*	3
MTH 102	Multi Variable Calculus	Debargha Banerjee*, Anup Biswas	3
MTH 103	Introduction to Computing	Collins Assisi*, M.S. Madhusudan	3(1L+1P of 3 hrs)
PHY 102	World of Physics II- Waves and Matter	Bhas Bapat, M.S. Santhanam*	3
CHM 121	Chemistry Lab I	Jeetender Chugh *, Musthafa M. , B.S.M. Rao, Pramod Pillai	2
BIO 122	Biology Lab II: Biochemistry, Genetics & Molecular Biology	Krishanpal Karmodiya*, Sanjeev Galande, Mayurika Lahiri, Jeet Kalia, Girish Ratnaparkhi, Sonam Mehrotra	2
IDC 104	Mathematical Methods	Sunil Mukhi	2
Semester IV			
BIO 202	Biology IV: Approaches to Study Complex Biological Systems	Aurnab Ghose*, Collins Assisi	3
CHM 202	Chemistry III- Organic Chemistry	H.N. Gopi	3
MTH 202	Probability and Statistics	Soumen Maity	3
PHY 202	World of Physics IV - Quantum Physics	Sourabh Dube	3
PHY 222	Physics Lab III	Sulabha Kulkarni*, Umakant Rapol, Ashna Bajpai, Shouvik Datta	2

Code	Course	Participating Faculty (*Coordinator)	Credits
CHM 222	Chemistry Laboratory III	Pinaki Talukdar, Srinivas Hotha, Britto Sandanaraj, B. Gnanaprakasam*	2
ECS 200	Introduction to Earth System Science	Shyam Rai	3
Semester VI & VIII			
BIO 312	Animal Physiology I	Nishikant Subhedar	4
BIO 321	Plant Biology I	Anjan Banerjee	4
BIO 323	Immunology I	Akanksha Chaturvedi	4
BIO 412	Microbiology	Gayathri Pananghat*, Neelesh Dahanukar	4
BIO 417	Advanced Biochemistry II	Thomas Pucadyil*, Saikrishnan Kayarat	4
BIO 422	Evolution	Milind Watve*, Sutirth Dey, L.S. Shashidhara	4
BIO 302	Lab Training/Theory Project	Raghav Rajan	3
BIO 402	Lab Training/Theory Project	Raghav Rajan	3
BIO 354	Neurobiology II	Suhita Nadkarni*, Raghav Rajan	3
BIO 413	Mathematical Biology	Pranay Goel	4
BIO 441	Genome Biology	Kundan Sengupta*, Farhat Habib	3
BIO 491	Literature Review	M.S. Madhusudhan	3
CHM 310	Quantum Chemistry	Anirban Hazra	4
CHM 321	Organic Synthesis-I	R.G. Bhat	4
CHM 322	Transition Metal Chemistry	S.K. Ghosh*, Moumita Majumdar	4
CHM 302	Lab Training/Theory Project	Angshuman Nag	3
CHM 323	Fundamentals of Molecular Spectroscopy	Mrinalini Puranik*, Pramod Pillai	4
CHM 334	Physical Chemistry of Solutions	Seema Verma*, Angshuman Nag	3
CHM 351	Bioorganic Chemistry	Raghavendra Kikkeri	3
CHM 360	Advanced Inorganic Chemistry Lab	Angshuman Nag*, Seema Verma, Nirmalya Ballav	3
CHM 420	Structural Methods and Analysis	Jeetender Chugh*, S.G. Srivatsan	4
CHM 421	Polymer Chemistry	M. Jayakannan	4
CHM 422	Statistical Thermodynamics	Srabanti Chaudhury*, Arnab Mukherjee	4
CHM 423	Medicinal Chemistry	Jeet Kalia	4

Code	Course	Participating Faculty (*Coordinator)	Credits
CHM 402	Lab Training/Theory Project	Angshuman Nag	3
CHM 433	Photochemistry	Partha Hazra*, B. Gnanaprakasam	3
CHM 441	Advanced Material Science	R. Vaidhyanathan*, Nirmalya Ballav	3
CHM 442	Organometallic Chemistry	M. Jeganmohan	3
MTH 320	Vector Spaces, Rings and Modules	Anupam Singh	4
MTH 326	Complex Analysis	Diganta Borah	4
MTH 327	Calculus on Manifolds	Chitrabhanu Chaudhary	4
MTH 314	Statistics	Uttara Naik-Nimbalkar	4
MTH 341	Topics in Analysis: Fourier Analysis	Chandrasheel Bhagwat	3
MTH 323	Graph Theory	Kaneenika Sinha	4
MTH 420	Algebraic number theory	Ronnie Sebastian	4
MTH 429	Differential Geometry	Tejas Kalelkar	4
MTH 423	Cryptography	Krishna Kaipa	4
MTH 424	Partial Differential Equations	Anisa Chorwadwala	4
MTH 427	Mathematical Biology	Pranay Goel	4
MTH 440	Topics in Algebra: Commutative Algebra	Rabeya Basu	3
MTH 302	Lab Training/Theory Project	Diganta Borah	3
MTH 402	Lab Training/Theory Project	Diganta Borah	3
PHY 320	Physics Lab V	Surjeet Singh*, Apratim Chatterji, Seema Sharma	4
PHY 322	Statistical Mechanics I	Arijit Bhattacharyay	4
PHY 324	Quantum Mechanics II	Anil D. Gangal	4
PHY 350	Electronics II	Aparna Deshpande	3
PHY 351	Gravitation and Cosmology (over NKN to IISERB)	Suneeta Vardarajan	3
PHY 356	Group Theory in Physics	Sudarshan Ananth	3
PHY 302	Lab Training/Theory Project	T.S. Mahesh	3
PHY 420	Atomic and Molecular Physics	Rejish Nath	4
PHY 421	Classical and Quantum Optics	G.V. Pavan Kumar	4
PHY 422	Nuclear and Particle Physics	Avinash Khare	4
PHY 434	Physics Lab VII	C.V. Dharmadhikari, Sunil Nair	3

Code	Course	Participating Faculty (*Coordinator)	Credits
PHY 352	Fluid Dynamics	Shivprasad Patil	3
#PHY 461	Quantum Field Theory	Nabamita Banerjee	3
#PHY 463	Advanced condensed Matter Physics	Mukul Kabir	3
PHY 402	Lab Training/Theory Project	T.S. Mahesh	3

Advanced level courses for PhD students, open to interested BS MS (Semester VIII) and Int. PhD (Semester IV) students satisfying the required pre-requisites

Academic Achievements of BS MS Students in 2014-15

- CNR Rao Education Foundation Prize was awarded to Ms. Shraddha Lall in Fall 2014 and to Mr. Chhajed Shubham Sohanlal in Spring 2014.
- Prizes for Academic Excellence were awarded to the following students of BS MS program
 - Spring 2014: Akshay S.; Khushboo Singh; K. Arun Kumar; Shiva Chidambaram P.
 - Fall 2014: Spandan Choudhury; Tanushree Bharat Shah; Akshay S.; Santpur Sai Neha; K. Arun Kumar
- Mr. Rohit Chikkaraddy has been selected for Dr. Manmohan Singh Fellowship to pursue PhD at St. John's College, University of Cambridge, U.K.
- Ms. Charu Jain has been selected through the Khorana Program to visit University of Minnesota, U.S.A.
- The following five students were selected through the DAAD-WISE Fellowship to carry out summer internship in Germany.

Name	Institute / University
Kaustav Dey	University of Leipzig
Santpur Sai Neha	MPI Gravitationsphysik (A.-Einstein-Inst.), Hannover
Shruti Paranjape	Carl von Ossietzky Universitat, Oldenburg
Tanmay Patankar	Jacobs University of Bremen
Govind Unnikrishnan	Albert Ludwigs Universitat, Freiburg

- Ms. Smita Madhukar Ghorpade and Mr. Cherukuri Kesava Phaneendra have carried out short research projects at the Ohio State University as part of an exchange program.
- Ms. Khushboo Singh was among a group of students across India selected for Charpak Internship allowing her to carry out a short research project at the University of Lyon, France.

During the third convocation held on June 15, 2014, 95 students have graduated from the BS MS program. The Institute Gold Medal was awarded to Akash G. and the following 11 students have graduated with Distinction (CGPA>9.0): Akash G.; Apte Amey Anant; Anurag Agrawal; Upendra Singh; Avani Gowardhan; Vikas Negi; Monika Dash; Rohit Chikkaraddy; Patil Aashay Prakash; Bhavesh Khamesra; and Sachit.



Personnel

Personnel

(as on March 31, 2015)

Faculty

Director & Professor

K.N. Ganesh

Professors

Sunil Mukhi
L.S. Shashidhara
Milind Watve
Sanjeev Galande
A. Raghuram
G. Ambika
Shyam Sundar Rai

Associate Professors

Rama Mishra
Ramana Athreya
M. Jayakannan
Suneeta Vardarajan
Srinivas Hotha
Mrinalini Puranik
Prasad Subramanian
M.S. Santhanam
Steven Spallone
Soumen Maity
R.G. Bhat
T.S. Mahesh
V.G. Anand
H.N. Gopi
Aloke Das
M.S. Madhusudhan
Sudarshan Ananth
Amit Hogadi
Shivprasad Patil
Bhas Bapat
Sutirth Dey
John Mathew

Partha Hazra
Girish Ratnaparkhi
Arijit Bhattacharyay
Anjan Banerjee
Arun Venkatnathan
S.G. Srivatsan
R. Boomishankar

Assistant Professors

Aurnab Ghose
Mayurika Lahiri
Shouvik Datta
Anupam Kumar Singh
Deepak Barua
Apratim Chatterji
Pranay Goel
Ayan Mahalanobis
Sujit Kumar Ghosh
Pinaki Talukdar
Harinath Chakrapani
Chaitanya Athale
Umakant Rapol
Arnab Mukherjee
Surjeet Singh
Saikrishnan Kayarat
G.V. Pavan Kumar
Richa Rikhy
Kundan Sengupta
Rabeya Basu
Baskar Balasubramanyam
Pankaj Mandal
Nagaraj Balasubramanian
Prasenjit Ghosh
Thomas Pucadyil
Jeganmohan Masilamani
Raghavendra Kikkeri

Nirmalya Ballav
Sunil Nair
Anirban Hazra
Aparna Deshpande
Anindya Goswami
Ramanathan Vaidhyanathan
Sudha Rajamani
Collins Assisi
Vivek Mohan Mallick
Mohammad Mukul Kabir
Kaneenika Sinha
Akanksha Chaturvedi
Anisa Chorwadwala
Shabana Khan
Jeetender Chugh
Srabanti Chaudhury
Jeet Kalia
Sourabh Dube
Rejish Nath
Debargha Banerjee
Tejas Kalelkar
Diganta Borah
Supriya Pisolkar
Seema Sharma
Britto Sandanaraj
Pramod Pillai
Krishna Kaipa
B. Gnanaprakasam
Suhita Nadkarni
Nabamita Banerjee
Mousomi Bhakta
Anup Biswas
Muhammed Musthafa O.T.
Moumita Majumdar
Chandrasheel Bhagwat
Gyana Ranjan Tripathy

Professors	8	Associate Professors	29	Assistant Professors	63	Total	100
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Non-teaching Staff

Col. G. Raja Sekhar (Retd.), Registrar
 Santosh Nevse, Assistant Registrar (Admin)
 Salim Shaikh, Assistant Registrar (Stores & Purchase)
 Deepali Dalvi, Assistant Registrar (Academics)
 Umeshreddy Kacherki, Deputy Librarian
 Avinash Abhale, Chief Security Officer
 Suresh Nair, Office Superintendent
 Beena Subhash, Office Superintendent
 Ramesh Mohite, Private Secretary
 Manoj Chaudhari, Personal Assistant
 Mahesh Rote, Personal Assistant
 Tanuja Sapre, Library and Information Assistant
 Namrata Shinde, Library and Information Assistant
 Snehal Batule, Accountant
 Prabhas Patankar, Accountant
 Shraddha Visal, Accountant
 Nayana Shirole, Office Assistant
 Mayuresh Kulkarni, Office Assistant
 Anil Jadhav, Office Assistant
 Prabhakar Anagare, Office Assistant
 Vrushali Birla, Office Assistant
 Sandeep Sankpal, Office Assistant
 Tushar Kurulkar, Office Assistant
 Suvarna Bharadwaj, Office Assistant
 Deepa Jain, Nurse
 Swapnil Bule, Physical Education Instructor
 Roshan Mohite, Car Driver
 Sanjay Gomale, Attendant
 Vitthal Shejwal, Attendant

Engineering Section

Yugraj Singh Rajput, Superintending Engineer
 (on deputation from CPWD)
 Ganesh Pingalkar, Assistant Engineer (Civil)
 Manoj Mane, Junior Engineer (Electrical)
 Vijaykumar Shinde, Junior Engineer (Civil)
 Santosh Kale, Accountant (on deputation from CPWD)

Technical Staff

Neeta Deo, System Administrator
 Parveen Nasa, Sr. Technical Officer (Instrumentation)
 Nilesh Dumbre, Technical Officer
 Mrinalini Virkar, Technical Officer
 Mahesh Jadhav, Technical Officer
 Saurabh Butolia, Technical Officer (IT)

Sureshchandra Prajapat, Scientific Assistant
 Prashant Kale, Technical Assistant
 Vijay Vittal, Technical Assistant
 Anil Prathamshetti, Technical Assistant
 Nitin Dalvi, Technical Assistant
 Rupali Jadhav, Technical Assistant
 S. Suresh Kumar, Technical Assistant (IT)
 Shabnam Patil, Laboratory Technician
 Devpalsingh Rajput, Laboratory Technician
 Narendra Khandekar, Laboratory Technician
 Yatish T.S., Laboratory Technician
 Tejal Vadgama, Laboratory Technician
 Santosh Khilare, Laboratory Assistant
 Megha Paygude, Laboratory Assistant
 Sudhir Lone, Laboratory Assistant
 Kalpesh Thakare, Laboratory Assistant
 Piyush Gadekar, Laboratory Assistant -
 Yashwant Pawar, Laboratory Assistant
 Ganesh Dimbar, Laboratory Assistant
 Sandeep Kanade, Laboratory Assistant

Registrar	1
Dy. Librarian	1
Superintending Engineer	1
Assistant Registrar	3
Chief Security Officer	1
Office Superintendent	2
Assistant Engineer	1
Junior Engineer	2
Private Secretary	1
Personal Assistant	2
Library Information Assistant	2
Accountant	4
Office Assistant	8
Sr. Technical Officer	1
System Administrator	1
Technical Officer	4
Scientific Assistant	1
Technical Assistant	6
Laboratory Technician	5
Laboratory Assistant	8
Attendant	2
Nurse	1
Physical Training Instructor	1
Driver	1
Total	60

Visiting Faculty

A.A. Natu
 Nishikant Subhedar
 V.S. Rao
 B.S.M. Rao
 Anil Gangal
 Avinash Khare, DAE Raja Ramanna Fellow
 C.V. Dharmadhikari
 K.P. Mohanan
 Aditi Deo
 Sulabha Kulkarni
 Sheela Donde
 Uttara V. Naik-Nimbalkar
 Pooja Sancheti
 Girish Deshpande

IISER Fellow

Seema Verma

Externally Funded Fellows/Scientists

Harsh Chaturvedi (Ramanujan Fellow, DST)
 Angshuman Nag (Ramanujan Fellow, DST)
 Ashna Bajpai (Ramanujan Fellow, DST)
 Sudipta Basu (Ramalingaswami Fellow, DBT)
 Raghav Rajan, Ramalingaswami Fellow
 Ashwin Kelkar WT-DBT IA Early career Fellow
 Shital Sarah S. Ahaley, WT-DBT IA Early Career Fellow
 Neelesh Dahanukar, INSPIRE Faculty
 Gayathri Pananghat, INSPIRE Faculty
 Ronnie Mani Sebastain INSPIRE Faculty
 Arjun Bagchi, INSPIRE Faculty
 Krishanpal Karmodiya, INSPIRE Faculty
 Smita Chaturvedi, Project Scientist, WOS-B, DST
 Tressa Jacob, Project Scientist, BIOCaRE, DBT
 Madhuri Vangala, DST Fast Track Scientist

Academic/Technical Staff on Contractual Basis

Tejasvi Tajane, Technical Assistant
 Deepali Jadhav, Technical Assistant
 Swati Padole, Technical Assistant
 Archana Jogdand, Technical Assistant
 Bhargavi Naik, Technical Assistant
 Samir Choudhary, Technical Assistant
 Hemlata Phadke, Teaching Assistant
 Sujatha Varadarajan, Teaching Assistant
 Nayna Nikam, Technical Assistant

Chinmay Lowalekar, Technical Assistant
 Gitanjali Nerurkar, Technical Assistant
 Uday Jagadale, Teaching Assistant
 Aman Jhinga, Teaching Assistant
 Jatin Majithia, Teaching Assistant
 Shailesh Patil, Technical Assistant (IT)
 Satish Jadhav, Technical Assistant (IT)
 Snehal Patil, Lab. Assistant
 Shaila Kulkarni, Project Assistant
 Chitra Shanbhag, Project Assistant

Project Scientists

K.P. Madhu, Incharge, Media Centre
 Farhat Habib, Scientist D
 Sonam Mehrotra, Scientist D
 A. Nagbhushana, Scientist C
 G.P. Manjunath, Scientist C

Post-Doctoral Fellows/Research Associates

D. Raghavendra Murthy, Research Associate
 Pramod Patil, Research Associate
 Srinu Meesala, Research Associate
 Ultaf Baig, Pre-doctoral Associate
 Uttar Lele, Post-doctoral Research Associate
 Preeti Chaudhary, CSIR Research Associate
 P. Chandramouli Reddy, DBT Research Associate
 Kirtikumar Kondhare, DBT Research Associate
 Ashok Kumar H.G., DBT Research Associate

IISER Post Doctoral Fellows

Rudranil Basu
 Shankhadeep Chakraborty
 Dinanath Fulse
 Ravi Kumar
 Amey Sathe
 Satyajeeet Khare
 Arpita Roychoudhury
 Anirban Guha
 Nitin Wadnekar
 Dipramit Majumdar
 Neelam Shivran
 Anup Pillai
 Debrina Jana
 Kaushiki Biswas
 Chitrabhanu Chaudhuri
 Dhruvjayoti Datta

Administrative and Support Staff on Contractual Basis

Mariamamma John (OSD, F&A)
 Shanti Kalipatnapu, Senior Consultant (Publications)
 Naresh Sharma (Advisor, Academics)
 Goldi Mishra, Chief Technology Officer (IT)
 Nita Belliappa (Science Media Consultant)
 Apurva Barve, Web Content Manager
 Chandrakant Bhoyar, Executive Engineer- Civil
 Varsha Hoshing, Executive Engineer- Electrical
 Mohd. Abdul Samad, Asst. Engineer (Mech)
 Shrikrishna Ayala, Consultant Engg. Support Service (Civil)
 S.H. Yadav, Consultant (Engineering Support Service)
 K.G.K. Marar, Senior Consultant
 Abhijit Kulkarni, Senior Technical Assistant (IT)
 Sachin Behra, Senior Technical Assistant (IT)
 M.M. Jana, Consultant (Horticulture)
 S. Giridhar, Guest House Manager
 V.V. Sinha, Administrative Staff
 Archana Pawar, Office Staff
 Smita Kondhalkar, Office Assistant
 Varsha Jain, Office Assistant
 Remya Radhakrishnan, Office Assistant
 Shakti Tiwari, Office Assistant
 Aparna Shimpi, Office Assistant

Anita Mishra, Hostel Manager
 Ravindra Singh, Sr. Dining Manager
 Ramlal Choudhary, Hostel Manager
 Sreejit Marar, Manager Dining Services
 Vijay Kale, Security Supervisor
 Mangal Kamble, Athletic Coach
 Santosh Bhosale, Gym Instructor
 Alom Hossain, Admin. Supervisor
 Pathan Yusuf Khan, Security Supervisor
 Manish Rajiwade, Office Assistant
 Sanjeev Gaikwad, Office Assistant
 C. Hema Bindu, Office Assistant
 Anjali Kuliye, Office Assistant
 Ruby Soni, Office Assistant
 Trupti Bhingarkar, Office Assistant
 Harshita Pathak, Office Assistant
 Dhanashree Sheth, Office Assistant
 Sneha Chordiya, Office Assistant
 Mugdha Sharma, Office Assistant
 Yogesh Kapse, Office Assistant
 Ketan Kakade, Office Assistant
 Vidya Dandavate, Office Assistant
 R. Bhagyaxmi, Office Assistant
 Shailesh Wadkar, Office Assistant
 Savita Mapari, Data Entry Operator

Project Fellows

Rohan Pandit
 Ashwini Keskar
 Abhishek Rale
 Shreya Krishnamurthy
 Neha Deshpande
 Apoorva Kulkarni
 Sujit Manmode
 Vikram Bakaraju
 Prachi Richa
 Sagar Gore
 Radhika Korrane
 Kiran Kadlag
 Prangya Mishra
 Kiran Nilangekar
 Shripad Joshi
 Shankar Gaware

Chintan Sheth
 G. Madhusudhana
 Arif Ikbal Inamdar
 Madhav Vipradas
 Santosh Botre
 Parameshwar Singh Yadav
 Antara Chakravarty
 Rafeeq Mir
 T. Shree Harsha
 Payal Arya
 Ketki Hekar
 Tejal Gujarathi
 Neha Shintre
 Shipra Gupta
 Nelchi Prashali
 Tarun Kaniganti
 Amita Ghadge

R. Nivedha
 Senthil Kumar
 Naziya Parveen
 Kajol Patel
 Abhishek Sahasrabuddhe
 T.Y. Gopal Krishna
 P. Sudheer Kumar
 Devika Bhawe
 Manjit Kaur
 Gaurav Isola
 Pranav Kulkarni
 Nishant Singh
 Pratima Gurung
 Anagha Pund
 Rajnandini Kashyap
 Swati Badgujar
 Sandip Pasari

Dhanashree Khanale Shekh Saddam Husen Viraj Gala Aashay Patil Sumit Bhosale Rohan Sharma Rahul Jangid Sindhuri Upadrast Vaishali Chakravarty Parichit Sharma Virendra Mokadam Vijay Kadam Nitesh Badave Yashodeep Matange	A.T. Dharmaraja Santosh Gadekar Shraddha Karve Digvijay Thorat Satheesh Ellipilli Jay Prakash Shukla Bhupendra Dandekar Piyush More Vijay Khopkar C.D. Mrutyunjayachari Sourajit Basu Monika Raina Bhakti Manna	Pallavi Kharade Ajay Bansode Nitesh Singh Madhusudhan Ingle Part-time Medical Officers V.S. Savaskar Priti Chhajed Aarti Rapol Counsellors Rebecca D'souza Vrinda Walimbe
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Appointments during the year 2014-15

Shyam Sundar Rai	01.09.2014	Mariamama John	09.03.2015
Bhas Bapat	14.07.2014	Pooja Sancheti	01.08.2014
John Mathew	05.11.2014	Uday Jagadale	21.07.2014
Seema Sharma	07.04.2014	Aman Jhinga	16.07.2014
Pramod Pillai	18.06.2014	Jatin Majithia	03.09.2014
Krishna Kaipa	23.06.2014	Chinmay Lowalekar	01.09.2014
B. Gnanaprakasam	07.07.2014	Girish Deshpande	01.12.2014
Suhita Nadkarni	01.07.2014	Kaushiki Biswas	01.12.2014
Nabamita Banerjee	21.07.2014	Chitrabhanu Chaudhuri	01.12.2014
Mousomi Bhakta	18.08.2014	Dhrubajyoti Datta	15.12.2014
Anup Biswas	18.08.2014	Ruby Soni	19.12.2014
Mohammed Musthafa O.T.	22.08.2014	Trupti Bhingarkar	19.12.2014
Moumita Majumdar	07.10.2014	Harshita Pathak	09.01.2015
Chandrasheel Bhagwat	01.12.2014	Dhanashree Sheth	15.04.2014
Gyana Ranjan Tripathy	11.12.2014	Mohd. Abdul Samad	06.06.2014
Sulabha Kulkarni	02.06.2014	Shailesh Patil	10.04.2014
Uttara Naik-Nimbalkar	02.02.2015	Satish Jadhav	10.04.2014
Rudranil Basu	01.09.2014	Snehal Patil	21.04.2014
Shankhadeep Chakraborty	01.09.2014	Shaila Kulkarni	01.05.2014
Dinanath Fulse	10.11.2014	Chitra Shanbhag	05.06.2014
Ravi Kumar	31.10.2014	Sneha Chordiya	01.08.2014
Ameya Sathe	16.10.2014	Mugdha Sharma	07.08.2014
Satyajeet Khare	16.10.2014	Yogesh Kapse	01.11.2014
Arpita Roychoudhury	01.04.2014	Ravindra Singh	24.10.2014
Anirban Guha	01.04.2014	Vidya Dandavate	24.11.2014
Nitin Wadnekar	07.04.2014	R. Bhagylaxmi	01.12.2014
Dipramit Majumdar	11.04.2014	Shailesh Wadkar	02.02.2015
Neelam Shivran	01.10.2014	Geetanjali Nerurkar	01.12.2014
Anup Pillai	17.10.2014	Savita Mapari	18.11.2014
Debrina Jana	19.03.2015	Apurva Barve	12.01.2015

PhD Students**CSIR SRF (Direct)**

Ritima Das

CSIR SPM

Ravi Devani

CSIR JRF/SRF

Mothukuri Ganesh Kumar

Sharad Garud-Deshmukh

Biplab Manna

Sunil Kumar

Abhinav Parivesh

Rashmi Kulkarni

Devika Ranade

Archana Pawar

Ravi Kiran

Dinesh Chauhan

Venkateswara Rao Boddu

Yasmeen Akhtar

Sachin Holkar

Kishore Padala

Vinayak Khodade

Aparna Sherlekar

Santosh Panchal

Balu Navale

Srishti Dar

Boominathan

Harikrishna Bavireddi

Ayantika Sengupta

Pramod Sable

Rajendra Aluri

Bhagyashree Kaduskar

Maidul Islam

Siva Koti Sangabathuni

Barun Dhara

Ashok Yadav

Mallu Chenna Reddy

Indumati Patta

Sushil Bhunia

Prahlaad Shinde

Tushar Khopade

Manidipa Pal

Nagnath More

Nandha Kumar

Bhagyashree Kulkarni

Shahaji More

Rajkumar Mishra

Sudhir Kumar Pujahari

Abhik Mallik

Makarand Sarnobat

Neha Nirwan

Trimbak Mete

Jyoti Baranwal

Sopan Shinde

Niraja Bapat

G. Ravi Kumar

M. Jagadeeswara Rao

R. Manikandan

Kriti Chaplot

Sudipta Tung

Bipasha Dey

Abhijit Pendse

Shubhanshu Chauhan

Pulastya Parekh

R. Manoharan

Ayesha Fatima

Sameer Thukral

Chandramouli Ghosh

Amit Kumar

Anil Yadav

Balamurugan

Rupal Bhaisare

Wasim Jeelani Mir

Ajay Kumar Sharma

Pramod Bhingardive

Sudhakar Shinde

Sucheta Majumdar

Raunaq Ali Deo

Preeti Chauhan

Pooja Kumari

Suraj Toraskar

Debyan Sarkar

G. Siva Kumar

Pavankumar Bhandari

Simran Kaur Juneja

UGC JRF/SRF

Nitin Bansode

A. Dharmaraja

Kiran Reddy Baddigam

Bapurao Surnar

Lakshmi V.R. Babu Syamala

Kavita Sharma

Snehal Shekatkar

Vallari Shukla

Rohan Yadav

Hitesh Raundal

Sushil Benke

Manu Unnikrishnan

Kundansingh Pardeshi

Tanmoy Saha

K. Rajkumar

Ishtiyah Ahmad Khan

Mahesh Deshmukh

Yettapu Gurivi Reddy

Karnati Narasimha

Arundhati Roy

Sohini Sarkar

Kajari Gupta

Darshika Tomar

Nuthanakanti Ashok

Prabhat Kumar Kushwaha

Bijoyanand Mishra

Anushree Chapalkar

Madhuri Gade

Reman Kumar Singh

Prabhakar Pawar

Sandeep Kumar Palvai

Sudeshna Manna

Srilata Arra

Arun Neru

Tanushree Kundu

Devika Andhare

Neha Kathewad

Partha Samanta

Shiv Pal

Girish Kulkarni

Milan Kumar Das

Debnath Talukdar

Turmoli Neogi

Vinayak Kulkarni
 Nilesh Deshpande
 Mahesh Neralkar
 P. Rajasekhar
 T. Vijayakanth
 Aditya Singh Mehra
 G. Shiva Shankar
 Dhruv Mishra
 Akanksha Ojha
 Prajna Nayak
 Sohan Patil
 M. Mohan
 Manoj Kumar Gupta
 Sanjit Dey
 Ganesh Shinde
 Kamal Kumar Mishra
 Sanku Paul
 Manish Singh Kushwah
 Avirup De
 Yeshwant Kumar
 Sanket Nagarkar
 Rishabh Gupta
 Nasrina Parvin
 Manish Kumar
 Saleem Yousf
 Soumendu Roy

DBT JRF/SRF

Shivik Garg
 Mahesh Kumar Chand
 Ramtirth Yogendra
 Siddhi Inchanalkar

NBHM JRF/SRF

Neha Prabhu
 Jyotirmoy Ganguly
 Chaitanya Ambi
 Advait Phanse
 Debangana Mukherjee

INSPIRE JRF/SRF

Libi Anandi
 Kunalika Jain
 Amit Bhunia
 Danveer Singh
 M. Vidyadhari

ICMR SRF

Manasi Gangan

IISER JRF/SRF

Anupam Savant
 Vishakha Karnawat
 Vijay Kadam
 Arun Tanpure
 Smita Kashyap
 Biplab Joarder
 Sanjog Nagarkar
 Sneha Bhogale
 Jayprakash Shukla
 Arthur Varghese
 Abhishek Shukla
 Minal Pednekar
 Indu Kaul
 Santosh Gadekar
 Koushik Karmakar
 Swati Hegde
 N. Bhavani
 Manasi Kulkarni
 S.K. Mubeena Ban
 Arvindam Dasgupta
 Abhijeet Bayani
 Krishna Gavvala
 Mandar Kulkarni
 Trupti Thete
 Soumya Mukherjee
 Anantkumar Shrivastava
 Madhangopal B.
 Sudeb Ghosh
 Partha Pratim Patra
 Ranguwar Rajendra
 Rakesh Gaur
 Manasi Mungi
 A. Shweta
 Avishek Karmakar
 Sampada Mutalik
 Mahesh Gudem
 Avdhoot Datar
 Sayan Mandal
 Maroti Pawar
 Rohit Joshi
 Satish Dasari

Shatarupa Ganguly
 Manawa Diwekar
 Vibha Singh
 Souparna Chakrabarty
 Sappati Subrahmanyam
 Aparna Banerjee
 Praveen Kumar
 Sonashree
 Plawan Kumar Jha
 Shalini
 Shyamaprasad Nandi
 Gunja Sachdeva
 Nishtha Sachdeva
 Sai Harini Tekur
 Shishir Sankhyayan
 Ravi Prakash Nath Tripathi
 Rabindra Bag
 S.K. Rejaul
 Kunal Kothekar
 Rohit Kumar
 Amandeep
 Soumendra Nath Panja
 Rohit Babar
 Gunjan Verma
 Neelesh Soni
 Aboli Kulkarni
 Devika Bodas
 Maithili Khot
 Natasha Buwa
 Shrikant Harne
 Yashraj Chavhan
 Himani Rawat
 Tathagata Mandal
 Namrata Pattanayak
 Sarath Kumar Thadeti
 C.S. Sudheer Kumar
 Rakesh Pant
 Debasis Saha
 Niharika Joshi
 Dinesh Mullangi
 Chetan D.S
 Neha
 Harshad Paithankar
 Roy Bibhisan
 Satpathi Sagar

Shahila Muhammed
 Shammi Rana
 Avinash Warankar
 Krutula Nair
 Madhumita Chakladar
 Gajanan Kendre
 Pallavi Agarwal
 Ashok Kumar B.
 Madan Ambhore
 Rahul Nisal
 Prakash Prabhat
 Bappa Ghosh
 Vinay Hegde
 Aakanksha Kapoor
 Chinmayee Mishra
 Aditee Rane
 Chandan Kumar Singh
 Shatruhan Rajput
 Yogeshwar More
 Ravindra Raut
 Samraj Mollick
 Akula Naveenkumar
 Rajarshi Dasgupta
 Debanjan Chkraborty
 Rahul Maity
 Javid Ahmad Malla
 Gulab Sudam Walke
 R.L. Praveena
 Rutuja Diwan
 Ravi Umadi
 Kasuladevu Jagannadha Rao
 Sachin Nalawade
 Devatha Gayathri
 Sachin Kumar Singh
 K. Alagar Raja
 Moreshwar Chaudhari
 Shweta Tendulkar
 K. Veeresh
 Manisha Balasaheb Walunj

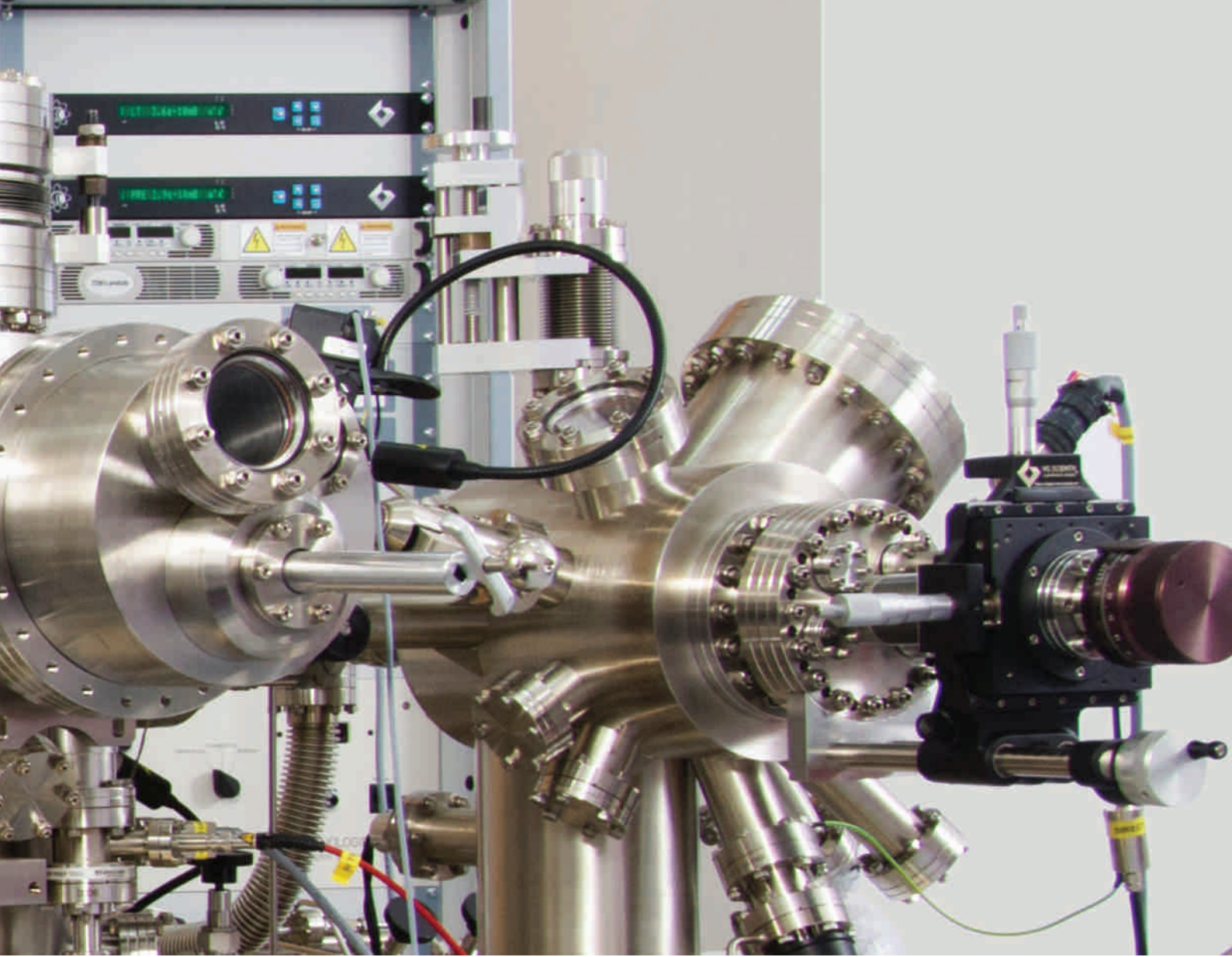
Integrated PhD Students

Sayali Chaudhary
 Roopali Pradhan (CSIR JRF)

Ketakee Ghate
 Shubhankar Kulkarni
 Chaitanya Mungi (CSIR JRF)
 Ajay Labade
 Anandita Adak
 Aamod Desai
 Amruta Sadhu
 Supratik Sarkar
 Srikrishna Sekhar
 Mahendra Prasad Mali
 Sumit Sarkar
 Santosh Kumar Singh
 Anjusha V.S.
 Tomin K. James
 Sukrut Karmekar (CSIR JRF)
 Ankita Shetty (CSIR JRF)
 Neha Khetan
 Aditi Maduskar
 Dnyanesh Dubal
 Mukul Rawat
 Jerrin Thomas George
 Sneha Banerjee
 Hridya M.
 Rahi Masoom Reja
 Aditi Nandi
 Amogh Kulkarni
 Abhishek Swarnkar
 Meghna Manae
 Prachi Telang
 Chetan Kumar Vishwakarma
 Dhanya Menon
 Mainak Ghosh
 Amarendra Soory
 Divya Rao
 Gungi Akhila
 Neeladri Sen
 Aditi Dixit
 Anish Rao
 Mehak Malhotra
 Shivani Sharma
 Sandip Varkey George
 Adarsh Vasista
 Charu Garg

Deepak Khurana
 G.A.R.S.R.K. Kashyap
 Jay Mangaonkar
 Dhriti Nagar
 Harpreet Singh Kalsi
 Bharat Tandon
 Anshul Kapoor
 Swati Sharma
 Ron Sunny
 Mukta Palshikar
 Nilam Malankar
 Punita Bathia
 Sanjana Nair
 Shikha Kalra
 Yashaswi Singh
 Arunabha Sen
 Bandana Kumari
 Girish Singh Bisht
 Kingshuk Roy
 Konoya Das
 Kriti Gupta
 Omshankar Tiwari
 Prashant Jain
 Shalini Pandey
 Vikash Kumar Ravi

 Arnab Sen
 Deepak Kumar Sharma
 Dipti
 Shubham Pandey
 Soham Pal
 Sayali Bhatkar
 Projjwal Kanti Kanjilal
 Rajesh Mandal
 Deepak Sharma
 Mohit Kumar Singh
 Mayur Shende
 Yashwant Chougule
 Kumar Saurabh (CSIR JRF)
 Vikhyat Ahlawat
 Ankita Niranjana
 Tejal Agarwal



Funding and Infrastructure

Grants Received
New Equipment
Library

Sponsored Projects 2014-15

(in lakh ₹)

Name of the Project	Project Leader	Code	Sanctioning Authority	Period (From- to-)	Grants Received during the year
Nano Science Unit	M. Jayakannan	GAP/DST/PHY-09-0009 30109009	DST	16-11-2009 to 15-11-2014	100.00
Structural studies on NTP-dependent restriction - modification enzymes	Saikrishnan Kayarat	GAP/WT-DBT/BIO-09-0015 30710015	Wellcome Trust - DBT India Alliance	04-1-2010 to 03-01-2015	38.94
Virtual Centre of Excellence on Epigenetics	Sanjeev Galande	GAP/DBT/BIO-10-0027 2000027	DBT	19-03-2010 to 18-09-2015	66.46
Modulation of the innate immune response by SUMOylation	Girish Ratnaparkhi	GAP/WT-DBT/BIO-10-0029 30710029	Wellcome Trust - DBT India Alliance	15-06-2010 to 14-06-2015	55.42
Ramanujan Fellowship	Harsh Chaturvedi	GAP/DST/PHY-10-0031 31110031	SERB-DST	01-07-2010 to 31-06-2015	20.00
Ramanujan Fellowship	G.V. Pavan Kumar	GAP/DST/PHY-10-0041 31110041	SERB-DST	01-11-2010 to 31/10/2015	4.00
Mechanistic analysis of endocytosis of the amyloid precursor protein	Thomas Pucadyil	GAP/WT-DBT/BIO-11-0043 30711043	Wellcome Trust - DBT India Alliance	01-01-2011 to 31-12-2015	41.33
Molecular mechanisms of nuclear structure - function relationships in Cancer	Kundan Sengupta	GAP/WT-DBT/BIO-11-0044 30711044	Wellcome Trust - DBT India Alliance	01-01-2011 to 31-12-2015	58.89
Micro-cantilever based calorimetric biosensor for decentralized diagnostics and drug discovery using a novel detection mechanism	Shivprasad Patil	GAP/WT-DBT/BIO-11-0045 30711045	Wellcome Trust - DBT India Alliance	15-01-2011 to 14-01-2016	29.49
Swarnajayanti Fellowship : Cascade Glycosylations : A novel strategy for carbohydrate epitopes and Glycoarrays	Srinivas Hotha	GAP/DST/CHE-11-0046 31211046	DST	17-01-2011 to 16-01-2016	20.00
Raja Ramanna Fellowship	A.V. Khare	GAP/DAE/PHY-11-0047 30911047	DAE	08-10-2010 to 19-06-2015	11.10

Name of the Project	Project Leader	Code	Sanctioning Authority	Period (From - to)	(in lakh ₹)	
					Grants Received during the year	
J.C. Bose Fellowship	L.S. Shashidhara	GAP/DST/BIO-11-0048 31511048	SERB-DST	01-02-2011 to 31-01-2016	13.60	
RNAi based genetic screen to identify interactors of Dvap33 and their role in Vapb Mediated Amyotrophic Lateral Sclerosis (Als8)	Girish Ratnaparkhi	GAP/DBT/BIO-11-0053 30811053	DBT	09-03-2011 to 08-03-2015	8.35	
Development and functional studies of homochiral inorganic - organic hybrid materials	Sujit K. Ghosh	GAP/DAE/CHE-11-0056 30911056	DAE	16-08-2011 to 15-08-2014	0.00	
Chiral lanthanide carbohydrate clusters for studying carbohydrate - protein interactions	Raghavendra Kikkeri	GAP/DAE/CHE-11-0057 30911057	DAE	16-08-2011 to 15-08-2014	0.00	
Total synthesis of natural benzo(c) phenanthridine alkaloids by metal-catalyzed cyclization or C-H bond activation reaction as a key step	Masilamani Jeganmohan	GAP/DAE/CHE-11-0058 30911058	DAE	16-08-2011 to 15-08-2014	0.00	
Integrin-dependent regulation of anchorage independence in cancers	Nagaraj Balasubramanian	GAP/WT-DBT/BIO-11-0059 30711059	Wellcome Trust - DBT India Alliance	01-09-2011 to 31-08-2016	52.46	
Quantum information processing by nuclear magnetic resonance : Oriented spin systems as large quantum registers	T.S. Mahesh	GAP/DST/PHY-11-0063 30111063	SERB-DST	31-10-2011 to 30-10-2014	4.00	
A transcriptomic approach to decipher the alarm signals in phloem of wild solanum species in response to pathogen challenge	Anjan Banerjee	GAP/DBT/BIO-11-0064 30811064	DBT	03-11-2011 to 02-03-2015	10.13	
New insight of flavin-aptamer recognition process with the help of biophysical studies	Partha Hazra	GAP/CSIR/CHE-12-0065 30512065	CSIR	01-01-2012 to 31-12-2014	2.81	

(in lakh ₹)

Name of the Project	Project Leader	Code	Sanctioning Authority	Period (From - to)	Grants Received during the year
Conformation of microhydrated peptides : Laser-desorption jet-cooled studies	Aloke Das	GAP/DST/CHE-12-0066 30112066	DST	01-03-2012 to 28-02-2015	13.00
Two-dimensional metal - organic coordination networks	Nirmalya Ballav	GAP/DAE/CHE-12-0069 30912069	DAE	05-03-2012 to 04-03-2015	0.00
Surface enhanced Raman scattering in holographic optical trap	G.V. Pavan Kumar	GAP/DST-PHY-12/0070 30112070	DST	09-03-2012 to 08-03-2015	6.00
Chimeric nanoparticle: A novel nanoplatform for signaling pathway driven cancer chemotherapy (Ramalingaswami Fellowship)	Sudipta Basu	GAP/DBT/BIO-12-0073 31312073	DBT	06-02-2012 to 05-02-2017	15.92
Hypoxia-activated prodrugs of Nitric Oxide	Harinath Chakrapani	GAP/DBT/BIO-12-0074 30812074	DBT	01-04-2012 to	8.99
Science Media Centre	L.S. Shashidhara	GAP/DST/S&T-12-0075 30112075	DST	16-04-2012 to 15-04-2015	
The role of SATB proteins in the structure and function of the inactive X	Ashwin Kelkar	GAP/WT-DBT/BIO-12/0076 30712076	Wellcome Trust - DBT India Alliance	01-05-2012 to 30-04-2016	20.38
INSPIRE Faculty Award	Chandrasheel Bhagwat	GAP/DST/INSPIRE-12-0077 31812077	DST	01-03-2012 to 28-02-2017	10.24
Ramanujan Fellowship	Ashna Bajpai	GAP/DST/PHY-12-0078 31112078	DST	09-03-2012 to 08-03-2017	23.00
SanGeniX: A Comprehensive Next Generation Sequence (NSG) data analysis solution	Sanjeev Galande	GAP/DBT/BIO-12-0079 30812079	DBT	16-03-2012 to	5.08
Modeling and observations of CME propagation associated radio bursts and cosmic ray forbush decreases at the earth	Prasad Subramanian	GAP/ISRO/PHY-12-0081 30612081	ISRO	06-06-2012 to 05-06-15	0.00

(in lakh ₹)					
Name of the Project	Project Leader	Code	Sanctioning Authority	Period (From - to)	Grants Received during the year
Palladium catalyzed chelation assisted C-H bond functionalization of aromatics, alkenes and alkanes	M. Jeganmohan	GAP/DST/CHE-12-0082 30112082	SERB-DST	03-07-2012 to 02-07-2015	10.00
Functional studies of novel inorganic-organic hybrid frameworks with guest accessible sites	Sujit Kumar Ghosh	GAP/DST/CHE-12-0083 30112083	SERB-DST	05-07-2012 to 04-07-2015	8.00
Role of network topology in the generation of coordinated neuronal activity	Collins Assisi	GAP/WT-DBT/BIO-12-0084 30712084	Wellcome Trust - DBT India Alliance	01-09-2012 to 31-08-2017	12.25
Investigating the role of intracellular calcium signal remodelling in the pathogenesis of Alzheimer's disease	Suhita Nadkarni	GAP/WT-DBT/BIO-12-0085 30712085	Wellcome Trust - DBT India Alliance	01-08-2012 to 31-07-2017	22.40
Development and application of theoretical methods for mechanistic understanding of ultrafast photoinduced molecular processes	Anirban Hazra	GAP/DST/CHE-12-0086 30112086	SERB-DST	03-08-2012 to 02-08-2015	2.00
Elevational species diversity patterns in the eastern Himalayas (Arunachal Pradesh)	Ramana Athreya	GAP/DST/BIO-12-0088 30112088	SERB-DST	21-08-2012 to 20-08-2015	8.00
Redox-directed mycobacterial therapeutics	Harinath Chakrapani	GAP/DBT/CHE-12-0090 30812090	DBT	28-09-2012 to 27-09-2015	11.79
DNA damage surveillance and repair: characterising the interaction between TopBP1 and Msh2-Msh6 complex	Mayurika Lahiri	GAP/DBT/BIO-12-0091 30812091	DBT	09-11-2012 to	19.15 08-11-2015
Interacting networks to model and control dynamics of complex systems (Indo-German (DST_DAAD) Project)	G. Ambika	GAP/DST/PHY-12-0092 30112092	DST	21-09-2012 to 20-09-2014	
Electronic, magnetic & non-magnetic doping of quantum spin chains	Surjeet Singh	GAP/DST/PHY-12-0093 30112093	SERB-DST	24-09-2012 to 23-09-2014	3.62

(in lakh ₹)

Name of the Project	Project Leader	Code	Sanctioning Authority	Period (From - to)	Grants Received during the year
Ramanujan Fellowship	Angshuman Nag	GAP/DST/CHE-13-0094 30113094	SERB-DST	29-10-2012 to 28-10-2017	20.00
Study on the impact of the project on wildlife of the area for construction of 780 MW Nyamjang Chhu HEP in Twang District of Arunachal Pradesh	Ramana Athreya	GAP/Arunachal/BIO-13-0095 32013095	Govt. of Arunachal Pradesh	01-01-2013 to 31-12-2014	4.89
INSPIRE Faculty Award	Neelesh Dahanukar	GAP/DST/INSPIRE-12-0096 31812096	DST	16-10-2012 to 15-10-2017	16.92
Fluorescent nucleoside based amphiphiles: Synthesis, self assembly properties and applications	Seerghazhi G. Srivatsan	GAP/CSIR/CHE-12-0097 30512097	CSIR	01-11-2012 to 30-10-2015	4.00
FIST Program-2012	K.N. Ganesh	GAP/DST/FIST/CHE-13-0098 30113098	DST	07-01-2013 to 06-01-2018	
Knowledge Economy Partnerships Scheme	Umakant Rapol	GAP/BC-IISER/PHY-13-0099 31713099	British Council	22-03-2013 to 31-3-2013	
Structural descriptors of protein-protein and protein-ligand binding sites and knowledge-based design of new interfaces and ligands	M.S. Madhusudhan	GAP/WT-DBT/BIO-13-100 30713100	Wellcome Trust - DBT India Alliance	01-04-2013 to 31-03-2018	154.71
J.C. Bose Fellowship	Sunil Mukhi	GAP/DST/PHY-13-0101 31513101	DST	09-06-2008 to 08-06-2018	4.80
INSPIRE Faculty Award	Gayathri Pananghat	GAP/DST/INSPIRE-13-0102 31813102	DST	01-04-2013 to 31-03-2018	16.92
Initiation and propagation of Earth directed Coronal Mass Ejection	Prasad Subramanian	GAP/AOARD-US/PHY -13-0103 32113103	AOARD-US	02-04-2013 to 01-07-2014	
Role of RNA binding proteins in Hedgehog signalling	Shital Ahaley	GAP/WT-DBT/BIO-13-0104 30713104	Wellcome Trust - DBT India Alliance	01-05-2013 to 30-04-2018	29.26

(in lakh ₹)

Name of the Project	Project Leader	Code	Sanctioning Authority	Period (From - to)	Grants Received during the year
INSPIRE Faculty Award	Ronnie Sebastian	GAP/INSPIRE/MTH-13-0105 31813105	DST	25-4-2013 to 24-4-2018	16.92
Ramalingaswami Fellowship	Raghav Rajan	GAP/DBT/BIO-13-0106 31313106	DBT	01-05-2013 to 30-04-2018	18.05
INSPIRE Faculty Award	Arjun Bagchi	GAP/INSPIRE/PHY-13-107 318133107	DST	04-06-2013 to 03-06-2018	16.92
Fabrication of optical gate functionalized with single based on bacterio-Rhodopsin walled carbon nanotubes	Harsh Chaturvedi	GAP/DST/PHY-13-0108 30113108	SERB-DST	07-06-2013 to 06-06-2016	
Ramanujan Fellowship - Research Grant	Mukul Kabir	GAP/DST/PHY-13-0109 31113109	SERB-DST	13-06-2013 to 12-06-2018	7.60
Dynamical effects in the mechanism of intercalation of anti-cancer drugs	Arnab Mukherjee	GAP/DST/CHE-13-0110 30113110	SERB-DST	13-06-2013 to 12-06-2016	
Peripherally functionalized siloxane scaffolds for the assembly of multi-metallic cages, clusters and supramolecules	R. Boomishankar	GAP/DST/CHE/13-0111 30113111	SERB-DST	13-06-2013 to 12-06-2016	5.00
Design, synthesis and characterization of modified dipyrins and its complexes	V.G. Anand	GAP/DST/CHE/13-0112 30113112	SERB-DST	17-6-2013 to 16-6-2016	8.00
Studies on non-covalent modulation of gating and selectivity of synthetic ion channels	Pinaki Talukdar	GAP/DST/CHE-13-0114 30113114	SERB-DST	1-7-2013 to 30-6-2016	5.00
Deciphering the transcriptional and miRNA mediated control of calcium dependent protein kinases *StCDPK in potato tuber development	Anjan Banerjee	GAP/DST/BIO-13-0115 30113115	SERB-DST	22-02-2013 to 21-02-2016	2.00

(in lakh ₹)					
Name of the Project	Project Leader	Code	Sanctioning Authority	Period (From - to)	Grants Received during the year
Crystal growth of the newly discovered high-temperature iron-arsenide superconductors AFe_2As_2	Surjeet Singh	GAP/DST/PHY-13-0116 30113116	SERB-DST	30/07/2013 to 29/07/2016	
Dielectric response of a lasing medium in frequency domain	Shouvik Datta	GAP/DST/PHY-13-0117 30113117	SERB-DST	30-07-2013 to 29-07-2016	3.00
Optoelectronic and Plasmonic Properties of all-Inorganic Sn Doped In_2O_3 (ITO) Nanocrystals	Angshuman Nag	GAP/DAE/CHE-13-0118 30913118	DAE/BRNS	01-08-2013 to 31-07-2016	3.97
Origin of plasma membrane polarity during embryogenesis	Richa Rikhy	GAP/DBT/BIO-13-0119 30813119	DBT	23-08-2013 to 22-08-2016	
INSPIRE Faculty Award	Diganta Borah	GAP/INSPIRE/MAT-13-120 31813120	DST	21-08-2013 to 20-08-2018	
Molecular motor driven centrosomal microtubule mobility: Mechanics and spatio-temporal organization (RGYI)	Chaitanya Athale	GAP/DBT/BIO-13-0121 30813121	DBT	3-9-2013 to 2-9-2016	
Systems modelling and experimental testing of cytoskeletal polarisation in cellular pattern formation	Chaitanya Athale	GAP/DBT/BIO-13-0122 30813122	DBT	3-9-2013 to 2-9-2016	
Developmental control of mitochondrial morphology	Richa Rikhy	GAP/DBT/BIO-13-123 30813123	DBT	4-9-2013 to 2-9-2016	
Molecular modelling and simulation of nanostructure and dynamics of ionic liquid doped polymer electrolyte membrane fuel cells	Arun Venkatnathan	GAP/DST/CHE-13-124 30113124	SERB-DST	05-09-2013 to 04-09-2016	2.00
Engineering novel supramolecular nanopatform for paclitaxel delivery in cancer	Sudipta Basu	GAP/DST/CHE-13-126 30113126	SERB-DST	06-09-2013 to 05-09-2016	3.50
INSPIRE Faculty Award	Krishnapal Karmodiya	GAP/INSPIRE/BIO-13-127 31813127	DST	02-09-2013 to 01-09-2018	

(in lakh ₹)					
Name of the Project	Project Leader	Code	Sanctioning Authority	Period (From - to)	Grants Received during the year
Learning and memory in aggression: Identifying the neurogenetic substrates and memory traces of a complex social behaviour	Aurnab Ghose	GA/DST/BIO-13-128 30113128	SERB-DST	17/10/2013 to 16/10/2013	
Women Scientist Scheme - A	Smita Chaturvedi	GAP/DST/PHY-13-129 30113129	SERB-DST	07-10-2013 to 06-10-2016	
Understanding the functional paralogs and their interaction with developmental pathways using Zebrafish as a model organism	Tressa Jacob	GAP/DBT/BIO-13-130 30813130	DBT	17-10-2013 to 16-10-2016	
Stabilizing the dynamics of laboratory populations of <i>Drosophila</i> melanogaster using limiter control	Sutirth Dey	GAP/CSIR/BIO-13-131 30513131	CSIR	11-10-2013 to 10-10-2016	2.15
Optical effects in functionalized single walled carbon nanotubes	Harsh Chaturvedi	GAP/DST/BIO-13-132 30113132	SERB-DST	16-09-2013 to 15-09-2016	
National network for mathematical and computational biology	L.S. Shashidhara	GAP/DST/BIO-13-0133 30113133	SERB-DST	30-10-2013 to 29-10-2016	13.00
Role of neuropeptide Y in zebrafish olfaction	Aurnab Ghose	GAP/DST/BIO-13-0134 30113134	SERB-DST	03-12-2013 to 02-12-2016	7.00
To set up Maharashtra Gene Bank in Maharashtra State	Milind Watve	GAP/GoM/BIO-14-0135 32214135	Govt. of Maharashtra	9-1-2014 to 9-1-2019	11.20
Capacity building among village youth for self study and self employment along western boundary of Tadoba-Andhari Tiger Reserve, Maharashtra	Milind Watve	GAP/DST/BIO-13-0136 30113136	SERB-DST	6-11-2013 to 5-11-2016	

(in lakh ₹)					
Name of the Project	Project Leader	Code	Sanctioning Authority	Period (From - to)	Grants Received during the year
Ligand-free colloidal all-inorganic semiconductor nanocrystals: Synthesis, photophysics and optoelectronic application	Angshuman Nag	GAP/DST/CHE-13-0137 30113137	SERB-DST	30-12-2013 to 29-12-2016	
Understanding dioecy by exploring floral organ identity genes (OIGs) in <i>Coccinia grandis</i> - a new model for study	Anjan Banerjee	GAP/DBT/BIO-13-0138 30813138	DBT	03-03-2014 to 02.03.2017	
DISC-B Denmark-India in vivo screen for cancer biomarkers	L.S. Shashidhara	GAP/DBT/BIO-13-0139 30813139	DBT	27-02-2014 to 26-2-2019	77.50
Glycochemical studies of mycobacterial arabinomycolate	Srinivas Hotha	GAP/ICPAR/CHE-14-0140 31414140	ICPAR	01-04-2014 to 31-03-2017	27.00
Synthesis of new fluorinated tumor-associated glycopeptide antigens and meningitis vaccine A analogues	Madhuri Vangala	GAP/DST/CHE-14-0141 30114141	SERB-DST	02-07-2014 to 01-07-2017	8.00
Development and functional studies of metal-organic polyhedras (MOPs)	Sujit Kumar Ghosh	GAP/INSA/CHE-14-0142 32314142	INSA	01-06-2014 to 31-05-2017	3.00
Target gene identification, regulation and functional characterization of the shoot meristem (STM) ortholog in Potato	Anjan Banerjee	GAP/DST/BIO-14-0143 30114143	SERB-DST	02-06-2014 to 01-06-2017	27.00
Structure and filament dynamics of the cytoskeletal protein fibril (Fib) involved in spiroplasma mitotility	Gayathri Pananghat	GAP/DBT/BIO-14-144 30814144	DBT	30-06-2014 to 29-06-2017	24.10
NAMASTE Program	Naresh Sharma	GAP/GU/BIO-14-145 32414145	Gottigen University, Germany		10.31
INSPIRE Faculty Award	Anup Biswas	GAP/DST/MTH-14-146 31814146	DST	18-08-2014 to 17-08-2019	7.00

Name of the Project	Project Leader	Code	Sanctioning Authority	Period (From - to)	Grants Received during the year
INSPIRE Faculty Award	Mousumi Bhakta	GAP/DST/MTH-14-147 31814147	DST	18-08-2014 to 17-08-2019	7.00
Design and development of aminoacid based polymer scaffolds for drug delivery	M. Jayakannan	GAP/DST/CHE-14-0148 30114148	SERB-DST	04-08-2014 to 03-08-2017	72.00
Identification and characterization of the CART neuropeptide receptor	Aurnab Ghose	GAP/LTMT/BIO-14-0149 32414149	LTMT	09-09-2014 to 08-09-2016	5.00
CoE FAST	K.N. Ganesh	GAP/MHRD/CHE-14-150 32514150	MHRD	04-09-2014 to 03-09-2019	150.00
Quantum memory based on nitrogen vacancy centers in diamond - Swarnajayanti Fellowship	T.S. Mahesh	GAP/DST/PHY-14-151 31214151	DST	23-09-2014 to 32-09-2019	157.50
The MOR cryptosystem Chevalley groups and Galois action	Ayan Mahalanobis	GAP/DST/MTH-14-152 3011415	SERB-DST	04-09-2014 to 03-09-2017	6.50
Porphyrin, chlorin and isophlorin based near infrared dyes for high-efficiency dye-sensitized solar cells: an inspiration from nature (Indo-Singapore)	V.G. Anand	GAP/DST/CHE-14-153 30114153	DST	30-08-2014 to 29-08-2017	15.42
Introduction of silylene in frustrated Lewis pair chemistry and their reactivity towards small molecules	Shabana Khan	GAP/DST/CHE-14-154 30114154	SERB-DST	18-09-2014 to 17-09-2017	26.00
Ruthenium-catalysed meta selective C-H Bond functionalization of substituted aromatics	M. Jeganmohan	GAP/CSIR/CHE-14-155 30514155	CSIR	01-10-2014 to 30-09-2014	1.50
Novel electronic and magnetic states in 4d and 5d transition	Sunil Nair	GAP/CSIR/PHY-14-156 30514156	CSIR	01-10-2014 to 30-09-2014	8.50

(in lakh ₹)

Name of the Project					Project Leader	Code	Sanctioning Authority	Period (From - to)	Grants Received during the year
Evolution of evolvability in laboratory populations of <i>E. coli</i>					Sutirth Dey	GAP/DBT/BIO-14-157 30814157	DBT	17-10-2014 to 16-10-2017	37.10
DBT program support for fetal programming research					Sanjeev Galande	GAP/DBT/BIO-14-158 30814158	DBT	10-11-2014 to 09-11-2019	14.25
Studying neoplastic transformation of mammosphere cultures in 3D using chemical mutagens					Mayurika Lahiri	GAP/DBT/BIO-14-159 30814159	DBT	12-11-2014 to 11-11-2017	47.90
Ruthenium catalyzed highly regio- and stereoselective oxidative coupling of α -components: A versatile route to substitute alkenes, dienes and heterocycles					M. Jeganmohan	GAP/INSA/CHE-14-160 32314160	INSA	01-11-2014 to 31-10-2017	2.50
The quest for new multiferroic oxides					Sunil Nair	GAP/DST/PHY-14-161 30114161	SERB-DST	22-11-2014 to 21-11-2017	41.00
Design and synthesis of covalent and non-covalent composites from aromatic and antiaromatic macrocycles for molecular diode (Swarnajayanti Fellowship)					V.G. Anand	GAP/DST/CHE-14-162 30114162	DST	03-11-2014 to 02-11-2019	135.00
J.C. Bose Fellowship					K.N. Ganesh	GAP/DST/JCB/CHE-14-163 31514163	SERB-DST	26-06-2006 to 25-06-2016	11.50
Ramanujan Fellowship					Nabamita Banerjee	GAP/DST/RJ/PHY-14-164 31114164	SERB-DST	17-09-2013 to 16-09-2018	19.02
Chimeric Nanoparticle for targeting signalling network as next generation cancer therapeutics					Sudipta Basu	GAP/DBT/CHE-14-0165 30814165	DBT	08-12-2014 to 07-12-2017	21.96
Non-abelian bilinear cryptography					Ayan Mahalanobis	GAP/DAE/NBHM/MTH-14-166 30914166	DAE-NBHM	27-01-2015 to 26-01-2018	1.70

(in lakh ₹)					
Name of the Project	Project Leader	Code	Sanctioning Authority	Period (From - to)	Grants Received during the year
Quantitative characterization of threshold behavior of oxidative stress towards development of insulin resistance	Pranay Goel	GAP/DBT/BIO-15-167 30815167	DBT	06-01-2015 to 05-01-2018	7.86
Elucidating the role of lipids in ion channel function	Jeet Kalia	GAP/WT-DBT/BIO-15-168 30715168	Wellcome Trust - DBT India Alliance	01-03-2015 to 28-2-2020	75.20
J.C. Bose Fellowship	Shyam Rai	GAP/DST/EAS-14/0169 31514169	SERB-DST	01-08-2010 to 31-07-2015	0.72
INSPIRE Faculty Award	Gyana Ranjan Tripathy	GAP/INSPIRE/EAS-15-170 31815170	DST-INSPIRE		
Development of functional ?-conjugated polymers for photonic applications	M. Jayakannan	GAP/DST/CHE-15-171 30115171	SERB-DST	18-03-2015 to 17-03-2018	37.00
Tailoring glycosyl-phosphatidylinositol substitutes and substrate mimics to study the GPI biosynthetic pathway and modulate host-pathogen interactions	Srinivas Hotha	GAP/DST/CHE-15-172 30115172	SERB-DST	19-03-2015 to 18-03-2015	30.00
Direct assembly of sialic acid specific petidomimics on cantilever array sensors for detecting cancer biomarkers	Raghavendra Kikkeri	GAP/DST/CHE-15-173 30115173	SERB-DST	12-03-2015 to 11-03-2018	23.00

Equipment Purchased During the Year

(costing more than 25 lakh rupees)

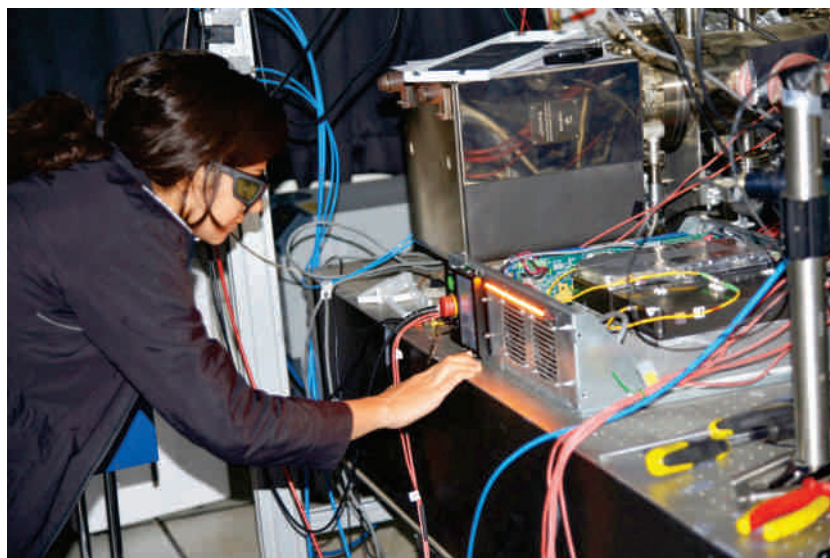
Equipment	Make	Cost in Indian Rupees
Atomic Force Microscope	Keysight Technologies Singapore Sales Private Ltd, Singapore	90,09,700.00
Glove Box	Jacomex, France	31,59,132.00
YLR-20-1064-LP-SF/20 W Fiber Laser Linearly Polarized Laser System	IPG Photonics Corporation, U.S.A.	28,38,315.00
Bench Top Flow Cytometer	Becton Dickinson Holdings Private Ltd, Singapore	25,20,000.00
Total		371,17,147.00



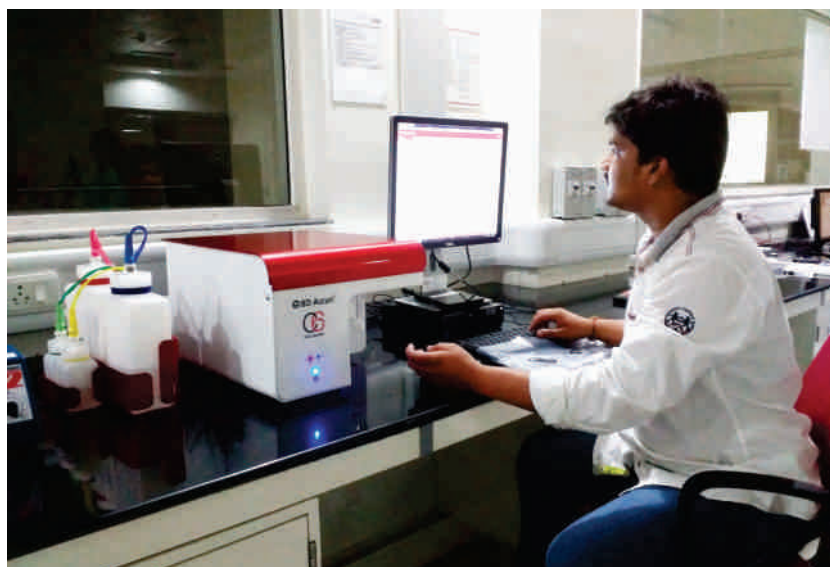
Neelesh Deshpande (PhD student) is seen here with Atomic Force Microscope (5500 Series) for multidisciplinary imaging applications purchased from Keysight Technologies, Singapore Sales Private Ltd, Singapore.



PhD student Anant Srivastava uses here a three port glovebox which maintains a completely inert atmosphere of < 1 ppm of oxygen and moisture. It is useful for storing and handling of air and moisture sensitive compounds and allows one to perform reactions that are sensitive to trace amounts of oxygen. In addition, it contains an in-built freezer for storing volatile liquids that are sensitive to ambient atmosphere. The glovebox was obtained from Jacomex, France.



Gunjan Verma (PhD student) working on setting up the 20 W, 1064 nm laser for experiments on Bose-Einstein condensation in a crossed dipole trap. The YLR-20-1064-LP-SF/20 W Fiber Laser Linearly Polarized Laser System has been obtained from IPG Photonics Corporation, U.S.A.



Satish Bodakuntla, project assistant in the research group of Dr. Mayurika Lahiri uses here a compact bench-top flow cytometer useful in cell counting, cell sorting and analysis of particles in a suspension. The flow cytometer has been obtained from Becton Dickinson Holdings Private Ltd, Singapore.

IISER Pune Library

The Institute Library provides essential and specialized information, resources and services to meet the academic and research needs of the IISER Pune community. Library adopts state-of-art technologies to facilitate access to online and print resources to its users.

Major international journals and online resources in the disciplines of basic sciences and its allied subjects have been subscribed. The IISER Pune Library is part of the 'IISER Library Consortium' constituted jointly by all IISERs. E-journal archives from Annual Reviews, Institute of Physics, Nature Publishing Group, Oxford University Press, Springer-Verlag and American Geophysical Union (AGU) have been made available through the consortium. The

Library also has a membership of national level consortia like INDEST-AICTE Consortium established by the Ministry of HRD, Govt. of India and UGC INFONET Digital Library Consortium.

Automated biometric based Kiosk has been installed in the Library for self-help circulation of print books, which enables users to issue, return and renew books by themselves. Circulation Kiosk is operational from 8 am to 11 pm on all days including holidays.

Library subscribes to iThenticate, a plagiarism checking web tool, which allows researchers compare content against a massive database before publication or submission of thesis to ensure the work is original. The IISER Pune Library has been awarded with 'Highest usage of Science

Direct among IISERs for the year 2014' by Elsevier publisher.

During 2014-15, Library has introduced two new services:

- **Monthly Table of Contents Service** to make users aware of newly published Journal Papers, Book Chapters, Conference Papers or any other publications by the faculty members and the students of IISER Pune.
- **Monthly List of New Additions of Books Service** to make users aware of new reading materials added to the library collection in different subject fields.

Over 1600 print books and many more online resources have been added to the Library's collection during the last financial year.



Collection Statistics of the Library as on March 31, 2015

Print Books: 17651

Gratis Books: 705

e-Books: 6070

Print Journals / Magazines: 50

e-Journals: 3000

Full-Text Databases: 10

Bibliographic Databases: 5

Records in IISER Digital Library (IDL): 439

Users of the Library: 1150

Important Online Full-Text Resources available

ACS Web Edition + Legacy Archive

American Institute of Physics (AIP) + Archives

American Physical Society (APS)

Elsevier's Science Direct

Institute of Physics (IOP) + Archives

Journal of Visualized Experiments (All Sections)

JSTOR

Nature Publishing Group (NPG) + Archives

OSA's Optics Infobase

Project Euclid's Prime Collection

Royal Society of Chemistry (RSC) + Archives

SPIE: International Society for Optics and Photonics

Wiley Interscience Journals

Important Online Bibliographic Resources available

Faculty of 1000: Post-publication peer review database

MathSciNet

SciFinder Scholar

Synfacts

Web of Knowledge



At a book exhibition organized by the Library on the occasion of Science Day



Scientific Report

1. Chemical Biology

1.1 Chemical Nanobiotechnology

Traditional cancer therapy uses highly cytotoxic drugs such as chemotherapy alone or in combination with radiation therapy. However, most tumors bypass the effect of monotherapy by developing intrinsic or acquired resistance mechanisms. Intrinsic resistance mechanism can pre-exist in the tumor through activation of redundant signalling pathways or overexpressing drug efflux pumps or mutational activation of downstream signalling. On the other hand, acquired resistance can develop during the treatment of tumor by mutations of the target or upregulation of other signalling pathways or downregulation of tumor suppressor proteins. It is now increasingly clear that none of these resistance developing signaling pathways operate in isolation. Instead, each is influenced by crosstalk with other pathways. To overcome this drug resistance in cancer, Dr. Sudipta Basu's group propose mechanism driven drug targeting of multiple organelles and multiple signaling hubs.

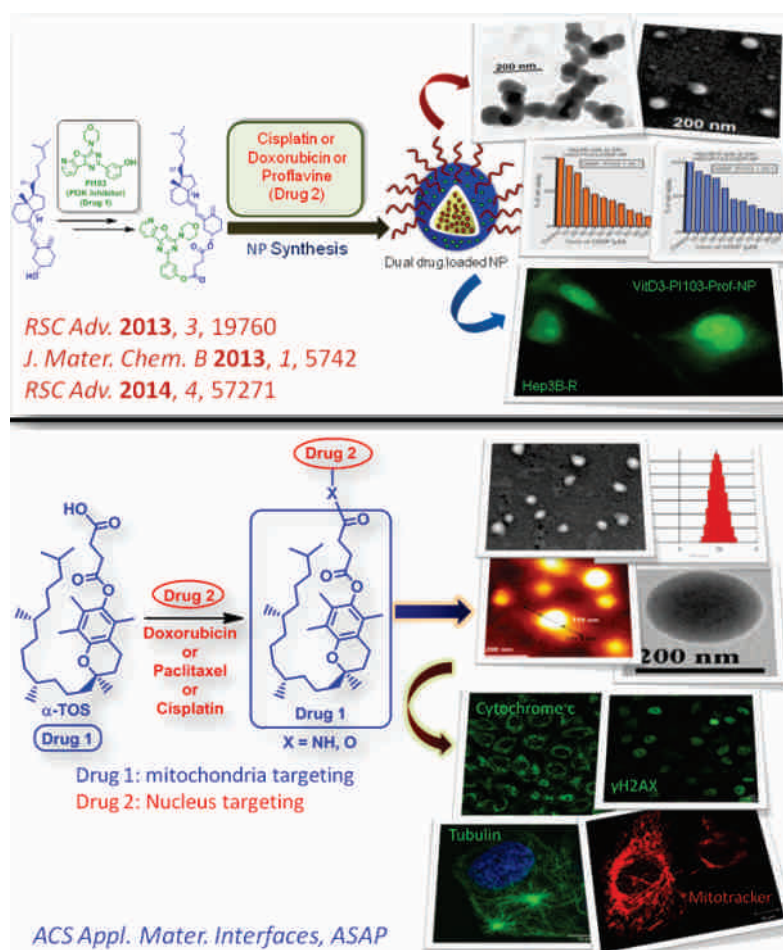


Figure 1: (Top panel): Targeting multiple signaling pathways; (Bottom panel): Targeting multiple organelles (Sudipta Basu's Group)

Dr. Basu's group has developed sub-200 nm particles from biocompatible, biodegradable vitamin D3 which can contain rational combination of dual drugs (PI3K and cisplatin or doxorubicin or proflavine) to target phosphatidylinositol-3-kinase (PI3K) signalling and DNA damage. These dual drug loaded nanoparticles induced increased cell death in human hepatocellular carcinoma, Hep3B cells compared to monotherapy; also, they were effective against cisplatin-resistant cells (Hep3B-R) as well.

The engineered nanoparticles that simultaneously target multiple organelles like mitochondria and nucleus were endocytosed into the acidic lysosomal compartments of HeLa cervical cancer cells and released the dual drugs in a slow and sustained manner. These nanoparticles showed cytotoxicity by inducing apoptosis through damaging mitochondrial outer membrane (MOM) to release cytochrome c as well as damaging nuclear DNA and tubulin to arrest the cell cycle.

1.2 Strategies for Organic Synthesis and Catalysis

Dr. Ramakrishna G. Bhat's research group focuses on asymmetric catalytic synthesis and C-H functionalization, with an emphasis on the development of new synthetic methods that facilitate the construction of complex and bioactive molecules.

They have developed novel and practical protocols for the deprotection of acetyl, N-Cbz, benzyl esters groups. *N*-deacetylation usually needs harsher conditions and is not suitable for sensitive substrates that are prone to racemization. A mild and efficient *N*-deacetylation process using the Schwartz reagent at room temperature in rapid time has been developed (*Org. Biomol. Chem.* (2014) 12:261-264).

This *N*-deacetylation protocol is chemoselective and did not induce any epimerization at chiral centres and enables the orthogonal *N*-deacetylation in presence of some of the common protecting groups (viz. Boc, Fmoc, Cbz, Ts).

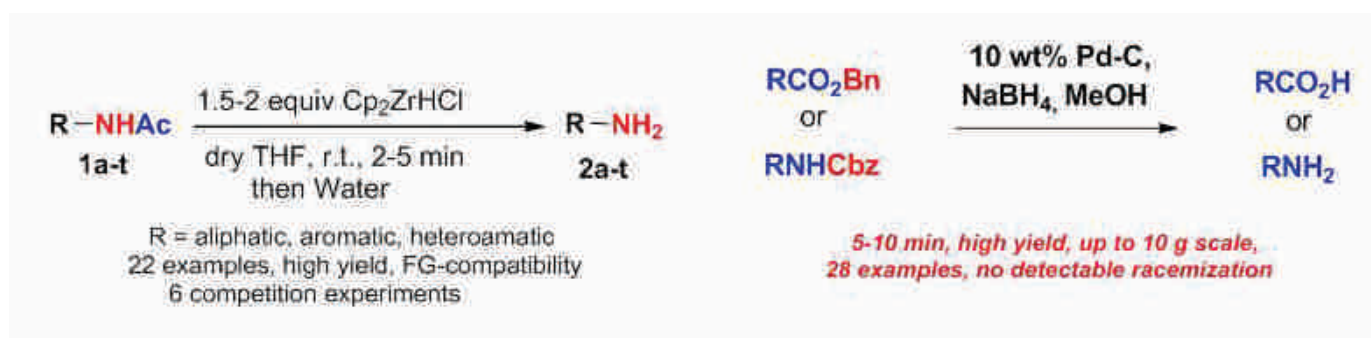


Figure 2: (Left): Schwartz reagent for facile *N*-deacetylation; (Right): Convenient deprotection of Cbz and Benzyl ester groups (Dr. Ramakrishna Bhat's Group)

A convenient method for the deprotection of *N*-benzyloxycarbonyl (Cbz) and benzyl ester groups using NaBH₄ and catalytic Pd-C in methanol involves in situ generation of H₂ and demonstration in gram scale reactions (*Tetrahedron Lett.* (2015) 56:2067-2070).

1.3 Controlled Generation of Reactive Species for Therapeutic Applications

Redox homeostasis is the maintenance of reducing and oxidizing equivalents within our cells and is critical to cellular survival and growth. A number of diseases such as cancer, diabetes, neurodegenerative diseases such as Parkinson's and Alzheimer's, and several cardiovascular diseases are associated with impairment of redox balance characterized by elevated reactive oxygen species, which in turn are derived from molecular oxygen. In addition, a number of antibiotics act through induction of redox stress. It has been proposed that bacteria can overcome antibiotic-induced stress and become drug-resistant by generating certain redox-active gaseous species such as hydrogen sulfide and nitric oxide. Understanding the molecular basis of such dysfunction should provide opportunities to develop interventional strategies and lay the foundation for novel therapeutics.

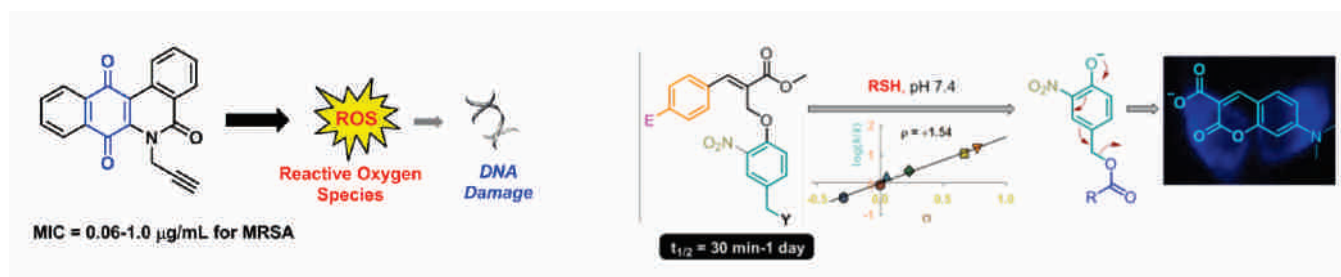


Figure 3: (Left): Drug-resistant bacteria such as MRSA are sensitive to elevated reactive oxygen species that can damage biomacromolecules such as DNA; (Right): A scaffold for tunable release that might find applications in diagnostics and drug delivery (Dr. Harinath Chakrapani's Group)

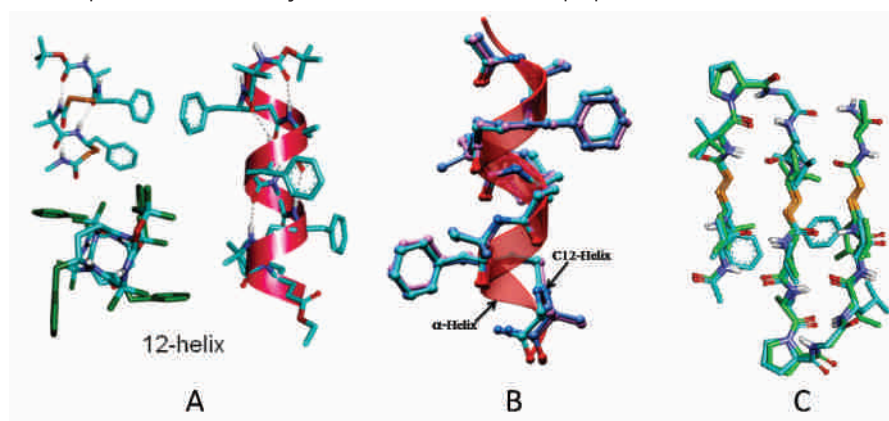
Dr. Harinath Chakrapani's laboratory focuses on developing methodologies that facilitate delivery of redox-active gaseous species within cells and then studying cellular responses. Several strategies have been developed for controlled generation of reactive oxygen species within bacteria. While certain bacteria are resistant to elevated reactive oxygen species, it was found that this strategy might help overcome resistance in certain other bacteria, for example, the emergence of multi-drug resistance in methicillin-resistant *Staphylococcus aureus* (MRSA). A natural-product inspired small molecule that generates reactive oxygen species within bacteria was found to be an excellent inhibitor (minimum inhibitory concentration, MIC was 0.06-1 µg/ml) against MRSA strains including patient-derived ones. A thiol-activated scaffold for tunable release of bioactive molecules such as a drug or fluorophore and useful for diagnostics and drug delivery has been developed.

1.4 Hybrid Peptides: Synthesis, Structure and Applications

Research in Dr. H.N. Gopi's group is mainly focusing on the exploration of naturally occurring non-ribosomal amino acids along with the novel α -, β - and γ -amino acids towards the design of proteolytically stable protein secondary structure mimetics, miniproteins, peptidomimetics. Their utilization towards structure based drug designs for protein-protein interactions, protease inhibitors, antibiotics (anti-microbials), self-assembled soft biomaterials such as hydrogels, vesicles and nanotubes, and exploitation of these soft biomaterial towards the biology and materials science is underway.

Inspired by the nature's selection, Dr. Gopi's group is exploring the utilization of naturally occurring γ -amino acids along with the α -amino acids to design protein secondary structure mimetics and foldamers. Using such amino acids, various secondary and supersecondary structures such as β -sheets, β -hairpins, helices and multi strand β -sheets have been designed, synthesized and characterized in both solution and single crystals. The folding rules for α/γ -hybrid peptides have been outlined. Interesting feature of α,γ -hybrid peptide helices is that the helical parameters of α,γ -hybrid peptide 12-helix is nicely correlating with the β -peptide 12-helices, suggesting that these peptides can be used as β -peptide surrogates. The structural analogy of the hybrid peptide structures have been assessed with native protein secondary structures as well as β -peptide foldamers.

Figure 4: A) A novel 12-Helix observed in α,γ -hybrid peptides; B) Superposition of α -helix over the 12-helix; C) First single crystal conformation of three-stranded β -sheets composed of E-vinylogous amino acids (Dr. H.N. Gopi's Group)



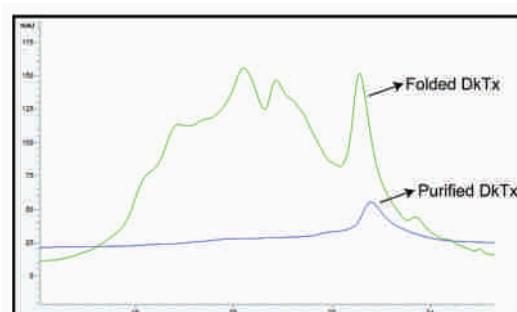
1.5 Ion Channels, Lipids, and Bioconjugation

Dr. Jeet Kalia's laboratory is focusing on (i) development of new bioconjugate methods, and (ii) development of the double-knot spider toxin as a tool in TRPV1 ion channel biology.

They have synthesized a library of 12 thiol-reactive probes and evaluated their hydrolytic stability. This has yielded new maleimide derivatives that specifically form stable Michael adducts with the thiol functional group.

The double-knot spider toxin (DkTx) is a peptide present in the venom of the Chinese bird spider. DkTx binds to TRPV1 ion channels expressed in nociceptive neurons, resulting in channel activation leading to pain. Dr. Kalia is interested in exploiting the high specificity of DkTx for TRPV1 to understand the gating mechanisms of the channel, and as a powerful pharmacological agent for physiology-based studies. Towards this goal, they have developed a robust *E. coli* expression system for producing the toxin as an insoluble protein from *E. coli* cell lysates that re-folds in a redox buffer to obtain the desired active toxin which can be used as a tool in TRPV1 biology.

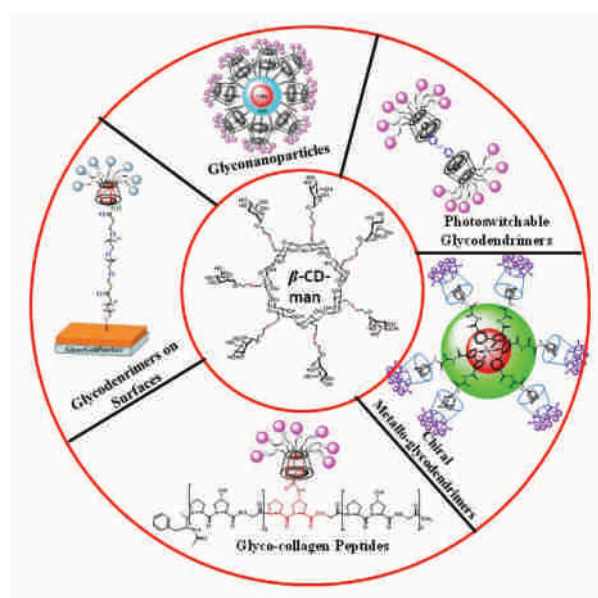
Figure 5: Methodology for production and purification of DkTx by utilizing an *E. coli* expression system. The plot in green represents an HPLC trace of the toxin during re-folding showing the emerging peak for the folded toxin. The plot in blue depicts the trace of the purified folded toxin. (Dr. Jeet Kalia's Group)



1.6 Glycans in the Study of Neuronal Growth

Carbohydrate-lectin interactions are involved in expansively diverse biological processes which include embryonic development, intracellular trafficking, cell-cell recognition, cell activation, cell adhesion, cell homing, endocytosis, phagocytosis, inflammation, tumor cell metastasis, and apoptosis. One main drawback for investigating carbohydrate-lectin interactions is their weak affinity to bind, which will require enhanced tools to analyze carbohydrate-lectin interplay. So far, two promising strategies have emerged from studies in **Dr. Raghavendra Kikkeri's** laboratory: (1) designing multivalent glyco-probes using cyclodextrin templates and their utilization towards amplifying carbohydrate mediated targeting, self-assembly, and remote actuation of particles to treat tumors in cancer models and (2) developing biomimetic carbohydrate strategies to modulate carbohydrate-protein interactions.

Figure 6: Applications of cyclodextrin-based templates (Dr. Raghavendra Kikkeri's Group)

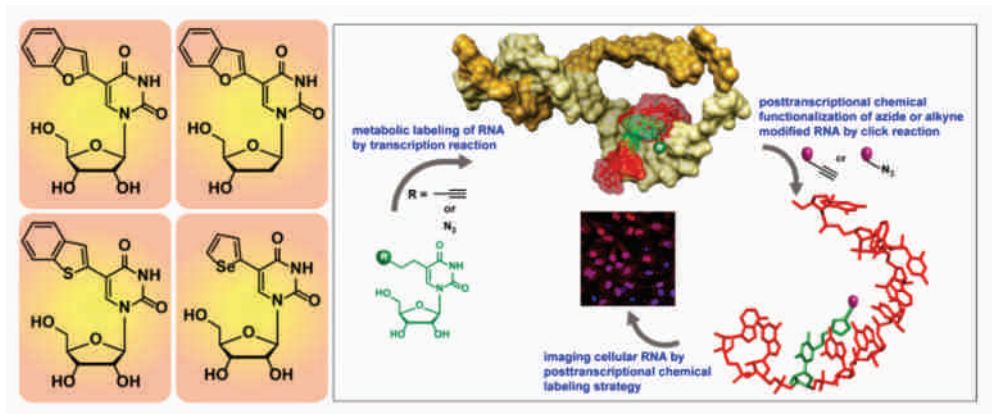


1.7 Functionalized Nucleobase Analogues for Studying Nucleic Acid Structure and Function

Dr. Seergazhi Srivatsan's group is developing tools to assess biological events by utilizing contemporary nucleic acid functions. These biophysical tools enable the study of nucleic acid structure, dynamics and function *in vitro* and in cells and multifunctional nucleolipid conjugates that self-assemble into nanofibres, nanotubes and gels. These self-assemblies would provide platforms for designing biosensors, biomaterials and scaffolds for non-templated/non-enzymatic oligomerization of nucleic acids. His group has successfully developed functionalized nucleoside analogues that are easily incorporated into DNA and RNA and used in study of the nucleic acid recognition process to detect abasic sites (depurinated site/mutation site) in DNA/RNA, and human telomeric DNA repeats of various lengths, monitoring bacterial RNA-drug binding, and study of oligonucleotide dynamics in cell-like confined environment. Currently, his lab is developing multifunction nucleoside probes, which could be used to study the

structure and function of nucleic acids simultaneously by fluorescence and NMR spectroscopy and by X-ray crystallography. His group has recently developed a practical chemical labeling and imaging method for cellular RNA by using a novel toolbox made of azide- and alkyne-modified UTP analogues.

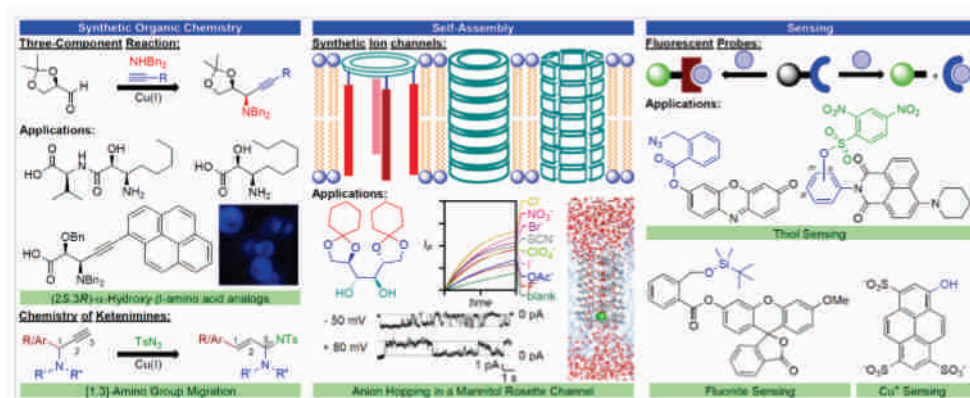
Figure 7: Nucleoside analogues developed in Srivatsan's lab for applications in nucleic acid study *in vitro* and in cells. (Dr. S.G. Srivatsan's Group)



1.8 Synthesis, Self-Assembly and Sensing

The main research focus of Dr. Pinaki Talukdar's group is to combine the knowledge of organic synthesis and supramolecular interactions to design molecules for functional applications. Targeted synthesis of molecules is essential in total synthesis, medicinal chemistry, chemical biology, supramolecular chemistry, etc. He has established Cu(I) catalyzed aldehyde-amine-alkyne coupling reaction as an efficient methodology for the construction of (2*S*,3*R*)- α -amino alcohol derivatives which was applied further in the synthesis of various natural products. Design of artificial supramolecular ion channels and pores to mimic the functions of their natural siblings; construction of unimolecular ion channels based on cyclo-oligo-glucosamines and mannitol based rosette for tuning of ion transport activity to allow selective anion transport via a hopping mechanism of ion from one rosette to the next. Development of fluorescent probes for the sensing of thiols (e.g. biothiols, aryl thiols, H_2S), anions (e.g. fluoride ion), cations (e.g. cations), etc. that are useful for rapid, selective and sensitive detection of respective analytes, and applicable for live cell imaging studies.

Figure 8: A snapshot of research from Talukdar's group in the area of synthesizing organic molecules with functional applications (Dr. Pinaki Talukdar's Group)



1.9 Chemical Physiology and Optical Molecular Imaging

Dr. Britto Sandanaraj's group is focusing their efforts in three different projects: Design, synthesis and biological applications of virus-like particles; synthesis of activity-based probes for biomaterial and proteomic applications; and developing new technologies for accurate and specific detection of active enzymes *in vivo*.

1.10 Natural Product Synthesis

Dr. Gnanaprakasam's group is developing efficient and novel sustainable route to synthesize natural products of challenging structures (Bualamycin and Carolactone etc.) with catalytic reactions using cooperative metal catalyst for stereoselective C-C, C-N and C-O bond formation. Research on catalytic fluorination of various activated/non-activated aromatic and non-aromatic compounds using cooperative metal complex catalyst, non-hazardous and inexpensive fluorinating agents is also carried out in his research group.

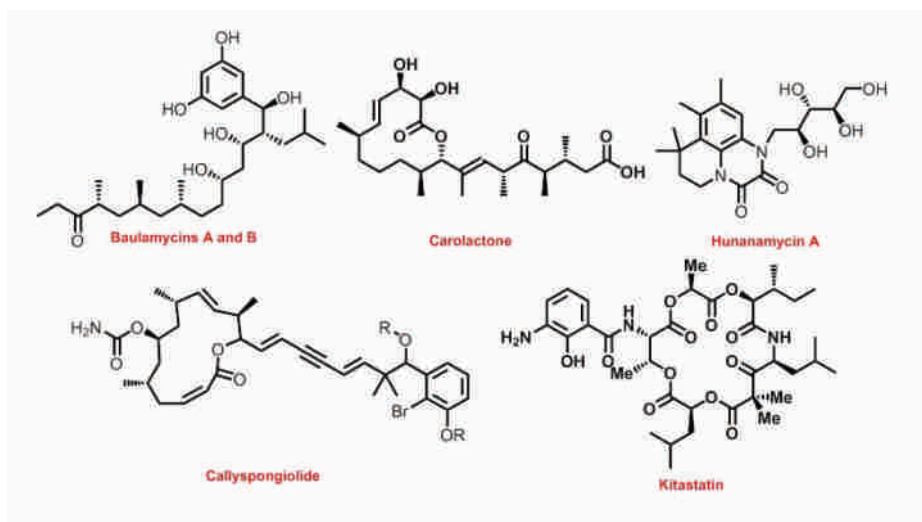


Figure 9: Targeted biologically inspired natural products (Dr. Gnanaprakasam's Group)

1.11 Collagen and Peptide Nucleic Acids

Prof. K.N. Ganesh's group is working on collagens, which are an important family of structural proteins found in the extracellular matrix with characteristic triple helix structure. The collagen triplex is made of three left-handed polyproline II (PPII) helices with each PPII strand consisting of repetitive units of the tripeptide motif X-Y-Gly, where the amino acids X and Y are most commonly proline (Pro) and 4R-hydroxyproline (Hyp), respectively. The ionizable NH_2 substituent at C4 in R/S configuration is a versatile probe for delineating the triplex. A C4-endo pucker at X-site and C4-exo pucker at Y-site are key for formation of triplex, and the nature of pucker is dependent on both the electronegativity and stereochemistry of the substituent. A new class of collagen analogues - chimeric cationic collagens, wherein both X- and Y-sites in collagen triad are simultaneously substituted by a combination of 4(R/S)-(OH/ NH_2 / NH_3^+ / NHCHO)-prolyl units were prepared and triplex stabilities measured at different pHs and in EG:H₂O. Based on these results, a model has been proposed in which specifically favored ring puckers at C4-endo

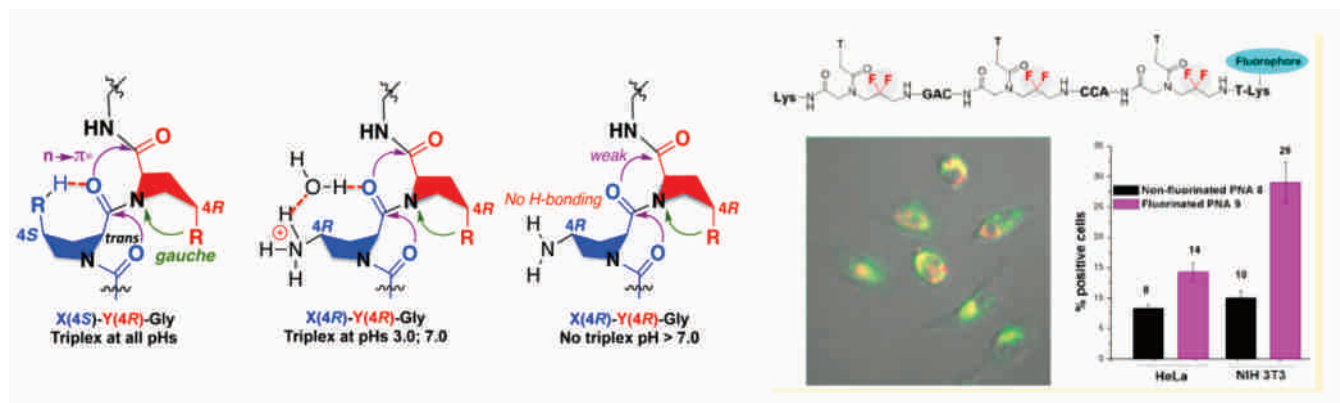


Figure 10: (Left): Assessing stability of chimeric cationic collagens indicated a critical combination of factors C4-(exo/endo), intraresidue H-bonding, stereo electronic (R/S) and $n \rightarrow \pi^*$ interactions orchestrate the strength of the collagen triplex; (Right): Cellular uptake of the fluorinated γ -CF₂-apg PNAs in NIH 3T3 and HeLa cells in comparison to that of nonfluorinated apg PNA (Prof. K.N. Ganesh's Group)

at X-site) and C4-exo at Y-site, stabilize the PPII conformation and the derived triplexes. It was shown that a critical combination of factors - C4-(exo/endo), intraresidue H-bonding, stereo electronic (R/S) and $n \rightarrow \pi^*$ interactions orchestrate the strength of the triplex. The results have potential for designing of collagen analogues with customized properties for material and biological applications.

Continuing their work on PNA analogues, they have now synthesized fluorinated PNAs possessing fluorine as inherent part of aminopropylglycine (apg) backbone - (γ -CF₂-apg PNA) and evaluated their biophysical and cell penetrating properties. These form duplexes of higher thermal stability with cRNA than cDNA, although destabilized compared to duplexes of standard aeg-PNA. Cellular uptake of the fluorinated γ -CF₂-apg PNAs in NIH 3T3 and HeLa cells was 2–3-fold higher compared to that of nonfluorinated apg PNA, with NIH 3T3 cells showing better permeability compared to HeLa cells (shown in Figure). The backbone fluorinated PNAs, which are first in this class, when combined with other chemical modifications may have potential for future PNA-based antisense agents.

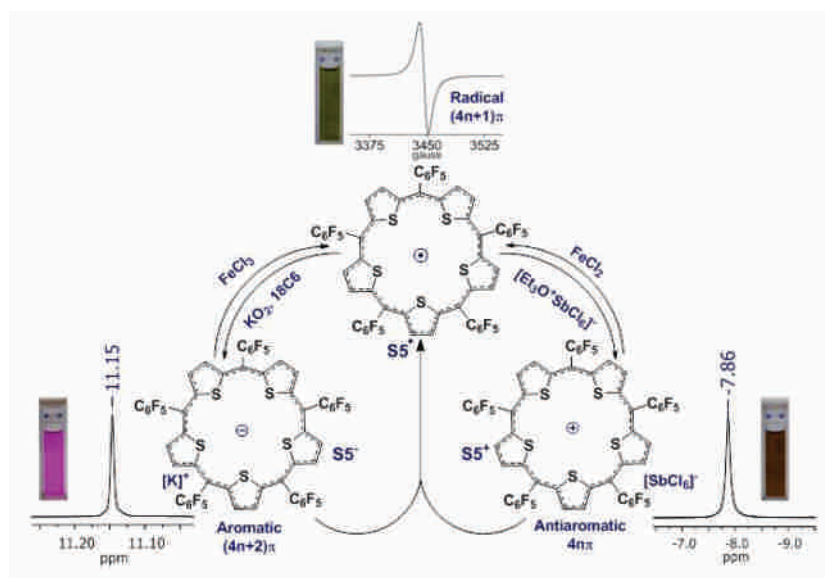
2 Materials Science and Nanoscience

2.1 Synthesis and Reactivity of Stable Antiaromatic Macrocycles

Dr. V.G. Anand's laboratory is involved in the design, synthesis and exploration of electronic properties of $4n\pi$ macrocycles derived from small heterocycles such as thiophene, furan, and selenophene. In pursuit of stable $4n\pi$ systems, a range of $4n\pi$ -expanded isophlorins bearing 20π to 48π electrons have been made. The group has been successful in the synthesis and characterization of the first stable 20π isophlorins derived from furan and thiophene heterocycles. In continuation, the isolation and characterization of an air-stable neutral 25π penta-thiophene macrocycle and its one-electron redox reactions to form 26π aromatic anion and 24π antiaromatic cation has been achieved. Much larger antiaromatic expanded isophlorins with 32π electrons exhibited reversible two-electrons oxidation to 30π

aromatic dication. The larger macrocycles bearing 40π and 48π electrons were found to be planar and antiaromatic in nature, but their redox properties were found to be different compared to the smaller macrocycles. Overall significant difference in the redox properties of antiaromatic macrocycles compared to aromatic macrocycles has been observed.

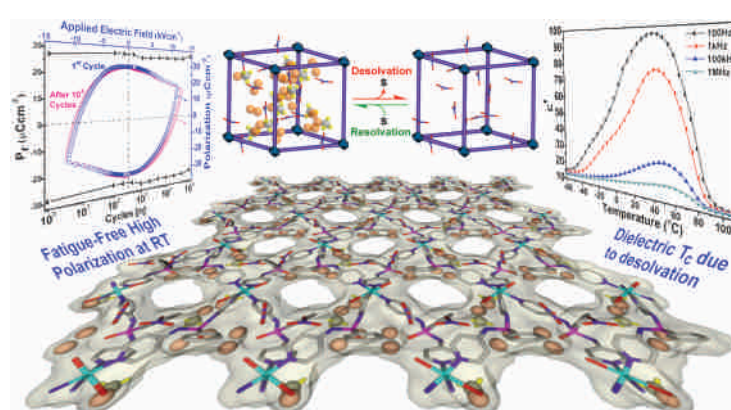
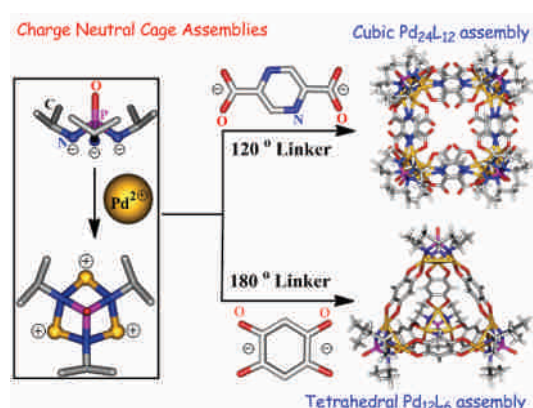
Figure 11: Amphoteric property of a pentathiophene: 25π radical along with spectroscopic characteristics of its 24π cation and 26π anion. The EPR signal for radical (Top) and the ^1H NMR signals for anion (Left) and cation (Right) along with their respective color in the solution state area also displayed. (Dr. V.G. Anand's Group)



2.2 Main-Group, Organometallic and Materials Chemistry

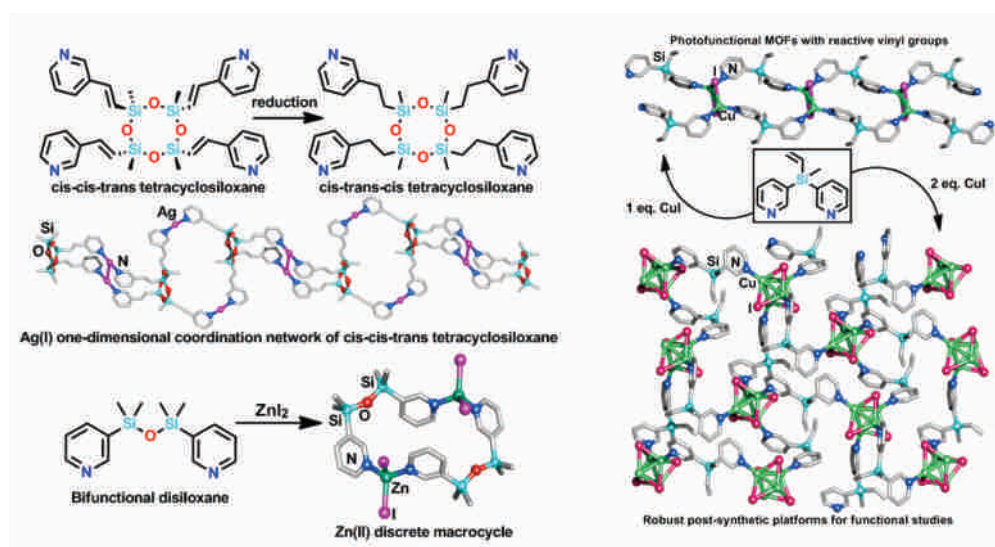
Figure 12: (Left): Formation of various neutral cages utilizing the $(\text{Pd}_3\text{X})^{3+}$ PBUs; (Right): Potentially ferroelectric $[\text{Cu}^\text{II}\text{L}_2]_n$ based two-dimensional framework exhibiting high polarization and guest-assisted dielectric anomaly (Dr. R. Boomishankar's Group)

The research interests of Dr. R. Boomishankar's group surrounds the development of tailor-made functional framework solids by employing the ligands derived from main-group elements. His group has developed a facile route to access the highly basic trianions, $[(\text{RN})_3\text{PO}]^{3-}$ ($(\text{X})^{3-}$) (analogous to $[\text{PO}_4]^{3-}$ ion), by treating phosphoramidate ligands of formula, $(\text{RNH})_3\text{PO}$ with $\text{Pd}(\text{OAc})_2$, as their trimeric or prismatic $\text{Pd}(\text{II})$ cluster of formula $\{\text{Pd}_3\text{X}(\text{OAc})_3\}_1$ or 2 . Interestingly, the reaction of these $\text{Pd}(\text{II})$ clusters with oxalate ions has led to the formation of a rare neutral tetrahedral cage assembly. Inspired by this, a general bridging ligand substitution strategy to obtain a family of neutral cages, utilizing the trinuclear $(\text{Pd}_3\text{X})^{3+}$ motifs as polyhedral building units (PBUs), has been developed by their group (Figure 12, image on the left).



Phosphoramides containing peripheral metal binding groups provide a flexible ligand platform and yield multi-metallic assemblies in various dynamic architectures. A family of anion driven $[\text{Cu}^{\text{II}}\text{L}_2]_n$ coordination assemblies ($\text{L} = \text{PhPO}(\text{NH}^3\text{Py})_2$; $^3\text{Py} = 3\text{-pyridyl}$) and their selective ferroelectric behavior was reported earlier by the group. Spurred by this observation, a family of $[\text{Cu}^{\text{II}}\text{L}_2]_n$ based assemblies have been synthesized and investigated for their ferroelectric properties. Noticeably, a high remnant polarization (P_r) value of $\sim 28 \mu\text{C cm}^{-2}$ at room temperature has been obtained for a two-dimensional $[\text{Cu}^{\text{II}}\text{L}_2]_n$ ($\text{L} = \text{PhPO}(\text{NH}^3\text{Py})_2$; $^3\text{Py} = 3\text{-pyridyl}$) framework, which is the highest among all metal-organic ferroelectric materials known so far and is closely comparable with BTO (Figure 12, image on the right). The temperature dependent permittivity measurements showed an anomalous dielectric peak with $T_c = 40^\circ\text{C}$ and a high dielectric constant value of 96.5 at 100 Hz, suggesting that gasification/release of the solvate molecules from its packing structure affects the polarization.

Figure 13: (Left): Peripherally functionalized di- and tetrasiloxane scaffolds and their metal complexes; (Right): Pyridyl functionalized silane scaffolds and their photo-functional CuI MOFs (Dr. R. Boomishankar's Group)



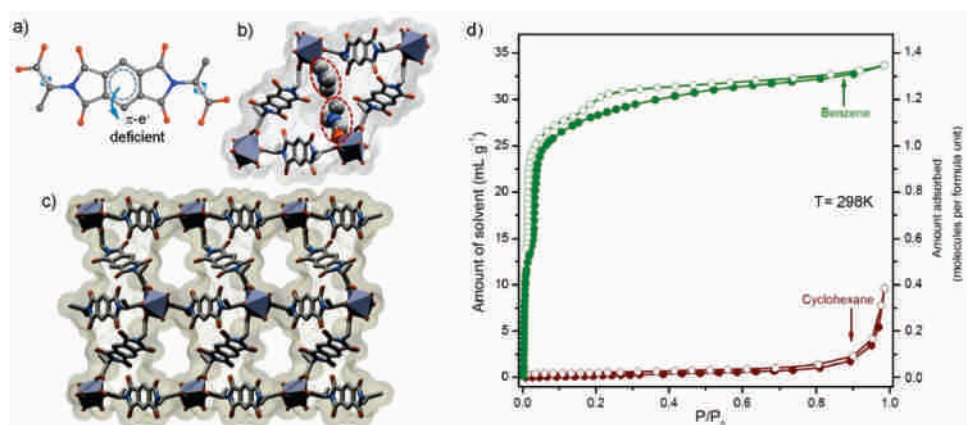
Another area of Dr. Boomishankar's research utilizes silane and siloxane (linear and cyclic) ligands containing multiple peripheral functionalities. The first examples of a tetrasiloxane containing peripherally attached metal-binding pyridyl groups exhibited interesting coordination chemistry leading to the isolation of interesting designer architectures in cyclic, cage and polymeric structures (Figure 13, image on the left). The pre- or post-synthetically modified materials based on these scaffolds (Figure 13, image on the right) are expected provide a better control on their properties/applications relevant to adsorption, separation, sensing and catalytic utility.

2.3 Metal-Organic Frameworks

Dr. Sujit Ghosh's laboratory works in the field of design synthesis and functional studies of metal-organic frameworks (MOFs) for their potential applications in energy, environmental and industrial applications. His group has developed a three-dimensional dynamic MOF with an electron-deficient pore surface using Zn^{II}

(having a variable coordination number) and a predesigned flexible p-electron-deficient core-based dicarboxylic acid ligand. The desolvated phase of the compound exhibits different gate opening mediated adsorption step phenomena associated with structural transformations triggered by different probe guest molecules. The presence of unsaturated metal sites and polar surface result in unusual guest sorption properties. The unique combination of flexible nature and polar surface present in this framework enables it to exhibit industrially relevant selective uptake of benzene over cyclohexane from the mixture, making it a strategically designed guest-responsive material (*Chem. Eur. J.* (2014) 20:15303-15308).

Figure 14: a) Chemical structure of the flexible π electron deficient dicarboxylic acid ligand; b) View of structural motifs found in single crystal structure of the Zn(II) framework; c) Surface view of the compound along a axis; d) Benzene and cyclohexane sorption isotherms of the desolvated compound at 298K (Dr. Sujit Ghosh's Group)



Dr. Ghosh's group has developed a novel approach of regulating the ligand functionality in a Zr(IV) based MOF as a function to probe the presence of NO in an aqueous environment, which is the first report of employing a physiologically stable, functionalized MOF as a NO sensor. Deamination by NO in an amine-decorated MOF has been tapped as a process to monitor its presence. The MOF performs the sensory activity in a selective manner, even in the presence of potentially interfering RNS/ROS species (*Chem. Commun.* (2015) 51:6111-6114).

2.4 Synthesis of Main Group Cations (e.g. R_3Si^+ , R_2Si^{2+} , RGe^+ , RSn^+) and their Application in Catalysis

Dr. Shabana Khan's group is involved in the synthesis of silicon based Frustrated Lewis Pair and in studying their reactivity toward small molecules. Frustrated Lewis pair (FLP) is a combination of a Lewis acid and a Lewis base where the simple adduct formation is precluded due to steric demand. Although much literature exists on P/B, N/B, C/B, and C/C based FLPs, there are no examples of silicon based FLP. This group is currently exploring the potential of Si(II) compounds as a base in FLP chemistry. Her group is also involved in developing PNP and PNB based Au⁺ complexes which can be further used in catalytic reactions. With PNP system, a dimeric Au-monocation has been formed while with BNP system monomeric. Their luminescent properties as well as catalytic activities are being explored.

2.5 Metal-catalyzed C-H Bond Activation

Dr. M. Jeganmohan's group is pursuing the development of highly efficient, easily accessible and environmentally friendly organic transformations by using metal complexes as catalysts. His group has developed several new synthetic methodologies for the C-H bond functionalization of aromatics, heteroaromatics and alkenes in the presence of ruthenium and palladium complexes as catalysts. By using the developed protocol, various substituted alkene derivatives, *ortho* benzoxylated aromatics, *ortho* arylated aromatics, *meta* halogenated benzonitriles and heterocycles including natural products such as N-methylcrinasiadine and Phenaglydon were synthesized (schematic shown in Figure). Various biologically active molecules such as α -pyrones, phenanthridines, carbazoles, 2-quinolinones, (Z)-3-methyleneisindolin-1-ones were prepared efficiently.

The group has demonstrated a metal-free aerobic oxidative dehydrogenative α -arylation at the sp^3 C-H bond of substituted ketones with aromatics or heteroaromatics in the presence of $K_2S_2O_8$ giving hindered symmetrical and unsymmetrical benzopinacolone derivatives.

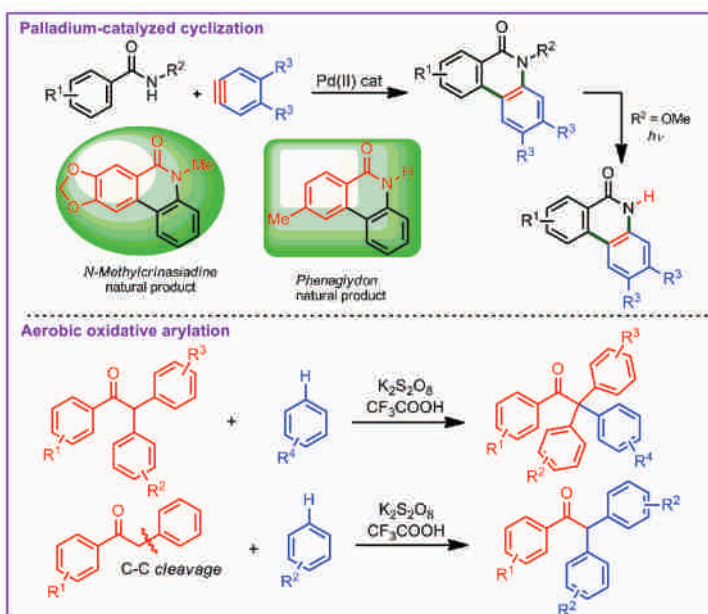


Figure 15: Synthesis of aromatic and natural compounds using new synthetic methodologies for the C-H bond functionalization of aromatics, heteroaromatics and alkenes in the presence of ruthenium and palladium complexes as catalysts (Dr. Jeganmohan's Group)

2.6 Responsive Polymer Vesicles for Oral Drug Delivery

a) Polymer vesicles for combination therapy in cancers

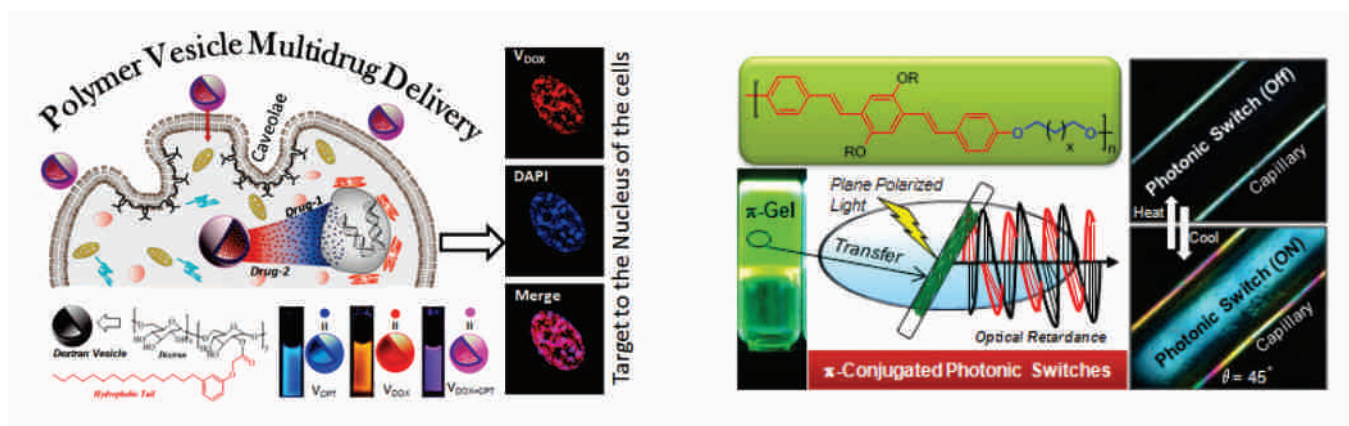
Polymer based drug delivery approaches are emerging as an important methodology for the administration of medicines or genes in cancer treatment. Dr. M. Jayakannan's research group has reported custom designed polysaccharide vesicles that are capable of loading and delivering hydrophilic and hydrophobic drugs together in a single polymer nano-scaffold. The vesicular scaffolds were found to preserve large amounts of doxorubicin (DOX) or camptothecin (CPT) drugs in the active form and resulted in killing of cancer cells with 60-80 % higher efficiency than the free drugs. The multiple drugs loading capability of these

vesicles allowed addressing both sequential delivery as well as synergistic killing of cancer cells by drug combinations. Results from these experiments have revealed that newly developed polysaccharide vesicles loaded with DOX and CPT drugs as potential candidates for improved cancer cell killing. These custom-designed polysaccharide vesicles open up new avenue for dual anticancer drug delivery.

b) Thermo-responsive π -conjugated photonic switches

Photonic switches are employed as half wave plates ($\lambda/2$) or quarter wave plates ($\lambda/4$) for tuning the wavelength of the incident light beam. The present work demonstrates new π -conjugated photonic switches (or photonic wave plates) based on the tailor made π -conjugated polymer anisotropic organogel. Semi-crystalline segmented π -conjugated polymers were designed with rigid aromatic OPV π -core and flexible alkyl chain along the polymer backbone. These semi-crystalline polymers produced organogels having nano-fibrous morphology of 20 nm thickness with length up to 5 μ m. The polymer organogel was aligned in a narrow glass capillary and this anisotropic gel device was further demonstrated as photonic switches. Thermo-reversibility of the polymer organogel (also its xerogel) was exploited to construct thermo-responsive photonic switches for the temperature window starting from 25 to 160 $^{\circ}$ C. The organic photonic switch concept can be adapted to large number of other π -conjugated materials for optical communication and storage.

Figure 16: (Left): Newly developed polysaccharide vesicles loaded with doxorubicin (DOX) or camptothecin (CPT) drugs could be potential candidates for improved cancer cell killing; (Right): Thermo-responsive - conjugated photonic switches (Dr. Jayakannan's Group)

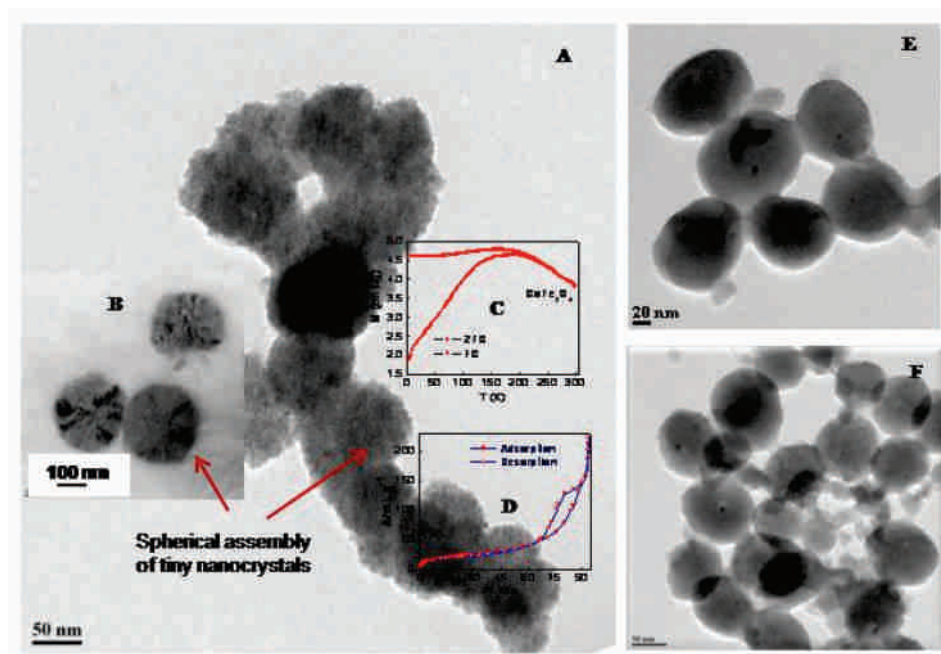


2.7 Multifunctional Magnetic Nanoparticles

Dr. Seema Verma is developing novel synthetic routes to obtain highly monodispersed multifunctional magnetic nanocrystals using suitable surfactants that are dispersible in water. The group is focusing on designing multifunctional magnetic-plasmonic hybrid nanostructures and mesoporous magnetic-plasmonic hybrid materials, suitable for biomedical applications (E and F in Figure).

Also, the group has reported a detailed examination of the effect of induced off-stoichiometry on structural, thermal and magnetic properties of nickel cobaltite, NiCo_2O_4 nanoparticles which is a promising transparent conducting oxide material.

Figure 17: TEM images of hydrophilic (A) CoFe_2O_4 and (B) NiFe_2O_4 nanocrystals. (C) ZFC and FC of CoFe_2O_4 nanoparticles. (D) N_2 adsorption-desorption isotherm of NiFe_2O_4 sphere (E and F) $\text{CoFe}_2\text{O}_4@\text{Ag}@\text{SiO}_2$ nanohybrids (Dr. Seema Verma's Group)



2.8 Physics and Chemistry at the Nanoscale using Theoretical Tools

a) Cadmium vacancy minority defects as luminescence centers in size and strain dependent photoluminescence shifts in CdS nanotubes

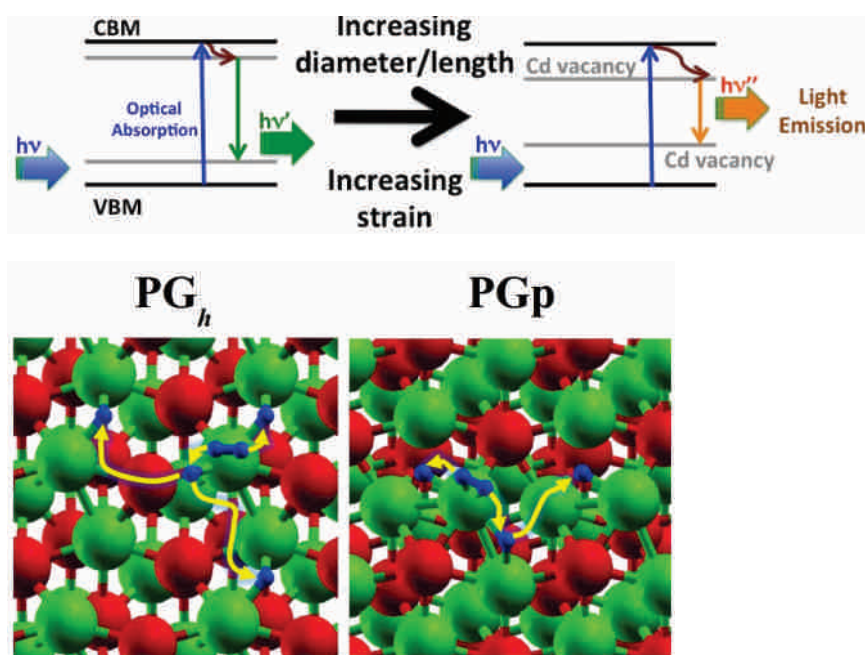
Defects play an important role in semiconductors as they affect both the electrical and optical properties of these materials. Cadmium Sulphide (CdS) is an important semiconductor whose nanostructures are plausible candidates for photovoltaic devices. These have different types of defects namely Cd vacancies and interstitials, S vacancies and interstitials, etc. Together with Dr. Shouvik Datta's group, **Dr. Prasenjit Ghosh's** group undertook a study of the optical properties of CdS nanotubes, prepared in S rich conditions, as a function of their length and diameters, their overall size is beyond the quantum confinement regime. While the absorption spectra are unaffected by the change in size, there is an anomalous red-shift in the photoluminescence spectra with increase in size. Using density functional calculations, the shift in the emission peak of the photoluminescence spectra is identified as a result of the interplay between Cd vacancies on the surface of these nanotubes and the crystalline strain, incorporated in these nanotubes during their growth process. Results from Dr. Ghosh's group have shown that it is the nature of the defect that plays a crucial role in determining the optical properties of these nanotubes.

b) First principles study of hydrogen dissociation and diffusion on low indexed (100) and (110) PdGa surfaces

Selective hydrogenation of acetylene to ethylene is an important reaction in the polymer industry. Ethylene formed can be easily converted to ethane using a catalyst that should have high stability (the reaction takes place at 450K), reactivity (acetylene is present in traces) and selectivity (to prevent further hydrogenation of

ethylene to ethane). Pd, the most widely used catalyst for this reaction, shows poor selectivity. PdGa intermetallic compounds are promising candidates as catalysts and using *ab initio* density functional theory based calculations, the stability and reactivity of the low-indexed (100) and (110) surfaces was studied. Hydrogen dissociation reaction and diffusion of hydrogen atoms on these surfaces, both these being the rate limiting steps in the selective hydrogenation of acetylene on these surfaces have been studied by DFT calculations to identify that the (100) surface created by cleaving the bulk crystal in the dense region is a promising candidate.

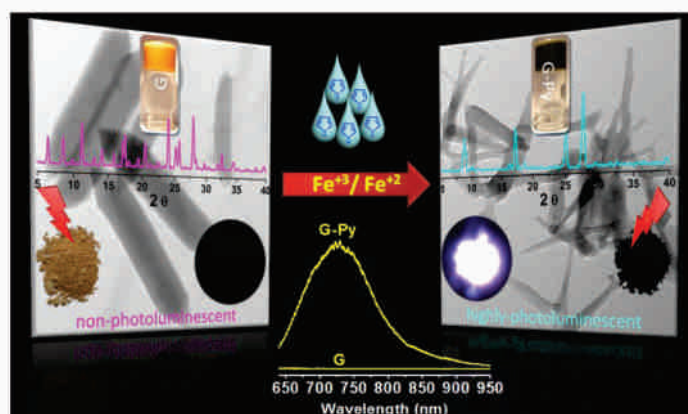
Figure 18: (Top): Schematic representation of the mechanism of red shift observed in the fluorescence spectra of CdS nanotubes as a function of increasing diameter or strain (Bottom): Hydrogen dissociation pathways on the PGh and PGp PdGa surfaces (Dr. Prasenjit Ghosh's Group)



2.9 Self-Assembly of Gold Nanoparticles and Supramolecular Assembly of Polyaniline

Polymeric coordination of organic ligand to metal ion leads to the formation of metal-organic frameworks and metal-organic gels. Fe-BTC/TPA (benzene tricarboxylic acid/ terephthalic acid) gels have been utilized to incorporate in situ

Figure 19: Use of pyrrole, bi thiophene and aniline as the co-ingredients of the redox-active Fe-TPA gel turns on the photoluminescence in otherwise non-luminescent material (Dr. Nirmalya Ballav's Group)

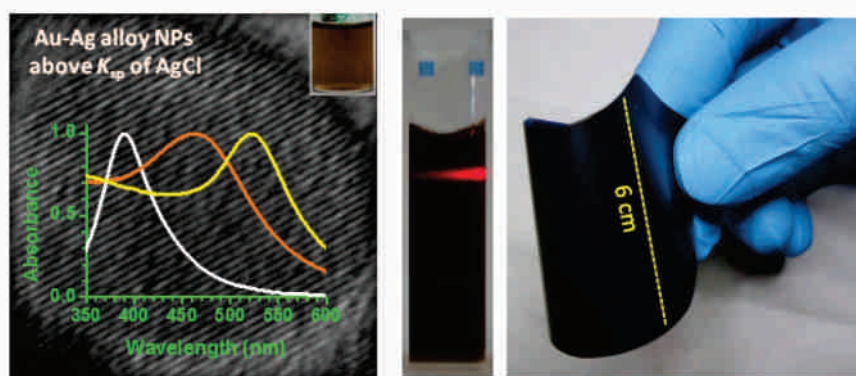


(without the use of extraneous oxidant) conducting polymers polypyrrole and polythiophene which resulted in the generation of conductive composite materials similar to earlier studied polymer bronzes. Use of pyrrole, bithiophene and aniline as the co-ingredients of the redox-active Fe-TPA gel turns on the photoluminescence in otherwise non-luminescent material.

Wet-chemistry plays a pivotal role in producing stable Au-Ag alloy NPs with controllable structure-property relationship via standard co-reduction of HAuCl_4 and AgNO_3 . Detrimental factors such as the co-precipitation of AgCl and surface-enrichment of Ag in the Au-Ag alloy NPs have been addressed in new procedures.

Graphite oxide (GO) is one of the main precursors to generate graphene-based materials that are highly-promising for various technological applications. Wet-chemical route to produce so called chemically converted graphene (CCG) sheets with thickness in the range of few nm and length in the range of few centimeters are being developed as new materials for studying thermal and electronic properties of flexible CCG thin-films.

Figure 20: (Left): Use of Tollens' reagent in generating single-crystalline Au-Ag NPs with tunable optical properties; (Right): Suspension of GO in H_2O exhibiting Tyndall effect and fabricated 6-cm long CCG thin-film (Dr. Nirmalya Ballav's Group)



2.10 Colloidal Nanocrystals: Optoelectronics, Surface Modification and Photophysics

Dr. Angshuman Nag's group has developed colloidal magnetically doped transparent conducting oxide nanocrystals. Materials such as Fe-Sn codoped In_2O_3 , Mn-Sn codoped In_2O_3 , and Mn-Al codoped ZnO simultaneously exhibit infrared plasmonics, magnetism, and electrical conductivity. Dopants, such as Al and Sn provide free electron, whereas, Fe and Mn doping provides magnetic spins. Interaction between these free electron and magnetic spins leads to modulation of magnetic properties by doping free carriers, and modulation of electrical and plasmonic properties by magnetic ions. These have the potential to generate novel magneto-optic, magneto-electric and electro-optic properties.

Development of electronically-coupled semiconductor nanocrystal films for solution-processed and flexible opto-electronic applications is underway. Engineering the surface chemistry of colloidal nanocrystals to improve inter-connects between adjacent nanocrystals in a film is important. A generic method has been developed to prepare organic-free colloidal inorganic nanocrystals. Flexible, electronic-grade and solution-processed films were prepared using

organic-free PbS and PbSe nanocrystals. Organic-free $(\text{ZnS})_{1-x}-(\text{AgInS}_2)_x$ exhibit interesting visible-light activity for H_2 production; organic-free AgInS_2 and Ag_2S nanocrystals exhibit improved performance of quantum dot sensitized solar cells. Steady-state and ultrafast photo-physics is an integral part of this study.

2.11 Main Group Chemistry - Catalysis and Materials Applications

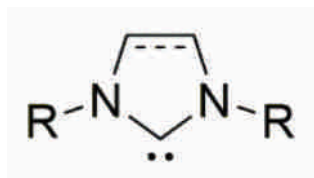


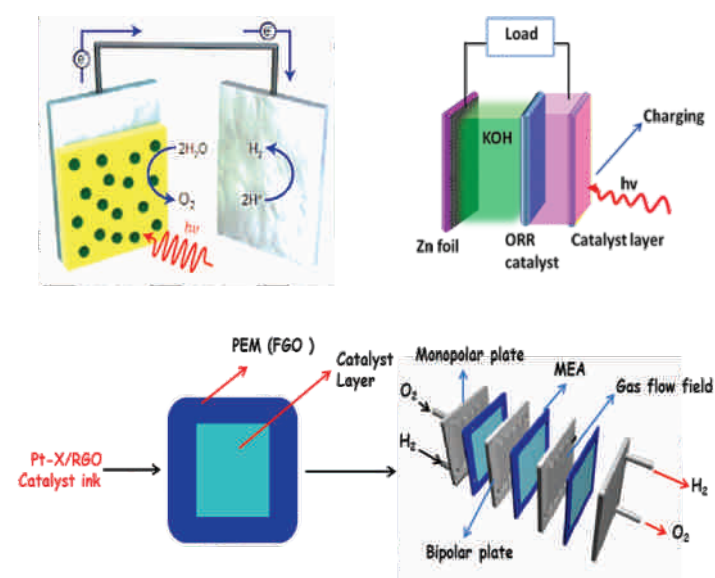
Figure 21: N-Heterocyclic carbene (Dr. Moumita Majumdar's Group)

Dr. Moumita Majumdar's research interests are to expand the chemical functionalities of low-valent compounds spanning Groups 13-15 of the periodic table. The aim is to synthesize poly(phenylenevinylene) PPV analogues involving homo- or hetero-nuclear bonds in the polymer backbone that will conceptually mimic inorganic semiconductors. The group is also investigating the stability of newly synthesized multiply bonded transition metal-silicon compounds and their potential applications in the fields of catalysis, coordination polymers, conducting materials etc. N-Heterocyclic carbenes with a variety of substitutes of R-group are being explored.

2.12 Energy Storage and Conversion

The main research focus of Dr. Musthafa's energy laboratory is understanding complex phenomena at the electrode/electrolyte interface by a range of electrochemical, microscopic and spectroscopic techniques and extending the fundamental understanding gained at the molecular level to design cost-sustainable and environmentally friendly energy storage and conversion devices. His group has enormous interest in building novel interfaces for selective sensors, water splitting, photoelectrochemical production of fuels, water remediation etc.

Figure 22: Photocatalytic O_2 evolution (Top left) and its integration in Zn-air battery cathode to charge the battery photo (electro) chemically (Top right). Thin film membrane electrode assembly based on functionalized graphene oxide membranes for proton exchange membrane fuel cells (Bottom panel). (Dr. Musthafa's Group)



The group is working on some of the critical issues facing rechargeable batteries, fuel cells and supercapacitors. Toward this direction the group has already initiated the possibility of photo charging of batteries to address the significantly higher charging voltages and longer charging time required. The group is

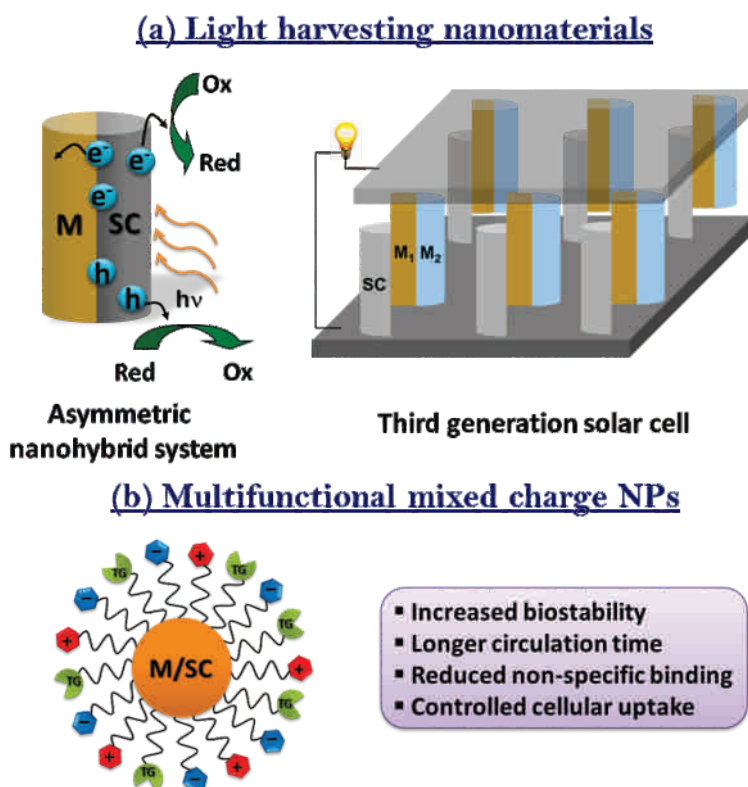
addressing the self-discharge encountered in typical energy storage devices, developing novel proton exchange membranes for PEM fuel cells, designing thin film membrane electrode assembly to explore pathways for charging supercapacitors and thinking beyond conventional means for energy storage and conversion.

2.13 Nanomaterials for Light Harvesting and Biotargeting Studies

Research in Dr. Pramod Pillai's laboratory is focused on the design and synthesis of hybrid nanomaterials - a unique class of materials formed by the integration of two or more materials at the molecular or nanometer length scale. Efforts are on to develop heterostructures based on metal (M) and semiconductor (SC) nanomaterials for studying the effect of geometries, compositions and configurations on the stability of photogenerated electron-hole pairs (shown in a schematic here).

Another area of focus is to improve the biostability and specific targeting of nanomaterials in therapeutics. Surface chemistry (charge, functionality, ligand arrangement, hydrophobicity and hydrophilicity) plays a crucial role and hence tuning the surface properties of metal/semiconductor nanoparticles (NPs) by incorporating both ionizable and biotargeting groups simultaneously is being addressed. These multifunctional NPs are anticipated to exhibit enhanced biophysical properties such as improved biostability and circulation time, controlled cellular uptake, reduced non-specific binding etc.

Figure 23: Schematic representation of hybrid nanomaterials for light harvesting and biotargeting studies: (a) A third generation solar cell fabricated with asymmetric metal-semiconductor nanostructures as light harvesting element; (b) Surface engineered nanoparticles with enhanced biophysical properties (Dr. Pramod Pillai's Group)



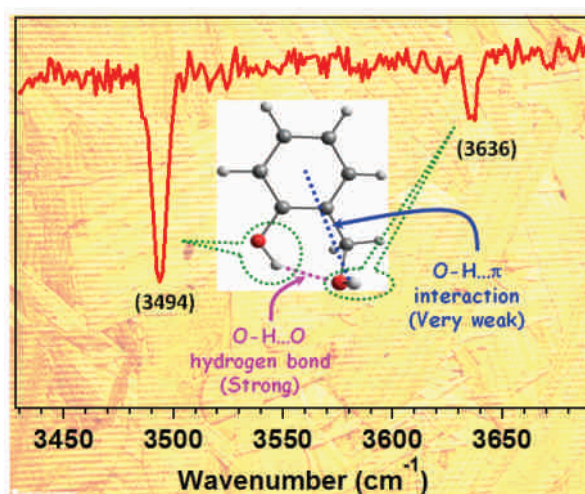
3 Spectroscopic Sciences

3.1. Gas Phase Laser spectroscopy

Dr. Alope Das and his group are focusing on molecular level understanding of weak non-covalent interactions responsible for the stabilization of specific structures of biomolecules (proteins, DNA etc) to understand biological recognition processes. These weak interactions are studied in a supersonic expansion employing UV (ultraviolet) and IR (infrared) laser-based spectroscopic techniques combined with quantum chemistry calculations.

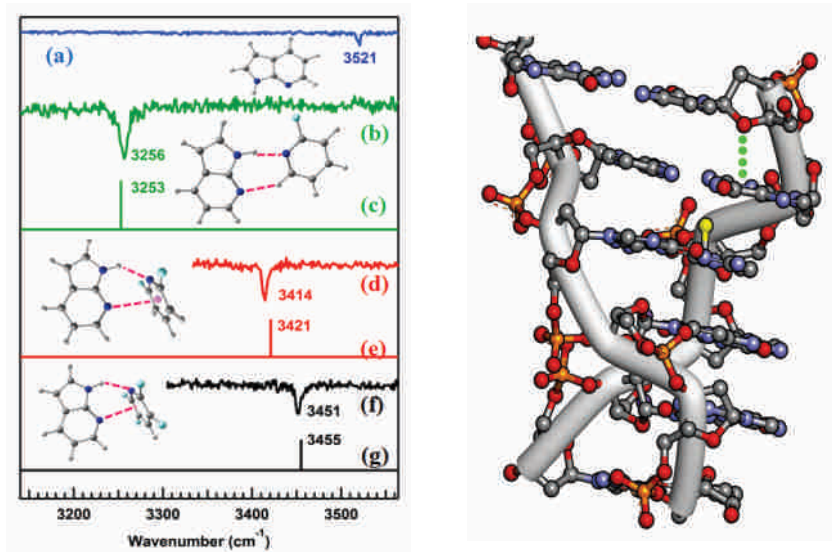
The structure of Saligenin (SA), an analgesic and antipyretic agent was determined using UV, IR and microwave absorption spectroscopy in a supersonic jet combined with *ab initio* calculations. The observed structure is stabilized by an intramolecular strong O-H...O hydrogen bonding as well as a very weak O-H... π interaction and steric effects govern the most stable structure of saligenin.

Figure 24: Gas phase IR spectrum of saligenin depicting the hydrogen bonded (O-H...O) O-H stretch as well as π -bonded (O-H... π) O-H stretch in saligenin (Dr. Alope Das's Group)



In search of a spectroscopic evidence for the recently discovered weak non-covalent $n \rightarrow \pi^*$ interaction, supersonic jet coupled with laser spectroscopy has been employed to study the complexes of 7-azaindole and fluorosubstituted pyridines synthesized in the supersonic expansion using IR-UV double resonance spectroscopy technique. In 7-azaindole...2-fluoropyridine, N-H...N and C-H...N hydrogen bonding interactions (double hydrogen bond) are present while 7-azaindole...2,6-difluoropyridine and 7-azaindole...2,3,5,6-tetrafluoropyridine complexes contain N-H...N hydrogen bond and $n \rightarrow \pi^*$ interaction. The results from IR spectroscopy reveal that there is an enormous decrease in the strength of the hydrogen bond in the presence of the $n \rightarrow \pi^*$ interaction in the 7-azaindole...2,6-substituted fluoropyridines compared to that in the double hydrogen bonded complex. This observation demonstrates the evidence of the $n \rightarrow \pi^*$ interaction by probing the strength of the hydrogen bond interaction.

Figure 25: (Left): IR spectra of 7-azaindole monomer, 7-azaindole...2-fluoropyridine, 7-azaindole...2,6-difluoropyridine and 7-azaindole...2,3,5,6-tetrafluoropyridine measured in a supersonic jet; (Right): Crystal structure of Z-DNA depicting $n \rightarrow \pi^*$ interaction with green dots. (PDB ID: 131D) (Dr. Aloke Das's Group)



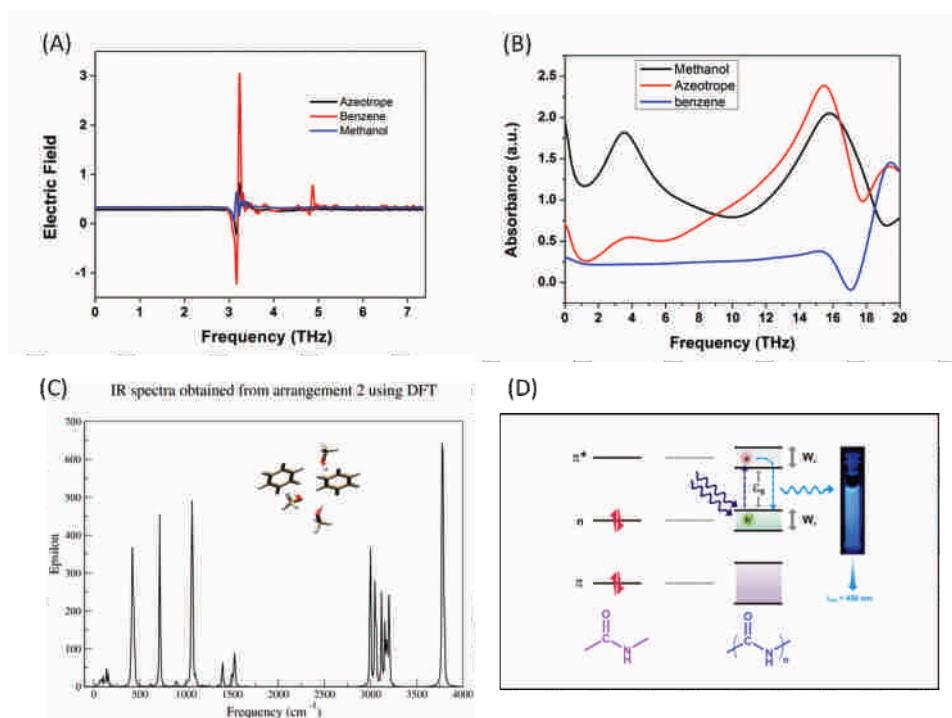
3.2 Terahertz Spectroscopy and Ultrafast Dynamics

Dr. Pankaj Mandal's laboratory is studying ultrafast dynamics in small molecules, biomacromolecules and nanomaterials using ultrafast pump-probe technique where both pump and probe can be varied from THz to deep ultraviolet.

Figure 26: Photographs of THz generating air-plasma (Left) and the experimental set-up (Right) (Dr. Pankaj Mandal's Group)



Figure 27: (A) Time domain THz spectra of benzene, methanol and their azeotrope; (B) Frequency domain spectra of benzene, methanol and their azeotrope; (C) Simulated vibrational spectrum of benzene-methanol azeotrope; (D) Schematic showing the origin of blue emission in proteins (Dr. Pankaj Mandal's Group)



Broad band THz spectrometer has been built in-house from a four-wave-mixing process in air-plasma. Air Biased Coherent Detection scheme was implemented for broadband detection to achieve a bandwidth of ~ 20 THz. Along with optical pump-THz/white light probe spectroscopy, this set-up enables probing a time-dependent (transient) event using broadband THz or white light (WL) probes to obtain a temporal resolution of ~ 100 femto-second (fs).

The origin of blue emission in serum proteins has been studied in the laboratory and it is most likely a property of the protein monomer. Evidences suggest that semiconductor-like band structure of proteins with the optical band-gap in the visible region is possibly the origin of this phenomenon.

3.3 Structure and Dynamics of Nucleic Acids and Interacting Proteins by NMR Spectroscopy

Dr. Jeetender Chugh's group works on understanding structure and dynamics of proteins and nucleic acids (DNA and RNA) to examine biological pathways, particularly microRNA biosynthesis pathway to understand different types of cancers and other diseases using multinuclear NMR.

Toward this, a high-throughput facility for preparing and purifying proteins and nucleic acids in large amounts and labeled with ^{13}C , ^{15}N and ^2H isotopes has been established. A clone of SMAD protein (involved in the processing of selective microRNAs) has been prepared and purified in collaboration with Dr. Shilpy Sharma (University of Pune) and work is on to make an isotopically enriched sample for NMR studies.

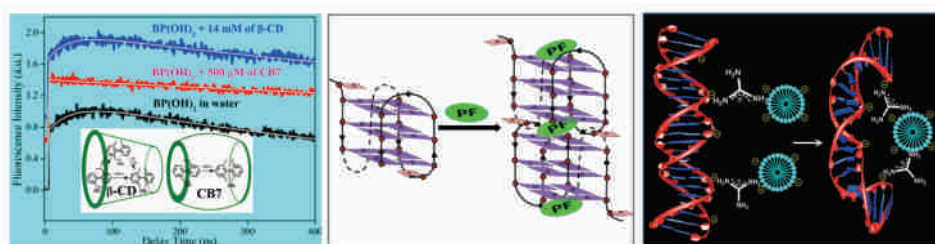
With support from DST-FIST and IISER Pune, a 600 MHz NMR spectrometer has been procured along with a cryoprobe (high sensitivity probe to study ^1H , ^{13}C , ^{15}N and ^{31}P) that was successfully installed in March 2015. The group is now testing and optimizing various experiments on standard samples of proteins and RNAs.

3.4 Spectroscopic Studies of Biological Systems

Figure 28: (Left): Femtosecond fluorescence transients of $\text{BP}(\text{OH})_2$ in water, in the presence of cucurbit[7]uril (CB7), and β -cyclodextrin (β -CD); (Middle): Proposed molecular picture of binding interaction between proflavine and (3 + 1) hybrid human telomeric GQ-DNA; (Right): A plausible DNA compaction mechanism by Gua-IL (Dr. Partha Hazra's Group)

Dr. Partha Hazra's group is focusing on the study of the excited state photophysics (like excited state proton transfer dynamics), DNA-drug interaction, and DNA compaction by fluorescence.

Ultrafast double proton transfer (PT) dynamics of $\text{BP}(\text{OH})_2$ inside molecular



containers (CB7 and β -CD) have been studied by femtosecond fluorescence upconversion measurements. Studies indicated the presence and the absence of water solvation network surrounding the BP(OH)_2 inside the nano-cavities of β -CD and CB7, respectively.

Spectroscopic study has shown that proflavine (PF) can act as a high binding stabilizer of telomeric G-Quadruplex -DNA through an entropically as well as enthalpically feasible process for potential development of a telomerase inhibitor.

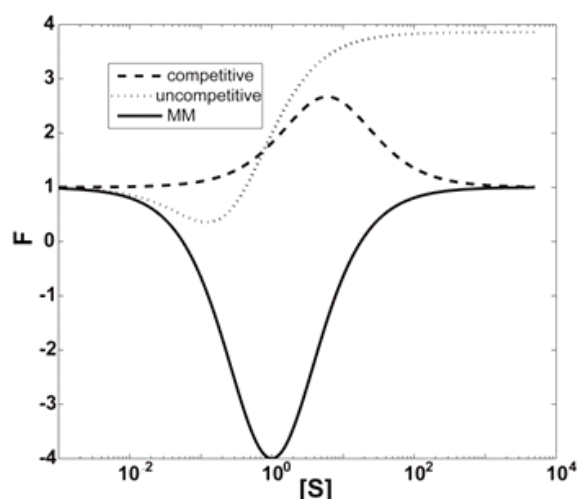
By using different spectroscopic techniques, like steady state emission, circular dichroism, dynamic light scattering, UV melting, field emission scanning electron microscopy (FE-SEM) and fluorescence microscopy images, it has been shown that ionic liquid (guanidinium tris(pentafluoroethyl)trifluorophosphate (Gua-IL)) can compact DNA, and this compaction process by Gua-IL has been extensively probed.

4 Theoretical and Computational Chemistry

4.1 Stochastic Processes

Dr. Srabanti Chaudhury and her group are constructing theoretical models to understand time dependent phenomena in different biological processes at the cellular level. The group is modeling the catalytic activity of metal nanoparticles (MNPs) which are *heterogeneous* catalysts that can catalyze reactions with two parallel product dissociation pathways. Heterogeneous distribution of surface active sites and availability of two concurrent product dissociation pathways, make it challenging to theoretically model such systems. A novel theoretical model is being developed that would study the time dependent fluctuations in catalytic reaction time and understand the characteristics of such fluctuations at

Figure 29: Fano factor F as a function of substrate concentration $[S]$ for competitive inhibition (dashed line), uncompetitive inhibition (dotted line) and simple MM enzyme kinetics (solid line) (Dr. Srabanti Chaudhury's Group)



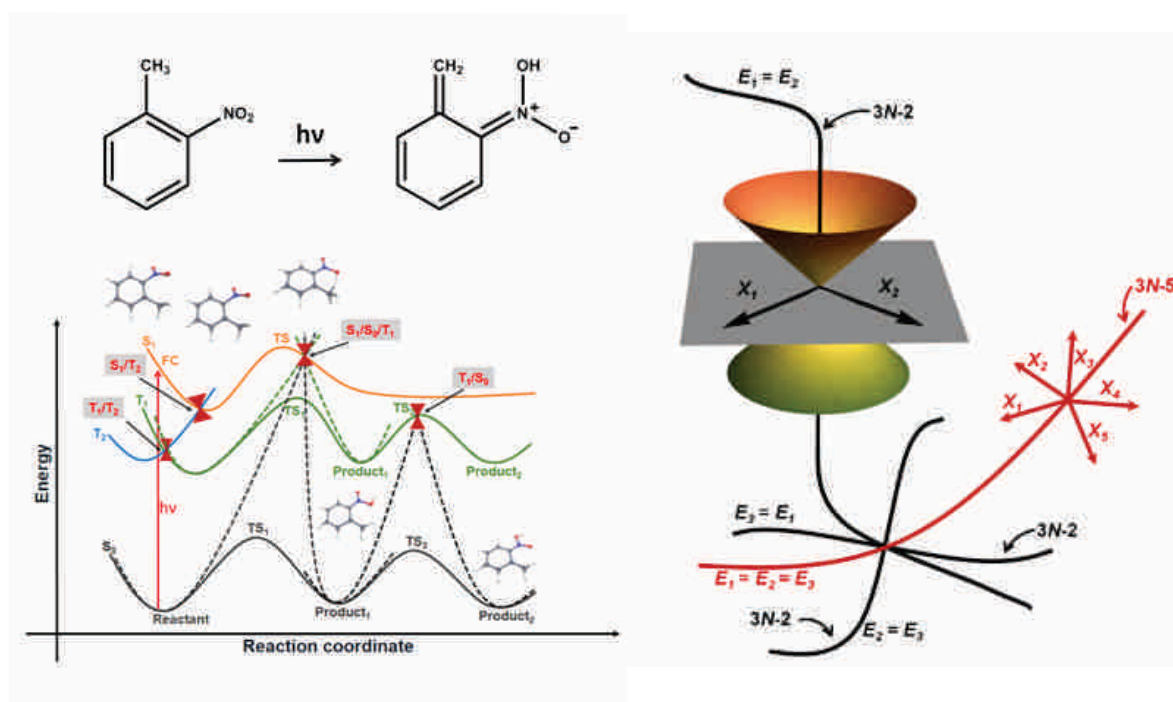
the molecular level. This theory has been implemented successfully to study enzymatic inhibition by product molecules and to understand the effect of temporal fluctuations on reaction rate. The proposed theoretical modeling can be predictively utilized in distinguishing different types of inhibition reactions depending upon the binding site of the enzyme.

Another goal is to understand the role of stochastic fluctuations in mRNA levels on gene expression. A new theoretical method to study the dynamics of switching in a two state gene expression model by explicitly accounting for the transcriptional noise has evolved.

4.2 Theoretical Studies of Ultrafast Photoinduced Molecular Processes

Dr. Anirban Hazra's group focuses on theoretical study of excited state molecular phenomena using tools from electronic structure theory and nonadiabatic dynamics. These processes (photoinduced electron transfer, photodissociation and fluorescence quenching) occur at the femtosecond timescale and have implications in solar-based renewable energy devices, particularly the conversion of solar energy to chemical energy. One of the ongoing projects in the group includes the mechanistic study of excited-state hydrogen transfer (ESHT), a reaction with major chemical and biological significance. The mechanism of ESHT leading to tautomerization of *o*-nitro toluene to its aci-nitro tautomer is found to proceed through a complex pathway, involving both singlet and triplet states. A method to find three-state conical intersections, one of the identified topological features on the potential energy surfaces, has been developed and implemented.

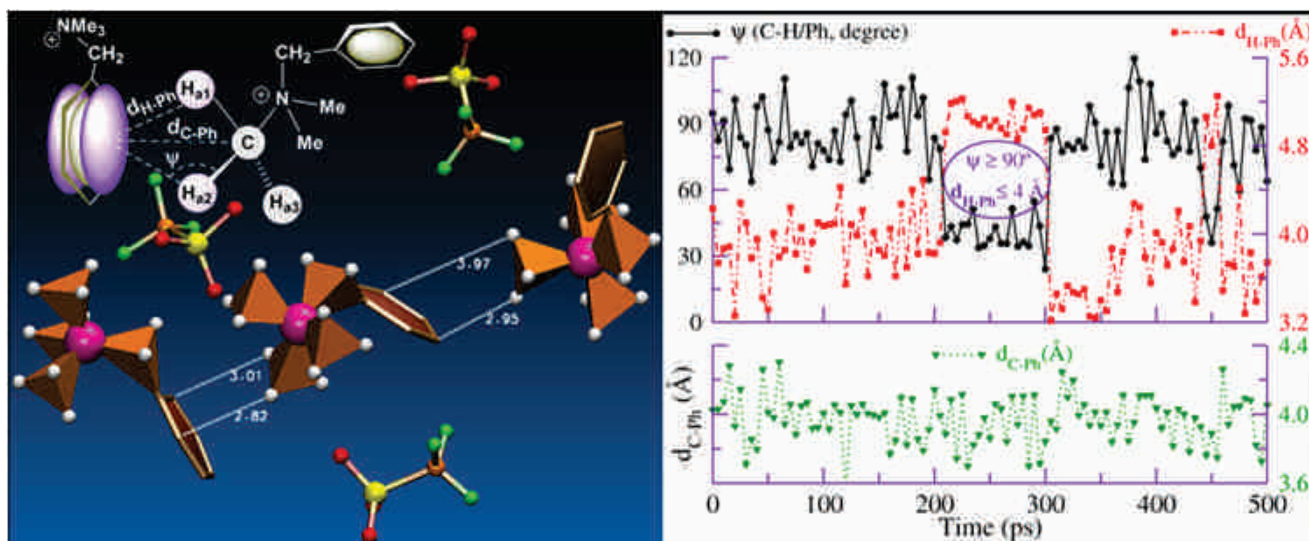
Figure 30: (Left): ESHT in *o*-nitro toluene tautomerization and schematic representation of the reaction mechanism; (Right): Topology and dimensionality of a three-state conical intersection (Dr. Anirban Hazra's Group)



4.3 Modeling and Simulation of Materials

Dr. Arun Venkatnathan's research group investigates proton transport in imidazole chains and ionic liquids (IL) using quantum chemistry methods. Some of the important findings include: the presence of excess protons in imidazole chains leads to cleavage of hydrogen bonds and for the rotation of neighboring imidazole molecule, the barrier is higher than the proton transport barrier along the hydrogen bond. This is the rate determining step of proton conduction. Calculations on proton transport predict that anions are responsible for proton-exchange between cations and neutral molecules in a triethylammonium-triflate IL doped side chain of a polymeric membrane. Such insights are important for design and development of anhydrous fuel cell applications. Structure and dynamics of hydrated Ammonium-based benzyl- NX_3 (X = methyl, ethyl) trifluoromethanesulfonate ILs (as electrolytes) has been characterized using classical Molecular Dynamics simulations. The simulations show that differences in conductivity from ILs containing ethyl and methyl derivatives of these cations arise due to various structural interactions between the cations and anions of these ILs. The simulations show that depending on water concentration, processes such as phase separation between ILs and water molecules, cationic tail aggregation and micelle formation are observed.

Figure 31: Inter-Ionic interactions in ammonium-based benzyl-NMe₃ trifluoromethanesulfonate ionic liquids from molecular dynamics simulations (Dr. Arun Venkatnathan's Group)

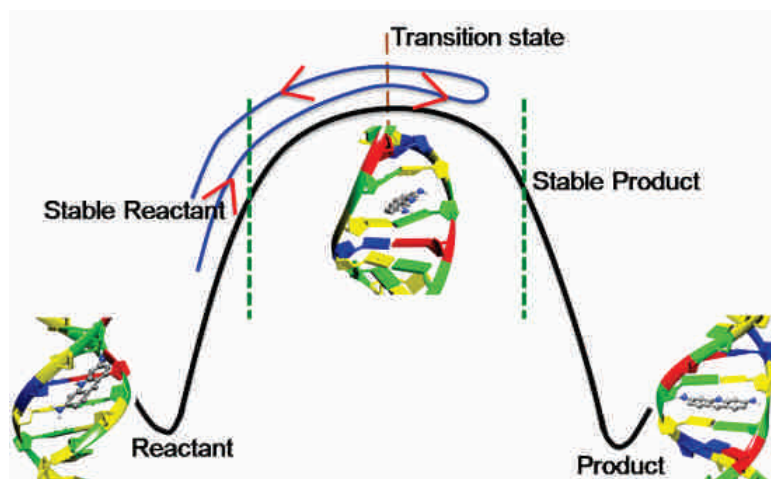


4.4 Mechanism of DNA Kinking, Misfolding of Prion Protein, Dynamical Recrossing

Dr. Arnab Mukherjee's group is currently working on the interaction of DNA with drugs and transcription factors.

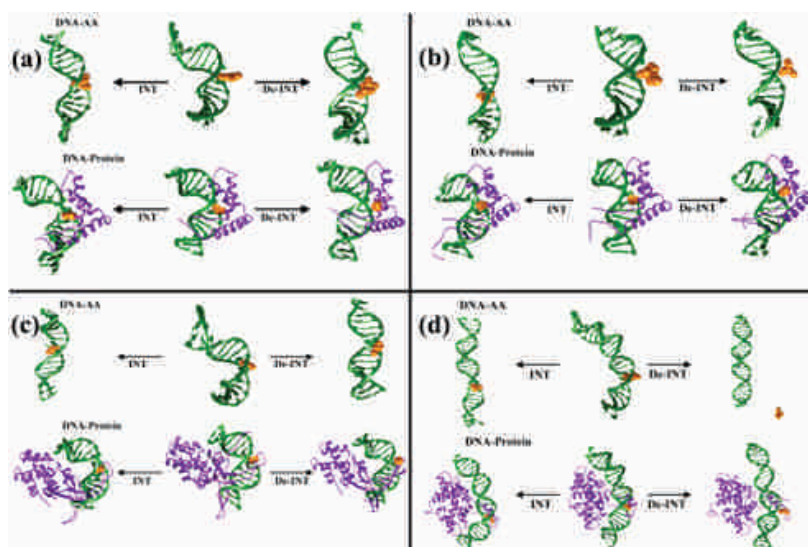
In relation to the study of dynamical re-crossing effect of proflavine intercalation, the group is working on determining the transmission coefficient that modifies the rate obtained from the transition state theory. This will provide a detailed understanding of the intercalation mechanism of anti-cancer agent proflavine.

Figure 32: Schematic representation of recrossing of proflavine intercalating into DNA (Dr. Arnab Mukherjee's Group)



The molecular origin of the DNA kinks observed in the TF-DNA complexes using small molecule intercalation has been studied using crystallographic analysis, and free energy calculations involving four different transcription factor (TF) protein-DNA complexes have been carried out. It is found that although protein binding may bend the DNA, it alone is not sufficient to kink it; partial (not complete) intercalation is required to form kink at a particular site in DNA.

Figure 33: Initial and final configurations of all the eight systems: (a) SOX4-DNA and MET-DNA, (b) SRY-DNA and ILE-DNA, (c) IHF-DNA and PRO-DNA, (d) NF-Y-DNA and PHE-DNA. DNA (green) and protein (violet) are shown using ribbon representation and the intercalating amino acids (IAA) are shown in the solid sphere representation. (Dr. Arnab Mukherjee's Group)



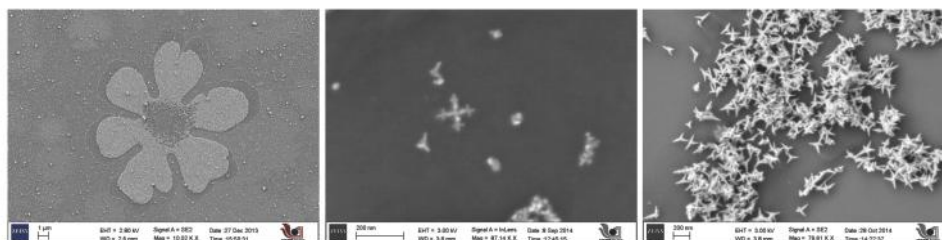
Another project is on the misfolding mechanism of prion protein, an essential protein implicated in the prion diseases. Using metadynamics method, the helices in the protein are shown not to be stable in isolation and to tend to form beta sheet. The unfolding pathways and possibility of beta sheet generation using both metadynamics and replica exchange molecular dynamics (REMD) methods have been studied.

5 Condensed Matter, Statistical Physics and Materials

5.1 Synthesis and Analysis of Nanoparticles

Dr. Sulabha Kulkarni's group is working on multiferroics, doped multiferroics and anisotropic plasmonic nanostructures as well as self assembly. Work on plexcitons is underway. Work carried out at HASYLAB is being analysed.

Figure 34: Gold nanostructures/self assemblies (Dr. Sulabha Kulkarni's Group)

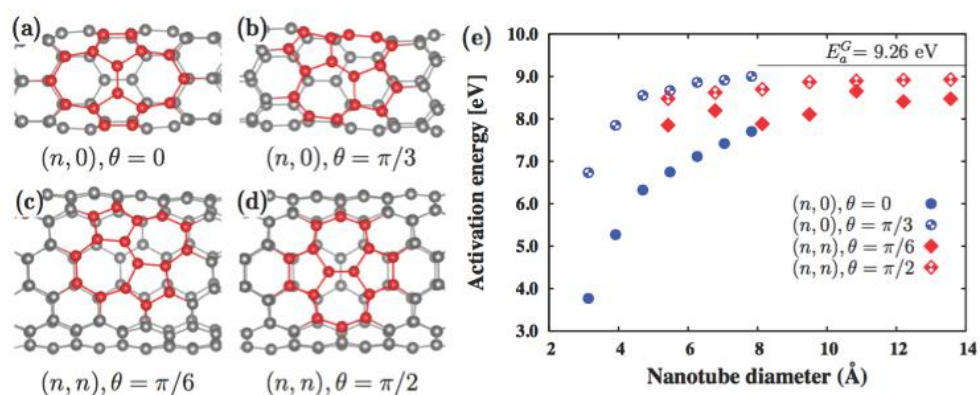


5.2 Magnetism in Graphene: Topological Defects in Single Walled Carbon Nanotubes

Dr. Mukul Kabir's group is focused on predictive materials modeling, and is interested in problems such as defects in reduced dimension, magnetism, two-dimensional spintronics, and catalysis.

Topological defects such as Stone-Wales defects play a central role in plastic deformation, chemical functionalization, and junction formation between carbon nanotubes. Dr. Mukul Kabir's group coupled density functional theory with transition state theory to systematically investigate the thermodynamic formation

Figure 35: Orientation of the topological Stone-Wales defect on the nanotube surface influences their thermodynamic formation energy, and kinetic activation barrier. For both zigzag and armchair nanotubes, these energies monotonically increase with tube diameter and approaches to the corresponding value for two-dimensional graphene. (Dr. Mukul Kabir's Group)



energy and kinetic activation barrier of topological Stone-Wales defect in single-wall carbon nanotubes. The group observed that both the formation and activation energies depend critically on the nanotube chirality, diameter and defect orientation. The kinetic activation barrier follows empirical Brønsted-Evans-Polanyi type correlation with the corresponding thermodynamic formation energy, and can be explained by overlapping energy-coordinate parabolas representing the structures with and without the defect.

The group proposes a possible route to substantially decrease the kinetic activation barrier for Stone-Wales defects. Such accelerated rates of formation of these defects are desirable in many novel electronic, mechanical and chemical applications, and also facilitate the formation of three-dimensional nanotube superstructures.

5.3 Nanospintronics

Dr. Ashna Bajpai's group is currently working on the synthesis of nano and mesoscopic length scale magnetic oxide that is inherently piezomagnetic. The group is also working on the synthesis of two dimensional layered material by liquid exfoliation technique and encapsulation of magnetic oxides in carbon nanotubes. Coupling of the functionality of nano scale oxides with that of carbon nanotubes can give rise to novel nano-spintronic devices that can be tuned by magnetic field, electric field and possibly strain. The group intends to fabricate nano spintronic devices using the material synthesized in the laboratory. For this purpose, they aim to set up a facility for electrical transport studies as a function of temperature and magnetic field in nano materials.

5.4 Electronic Origin of Light Emission and Lasing

Dr. Shouvik Datta's group has been working on the following topics sponsored by DST-SERB.

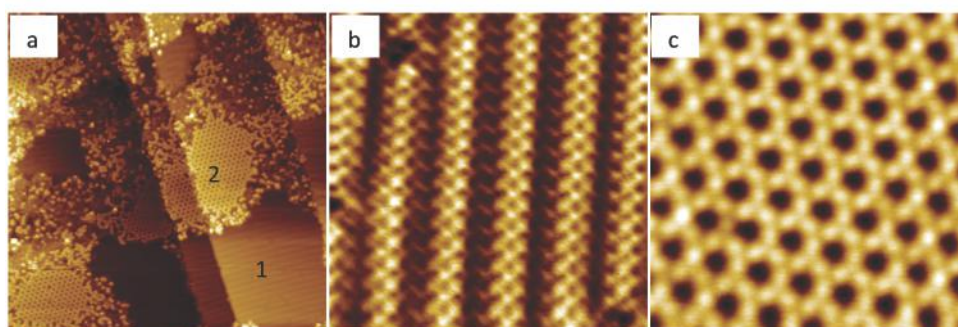
- 1) Electrical and optical investigation of excitonic and exciton-polaritonic BEC and BCS transitions using GHz scale dielectric response & energy-momentum spectroscopy of excitons etc (with PhD student Amit Bhunia)
- 2) Photon statistics before and after lasing in semiconductor laser diodes (with Integrated PhD student Kumar Saurabh)
- 3) Shot noise before and after lasing in semiconductor laser diodes (with Integrated PhD student Mohit Kumar Singh)
- 4) Investigation of coherent electronic transport in semiconductor laser diodes as well as plasmonic materials (with Integrated PhD student Mayur Shinde)

Dr. Datta's group has also initiated work on setting up time of flight photoconductivity for mobility measurements. This work is sponsored by CORESUM in IISER Pune under MHRD and IISER Pune.

5.5 Matter at the Atomic Scale

Molecular self assembly. Using the commercial ultrahigh vacuum, low temperature scanning tunneling microscope (UHV-LT-STM), **Dr. Aparna Deshpande's** laboratory is studying the self assembly of FePc (iron phthalocyanine) molecules on Au/mica substrate. After flame annealing of the substrate in air the substrate is cleaned with argon ion sputtering (1 kV beam energy) and annealing (till 400°C). On this clean sample, the group carries out vapor deposition of FePc molecules using a homebuilt Knudsen cell. FePc molecule is found to assemble in diverse patterns on the substrate (as in Figure) and forms a 1D chain on the Au substrate. In some regions FePc covers the substrate with a 2D Kagome lattice.

Figure 36: STM images of FePc molecules on Au substrate taken at $V=0.8$ V, $I = 100$ pA. (a) FePc assembly going over Au steps, image size 50 nm x 50 nm. (b) STM image of region 1 in (a) showing 1D chain on Au substrate, image size 6 nm x 6 nm. (c) STM image of region 2 in (a) showing 2D Kagome lattice on Au substrate, image size 6 nm x 6 nm. (Dr. Aparna Deshpande's Group)



Exploring 2D materials: Dr. Deshpande's group is also working on the 2D material molybdenum disulphide (MoS_2). They have started making single layer MoS_2 from bulk crystal using the technique of electrochemical exfoliation.

5.6 Statistical Physics, Complex Systems

Dr. Arijit Bhattacharyay's group is working on developing equilibrium statistical mechanics of mesoscopic systems. In their new work, they showed the derivation of Langevin equation with modified Einstein relation (arXiv:1503.00223). The group continues to work on analogue gravity where they have recently shown the emergence of a massive scalar field from the quantum pressure term in the BEC-model of analogue gravity (arXiv:1405.1865). The group is also working on the supersolid phase induced by nonlocal interactions in a BEC (arXiv:1407.2039). Presently, a full model for the analogue gravity in BEC including quantum potential and back-reaction is being developed and alternative ways of melting vortex lattice in a BEC in order to have atomic quantum Hall effect experimentally realizable in these systems are being investigated.

5.7 Soft Matter Physics

The connecting theme of the different projects in **Dr. Apratim Chatterji's** group is the phenomena of (i) structure formation by self assembly in soft matter systems and (ii) modeling low Reynolds number flows and seeing the response of soft matter systems in such flows.

The group has studied the hierarchical self assembly of nano-structures by attractive colloidal particles (modelled by Lennard Jones interaction) inside a template of nematically ordered self assembling polymers (*Phys. Rev. E* 91:032602); the steady state extensional flow with PBC; and self assembly of nanoparticles with repulsive excluded volume interactions in a background matrix of self-assembled polymeric chains. Some of the ongoing work includes investigating the shear of self assembling polymeric chains without branches; modelling active matter incorporating hydrodynamic interactions in 3d; and modeling semiflexible self assembling chains using a radially symmetric 2 body potential.

6 Atomic and Molecular Physics, Optics and Quantum Information

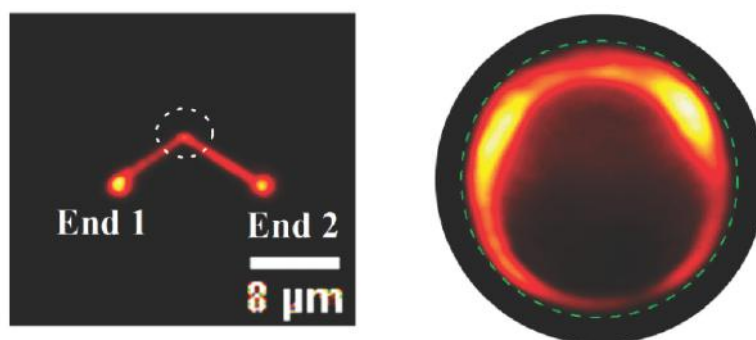
6.1 Plasmonics and Raman Spectroscopy

Dr. G.V. Pavan Kumar's group has fabricated a novel plasmonic nano-element called end-to-end coupled nanowires. This sub-wavelength optical element exhibits polarization-controlled plasmonic hot-spots and optical antenna (see image) and may have implications in nanophotonic circuits, sensors and chip-scale quantum optics.

The group has developed a new method—plasmofluidic surface enhanced Raman scattering—to detect and probe single molecules using dynamic evanescent traps of plasmonic nanoparticles. They have also developed Fourier-space optical microscopy method that can be used to determine k-vector distribution of photons emerging from nanostructures and single emitters to perform photonic energy-momentum spectroscopy.

These recent developments could lead to new paradigms in understanding how light can be influenced by nano-scale matter, and how nano-scale matter can be influenced by light.

Figure 37: (Left) A fluorescent Nile blue-coated end-to-end coupled plasmonic nanowire illuminated by focused laser beams (633nm) at ends 1 and 2; (Right) The angular distribution of fluorescent photons out-coupled from the dotted circle. The junction between the two nanowires is essentially acting as a dual-channel optical antenna. (Dr. G.V. Pavan Kumar's Group)



Research in Dr. Pavan Kumar's group has recently been highlighted in popular media. This includes the following article in *The Indian Express* (<http://epaper.indianexpress.com/c/3139563>).

6.2 Quantum Simulation of Condensed Matter Models

Quantum spin-ice represents a paradigmatic example of how the physics of frustrated magnets is related to gauge theories. In the present work, **Dr. Rejish Nath's** group addresses the problem of approximately realizing quantum spin ice in two dimensions with cold atoms in optical lattices. The relevant interactions are obtained by weakly laser-admixing Rydberg states to the atomic ground states, exploiting the strong angular dependence of van der Waals interactions between Rydberg p -states together with the possibility of designing step like potentials. This allows the implementation of Abelian gauge theories in a series of geometries, which could be demonstrated within state-of-the-art atomic Rydberg experiments. The group has numerically analyzed the family of resulting microscopic Hamiltonians and find that they exhibit both classical and quantum order by disorder, the latter yielding a quantum plaquette valence bond solid. They have also presented strategies to implement Abelian gauge theories using both s - and p -Rydberg states in exotic geometries, e.g., on a 4–8 lattice.

The group has proposed a trapped ion scheme en route to realize spin Hamiltonians on a Kagome lattice which, at low energies, are described by emergent Z_2 gauge fields, and support a topological quantum spin liquid ground state. The enabling element in their scheme is the hexagonal plaquette spin-spin interactions in a two-dimensional ion crystal.

This model is an archetypical Hamiltonian in which gauge fields are the emergent degrees of freedom on top of the classical ground state manifold. Under realistic situations, the group showed the emergence of a discrete Gauss's law as well as the dynamics of a deconfined charge excitation on a gauge-invariant background using the two-plaquettes trapped ions spin-system. The proposed scheme, in principle, allows further scaling in a future trapped ion quantum simulator, and could pave the way toward the simulation of emergent gauge theories and quantum spin liquids in trapped ion systems.

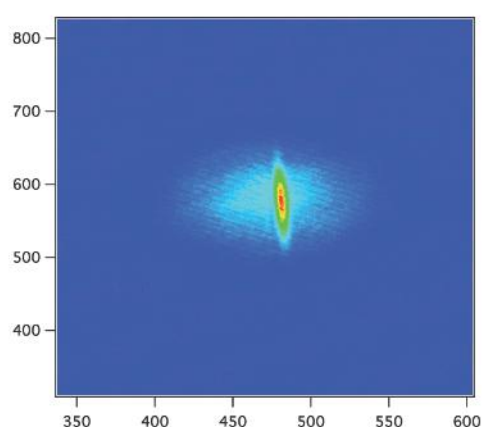
6.3 Ultracold Atoms

Dr. Umakant Rapol's group works in the area of atomic physics and quantum optics. Special emphasis is on developing new platforms for entangling isolated particles and for using quantum-optic or atomic systems for precision spectroscopy. These new platforms will be developed using either the combination of a variety of techniques with the use of ultra-cold and dense sample of neutral atoms, plasmonic arrays, ultra-high quality factor optical cavities and ions trapped in electro-dynamic traps.

Near term goals are to a) create strong electromagnetic coupling between neutral-atom pairs using localized Plasmons and neutral atoms b) search for novel phases in condensed matter systems using Bose-Einstein Condensate (BEC). In this direction, the lab has achieved the Bose Einstein Condensation in Rb atoms in a novel magnetic trap (*New J. Phys.* 17:023062). Ongoing efforts are directed into isolation of single atoms from the Bose-Einstein Condensate. The existing trap is being modified for gaining more optical access so that the BEC can be transferred into a 3-D optical lattice. A hybrid optical + magnetic trap is being constructed

wherein the atoms are first evaporated in the magnetic trap and transferred into an optical Dipole trap with weak axial confinement. Atoms will then be evaporated in the dipole trap and BEC can be achieved. The condensate can then be transferred into an optical lattice. By tuning the lattice parameters, one can get single atom occupancy per lattice site. This way one can isolate individual atoms from the lattice. A picture of the atoms captured into a focused beam optical trap (similar to optical tweezers that confines micron sized particles and biological cells) is shown (Figure 38).

Figure 38: Plot of density of trapped atoms in the Hybrid Optical + Magnetic Trap. The bright central band is the collection of the atoms in the focused Gaussian laser beam. The trapping laser is far detuned from the atomic resonance. The scale of the axes is in pixel nos of the CCD camera having a pixel pitch of 8 microns. (Dr. Umakant Rapol's Group)



7 Particle Physics and Gravity

7.1 Higher Spin Fields

Dr. Sudarshan Ananth and group has worked for the past year on establishing and refining a complete framework to derive quantum field theory Lagrangians describing fields of arbitrary spin. This approach uses the fundamental symmetries in a theory to completely derive, from first principles, the corresponding Lagrangians (*J. Phys. A* 47(2014):045401; work with BS MS student Y.S. Akshay).

This framework

1) shows interesting links between different Lagrangians (*Nucl. Phys. B* 887(2014):168-174). This work showed that: in momentum space, the coefficient of the cubic interaction vertex for a spin λ field is equal to the corresponding Yang-Mills (spin=1) coefficient, raised to the power λ . This generalizes the KLT relations;

2) when adapted to curved space-times, like AdS_4 could yield the Lagrangian origin of the Vasiliev equations of motion. As a start, the group (with Y.S. Akshay, PhD student Mahendra Mali and Sudarshan Ananth) has worked out the spin 2 case in AdS_4 to use as a guide. The group has also recently completed incorporating fermions into their framework. This completes the framework since it also offers a description of matter fields and their Lagrangians (*Nucl. Phys. B* 884(2014):66-73).

3) is ideal to re-examine many of the no-go results pertaining to interacting higher spin fields in flat space-time.

7.2 Gravitation and Quantum Effects

Dr. Suneeta Vardarajan and her group members have worked on problems in classical gravity. Along with MS student Bhavesh Khamesra, Dr. Vardarajan has analyzed spacetimes with fluid sources which describe realistic interiors of stars. This work would answer questions such as: if the fluid in the stellar interior were perturbed, would the star be stable.

A framework to study the stability of spacetimes with a variety of sources, like fluids and fundamental fields is being built (work with PhD student Amruta Sadhu); this work would be useful in astrophysics. An important problem in gravitation that showcases its nonlinearity with very interesting connections to nonlinear dynamics is being worked on (with PhD student Dhanya Menon).

Dr. Vardarajan is also interested in mathematical physics, particularly applications of recent research in geometry to difficult physics problems. Results have been obtained on a class of physics models—the nonlinear sigma models which are widely used in physics from subjects as diverse as spin systems to string theory.

7.3 String Theory and Quantum Field Theory

Two main research projects in quantum field theory and string theory were initiated by **Prof. Sunil Mukhi** during this period: (i) the study of entanglement entropy at finite temperature and finite interval, and its relation to anti-deSitter spacetimes and black holes, (ii) the study of asymptotic symmetries of gravity and Yang-Mills theory and their relation to infinite-dimensional symmetries. In the former project a detailed study was carried out of the role of modular invariance in Renyi and entanglement entropies. This requires summing over fermion spin structures in the replica trick. Using a predicted relation between entanglement and thermal entropy, it was shown that this sum needs to be carried out before replication in the limit of small intervals, and the converse for large intervals. The study of modular invariance was extended to free boson CFT's on the Spin(2d) weight lattice with similar results.

Several chapters of a forthcoming textbook "The Standard Model" were written. The book, jointly co-authored with Prof. Rohini Godbole, is to be published by the Cambridge University Press.

7.4 Black Hole, Holography and Hydrodynamics

Black Holes are primary objects that arise as solutions of General Theory of Relativity. Understanding their microscopic properties is of fundamental interest. With collaborators, **Dr. Nabamita Banerjee** is studying the properties of various supersymmetric and non-supersymmetric black holes that arise in string theory.

On the other hand, String theory has given a correspondence, known as AdS/CFT conjecture, that relates a theory of quantum gravity (in AdS space) to a gauge theory in one lower dimensions. The conjecture has been extended to study hydrodynamics properties of strongly correlated systems. Dr. Banerjee's group studies this fluid/gravity correspondence to finer details to understand properties of hydrodynamic systems. The group is also studying properties of non-relativistic fluid systems that they get as a limit of relativistic fluids.

7.5 String Theory and Holography

Dr. Arjun Bagchi's research over the past academic year has focused on three different aspects:

Construction of holography for flat spacetimes: One of the principal successes of the last year was the calculation of holographic entanglement entropy for 3D flat spacetimes and their proposed holographic duals and the agreement between two very different calculations (work done with Rudranil Basu (IISER Pune), Grumiller and Riegler (Vienna University of Technology)). A project that generalized the previously discovered phase transition in three dimensions between cosmological solutions and flat space to 1+1 dimensions was successfully completed.

Non-relativistic conformal field theories: Together with Rudranil Basu, Aditya Mehra and later Ashish Kakkar, a program was initiated of systematically studying gauge theories in the non-relativistic set-up and looking for conformal invariance in the Galilean context. Galilean Electrodynamics was analysed first, and novel infinite dimensional symmetries were discovered in the non-relativistic analogues of Maxwell's equations. This constituted the first known example of a Galilean Conformal Field Theory in dimensions higher than 2. These results have been generalized to Yang-Mills theories where infinite dimensional symmetries exist even in this interacting context. This construction opens up very interesting possibilities of integrable sectors in theories like Quantum Chromodynamics (QCD). Another, more immediate application may be in supersymmetric gauge theories and connections to gravitational theories in AdS spacetimes via the AdS/CFT correspondence.

Tensionless string theory: With Shankhadeep Chakraborty and Pulastya Parekh, investigations were initiated into the extreme high-energy regime of string theory, viz. the theory of tensionless strings, focusing on symmetries on the world-sheet. This limit is expected to yield an understanding of the connection of strings to higher spin particles.

7.6 Experimental High Energy Physics

IISER Pune joined the CMS Collaboration at CERN in September 2014. This followed a dedicated effort by group members Dr. Sourabh Dube and Dr. Seema Sharma after joining the India-CMS collaboration earlier in the year.

Dr. Sourabh Dube, with PhD student Shubhanshu Chauhan, joined the efforts of the Fast Simulation group in CMS to work on validating the reconstruction of

charged particles with the tracking detector. After validation, they worked on the Fast Simulation code for the CMS software release that will be used for the data collected by the experiment in 2015.

A collaboration has been initiated by Dr. Dube (along with Integrated PhD student Anshul Kapoor) with the Rutgers CMS group to perform searches in lepton final states using the data collected during the LHC Run 2.

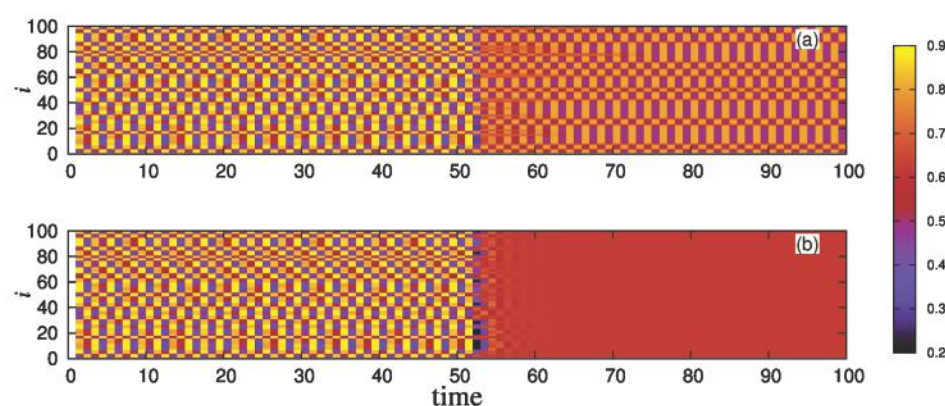
Dr. Seema Sharma, with PhD student Kunal Kothekar is working on understanding the presence of signals in the hadron calorimeter that can be attributed to noise. These efforts will culminate with the design of an algorithm to remove noisy events from collected collision data, and will play an important role in all the analysis of CMS data.

8 Complex Systems

8.1 Nonlinear Dynamics and Complex Systems

The method of environmental coupling introduced by **Prof. G. Ambika's** group has been developed into a general method for suppression of dynamics and control of spatiotemporal dynamics especially for discrete dynamics on a lattice. This scheme provides a model for real-life phenomena, like the dynamics of coupled neurons being affected by extra cellular medium through ephaptic coupling as well as a technic for controlling the chimera states and propagation of undesirable excitation waves (Figure 39).

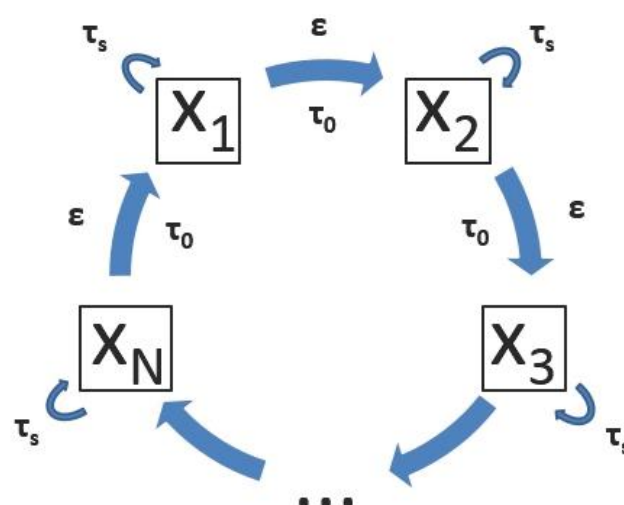
Figure 39: Control (a) and suppression (b) of spatio-temporal dynamics in a ring of logistic maps due to environmental coupling. (Prof. G. Ambika's Group)



The group showed how in a system of Mackey–Glass systems, connected on a ring via unidirectional positive feedback with constant delay in coupling, the interplay

between the different time scales give rise to many emergent phenomena such as isochronous and anti phase synchronization, amplitude death, phase locked cluster states and splay states. The group has extended the study to the case of digitized coupling and observed that the sampling and quantization reduce the regions of amplitude death and can induce phase-flip bifurcation (Figure 40).

Figure 40: Network of Mackey-Glass time delay systems X_i with constant inherent delay τ_s , connected in a ring with coupling strength ε , such that the coupling provides a positive feedback with a delay τ_0 . (Prof. G. Ambika's Group)



The group has introduced a method of checking the reliability of computed correlation dimension when gaps are present in observational data. This is illustrated for real world examples of the data from three variable stars, R Scuti, U Monocerotis and SU Tauri. The group proposed a uniform framework for the construction and analysis of recurrence networks from chaotic time series.

8.2 Chaos and Extreme Events

Much of the research work in the last one year by **Dr. M.S. Santhanam's** group was concentrated on the study of quantum manifestations of non-KAM chaos in periodic Hamiltonian potentials and on extreme events in complex networks. The quantum mechanics of a particle periodically kicked by a sinusoidal field in Kronig-Penney stationary potential was investigated in detail. This displays chaotic dynamics but the transition from integrability to chaos is not through the usual route, the KAM scenario, of breaking invariant tori. On the other hand, it displays abrupt transition to chaos. In particular, connections between the quantum dynamical localization occurring in this system and Anderson localization were studied. The main results are that in the semiclassical regime, it is possible to control quantum coherences and hence the localization phenomenon in this system. On extreme events front, the group has attempted to understand how the knowledge of extreme event probabilities on nodes of a network can be used to understand the progression towards failure of the complex networks on which they take place. The idea of extreme events is framed with respect to classical random walks on complex networks. In real life, many networks suffer from breakdowns such as for instance the power blackouts in electrical grids. The ultimate aim is to understand if such extreme events could be predicted in advance.

9 Earth and Climate Science

9.1 Geophysical Data Modeling in Deep Earth Exploration

Prof. Shyam Rai's current research interest includes creating 3-D high resolution images of the deep Earth beneath Indian region using natural sources like earthquakes and ambient noise generated by ocean and atmospheric disturbances. These waves are recorded by a network of high fidelity instruments in field. These images, widely referred as Seismic Tomography, are akin to the medical CAT and represent 3-D variation of Earth's elastic and anelastic properties. Apart from improving our understanding of the making and working of the Earth and its dynamics, these images would guide the future generation exploration of natural resources and quantitative assessment of earthquake hazard in the continental interior of India where despite low strain rate earthquake of magnitude 6 occurs at an interval of ~60 years somewhere in the peninsula. He, along with research students has demonstrated the feasibility of generating such images by field experiment and theoretical studies in southern India.

9.2 Rhenium-Osmium Geochronology

Chemical and isotopic signatures of organic-rich marine sedimentary rocks (e.g. black shales) serve as potential proxies to reconstruct oceanic conditions in the past. Meaningful interpretation of these paleoceanographic signatures and their correlation with other global sedimentary archives require precise depositional age of the rocks. Radiometric dating of sedimentary deposits, however, is a challenging task. Recent research by **Dr. Gyana Ranjan Tripathy** is mainly focused to employ the rhenium-osmium radioactive decay scheme to constrain depositional age and environment of black shales from important geological settings. Re and Os are redox-sensitive elements; both of these elements remain in dissolved (oxyanion) form in oxygenated waters and get removed to underlying organic-rich sediments (mostly by forming organometallic complexes) under reducing environments. Owing to this redox-dependent sequestration process, Re and Os present in anoxic sediments are mostly hydrogenous in nature and hence distribution of these elements and their isotopes is found successful in constraining age information and depositional environment for various black shales. The Re-Os elemental and isotopic systematic can further be applied to various energy resources, *e.g.* coal and petroleum, to gain information about their chronological framework and depositional settings.

10 Ecology, Evolution and Biodiversity

10.1 Plant Physiological Ecology

Dr. Deepak Barua's laboratory focuses on physiological ecology of plants.

a) They have carried out a meta-analysis of published data on plant phenology patterns in the tropic, which shows low sampling, lack of standardized methodology, uneven geographic coverage, and highlight the need for an integrated effort in monitoring phenology in India. The group finds that in the Asian tropics seasonality in rainfall is important in determining the importance of light versus water in driving community phenology.

b) Based on findings from above, they have taken up experimental work in the greenhouse to test a novel hypothesis that optimizing water transport efficiency versus safety may be crucial in seasonally dry environments. In this direction, they are examining the relationship of leaf and stem functional traits with performance in water limiting conditions. Field work in sites with contrasting seasonal patterns and annual rainfall complement these efforts in addressing the importance of intraspecific and interspecific variation in leaf traits.

c) Their ongoing work also explores plant phenology in the context of interactions with pollinators/herbivores. 1) Pollinator interactions in *Randia dumetorum* - the effect of flowering phenology and flower color on pollinator visitation and fruit set is being investigated. 2) Leafing phenology, functional traits and herbivory - the relationship between phenology, leaf traits in 75 woody species in the Northern Western Ghats is being examined. Work from the group indicates that leaf traits are intricately linked to seasonal patterns of flushing and shedding. Future work is planned to quantify herbivory to test whether escape from herbivory explains the paradoxical observation where leaf flushing occurs during the dry summer.

d) Plant responses to high temperature stress: Other work in the lab focuses on the relationship of leaf functional traits to responses to temperature stress in tropical trees. Results demonstrate large variation in thermotolerance in tropical trees, and partly some of this variation is due to difference in leaf traits.

10.2 Population Biology

a) Controlling the dynamics of unstable populations:

Dr. Sutirth Dey's group has proposed a strategy called the Adaptive Limiter Control (ALC), for controlling the dynamics of unstable biological populations. The method

is robust to reasonable amounts of noise and extinction probability. ALC increases constancy and persistence of laboratory populations and metapopulations of *Drosophila melanogaster*. Dr. Dey's group has also empirically investigated the working of several other control methods and has derived biological understanding of how they attain stability.

b) Effects of fluctuating environment on bacterial evolution

There is considerable understanding about how laboratory populations respond to predictable (constant or deteriorating-environment) selection for single environmental variables like temperature or pH. However, such insights may not apply when selection environments comprise multiple variables that fluctuate unpredictably, as is common in nature. To address this issue, Dr. Dey's group grew replicate laboratory populations of *E. coli* in complex randomly changing environments. After ~170 generations, these selected populations had significantly greater fitness in four novel environments including antibiotics and heavy metals. The selected populations evolved an increased ability for energy dependent efflux activity that might enable them to throw out toxins, including antibiotics, from the cell at a faster rate. This provides an alternate mechanism for how evolvability can evolve in bacteria and potentially lead to broad-spectrum antibiotic resistance, even in the absence of prior antibiotic exposure. Given that environmental variability is increasing in nature, this might have serious consequences for public-health.

10.3 Evolutionary Biology in Behavior, Health and Metabolism

Research in Dr. Milind Watve's group is being pursued on the following lines currently.

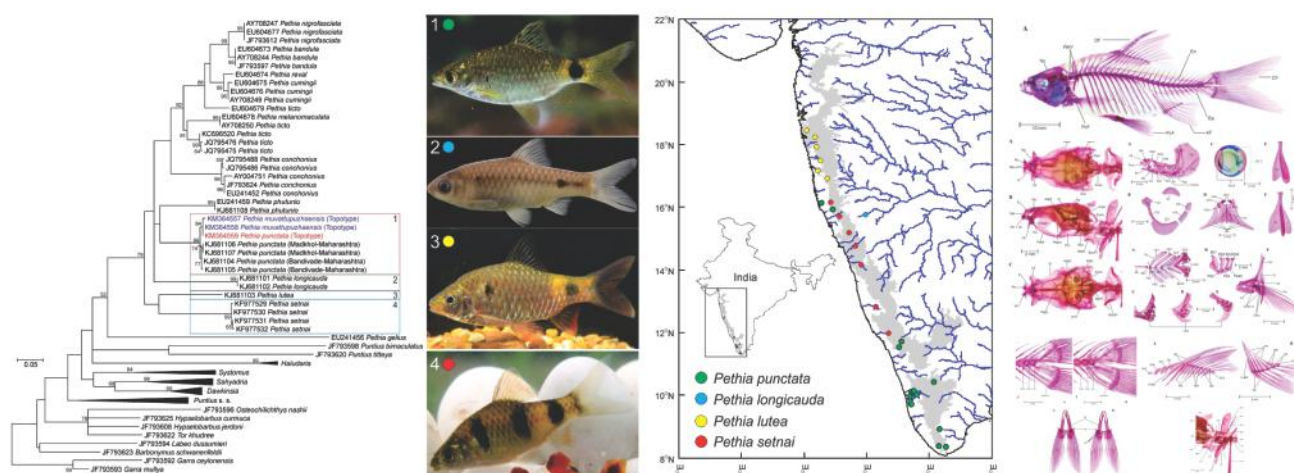
- (i) Evolutionary medicine - Type 2 diabetes: Testing evolutionary models of type 2 diabetes using a combination of modeling, epidemiological data analysis and experimental work in rat models.
- (ii) Evolutionary Ecology of Bacteria: The ecological role of antibiotics, bacterial life in dilute environments and experimental evolution of aging in bacteria has been investigated.
- (iii) Patterns in Biodiversity: Currently coordinating the Maharashtra Gene Bank project comprising 20 research groups working in different parts of the state.
- (iv) Collection of field data is nearing completion for the study of human-wild life conflict on the western boundary of Tadoba Andhari Tiger Reserve.

10.4 Molecular Phylogeny and Phylogeography of Freshwater Fishes and Frogs

Dr. Neelesh Dahanukar's laboratory works on the molecular phylogeny and phylogeography of freshwater fishes and frogs with implications in understanding their systematics, diversity, distribution patterns and conservation status. Phylogenetic, osteological and morphological studies on the freshwater fish

Figure 41: Integrated studies with molecular phylogenetic, distributional, morphological and osteological details provide novel insights on the speciation events and biogeographical distribution patterns. (Dr. Neelesh Dahanukar's Group)

genus of small barbs, *Pethia*, has led to the discovery of two new species *Pethia longicauda* and *Pethia lutea* from the east and west flowing rivers of the Western Ghats of Maharashtra, respectively (Figure 41). Phylogenetic studies have also revealed the taxonomic and systematic status of small barbs, *Pethia punctata* and *P. muvattupuzhaensis*; large barb, *Neolissochilus wynaadensis*; and catfish, *Horabagrus brachysoma* and *H. melanostoma*. Studies on *Pethia punctata* and *Horabagrus brachysoma* have also revealed new challenges in understanding the phylogeographical distributional patterns of freshwater fishes of the west flowing rivers of the Western Ghats, while studies on *Neolissochilus wynaadensis* have provided new insights on the conservation of this threatened taxa. Phylogenetic and morphological studies on the Western Ghats endemic monotypic frog family Ranixalidae has led to the discovery of a new species *Indirana chiravasi* and distributional delimitation of a threatened species *Indirana leithii*. Cross taxa analysis based on the phylogenetic diversity and distribution of freshwater fish and frog species along the Western Ghats of India suggests that there are some general trends in the distribution of species. In the light of molecular dating, such biogeographical patterns can reveal the affinities of Western Ghats organisms with the south east Asian and east African lineages.



11 Cell and Developmental Biology

11.1 DNA Damage and Maintenance of Genome Integrity

Research in **Dr. Mayurika Lahiri's** laboratory focuses on the use of biochemical, cell and molecular techniques in human cell culture systems to better understand the DNA damage response mechanisms of cells to maintain genome stability. Damage response mechanisms include cell cycle checkpoint arrest, DNA repair and apoptosis. Understanding the key processes involved in the maintenance of

genomic integrity is critical in the prevention, diagnosis and treatment of a number of human pathologies, including cancer.

The effect of alkylating agents on morphogenesis of non-tumorigenic breast epithelial cells using 3D culture systems is one of the avenues being studied. Loss of cellular architecture and polarity of breast tissue is one of the early markers for onset of breast cancer. The group found that the addition of alkylating agents to non-transformed epithelial cells grown as 3D cultures disrupted apico-basal polarity as well as upregulation of vimentin thus denoting a transformed phenotype. The transformed acini were observed to contain fewer nuclei without appreciable change in volume of acini compared to non-treated cells. Interestingly, morphometry analysis of each nuclei in the transformed acini revealed an increase in volume and surface area compared to control acini. Currently, the non-tumorigenic cells are being modified to have an altered expression of key genes, which are known or speculated to play a vital role in the process of breast carcinogenesis with an attempt to dissect out the molecular mechanisms involved in the process of tumorigenesis initiated by the absence or presence of such genes.

Another avenue that the laboratory is working on is the characterization of the interaction between checkpoint protein, TopBP1 and mismatch repair protein complex, Msh2-Msh6 as well as an anti-apoptotic protein, Api5 following DNA damage. Both Msh2-Msh6 and Api5 were observed to interact physically with TopBP1. Currently, the functional relevance of the interaction is being investigated.

11.2 Common Molecular Principles underlying Animal Development and Disease

Animals as different as humans, worms, and flies use remarkably similar molecular mechanisms to control their development. Discoveries of developmental paradigms in one organism have provided insights into development processes of other organisms. **Dr. Girish Ratnaparkhi's** group utilizes *Drosophila melanogaster* and *Hydra magnipapillata* as model organisms to study common molecular principles underlying animal development and disease.

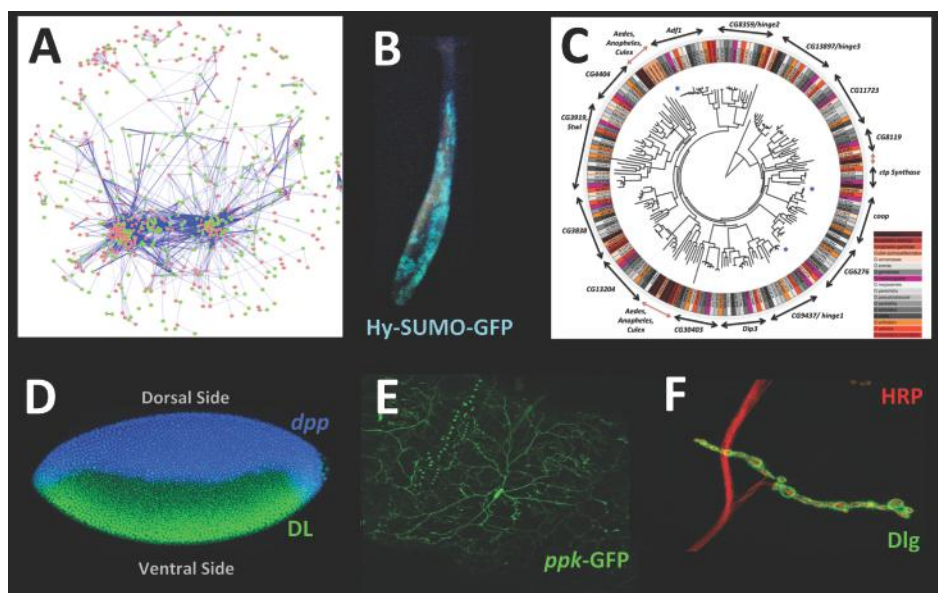
In *Drosophila*, the role of the small ubiquitin like modifier SUMO, a post-translational modifier, in regulating gene expression in the innate immune system is being studied using a proteomics based discovery process in combination with genetics. Currently the mechanistic roles for the SUMO targets uncovered in the screen are being uncovered. In *Hydra*, the group is interested in roles for SUMOylation in stress, immunity, and regeneration.

Lineage-specific gene family expansion (LSE) appears to be an important source of structural and regulatory diversity in eukaryotes during evolution. The group is studying LSE in the *Drosophila* MADF-BESS family of proteins with a focus on understanding roles for this interesting family in transcriptional regulation in pattern formation.

Amyotrophic lateral sclerosis (ALS) is a progressive, neurodegenerative disease characterized by loss of motor neurons; leading to gradual paralysis and death of

Figure 42: A. LPS induced SUMO proteome in *Drosophila* S2 cells mapped onto the *Drosophila* Interactome; displayed using Cytoscape. B. Transgenic *Hydra* expressing 6XHis:FLAG-Hydra-SUMO:GFP in mosaic (blue) patches; driven by the *Hydra* Actin promoter. C. A phylogenetic tree depicting relationships between MADF-BESS domain proteins in Dipterans. D. Patterning of the Dorsal-Ventral axis in the embryo by opposing gradients of Dorsal (DL) and Decapentaplegic (Dpp). DL is SUMOylated at K382. E. Dendritic arborization by Type IV Da neurons in *Drosophila* larvae. GFP is driven by promoter/enhancer elements of the pickpocket (ppk) gene. F. The larval neuromuscular junction. Horseradish peroxidase (HRP, red) marks neurons while green marks Discs large (Dlg), a postsynaptic protein located in the sub-synaptic reticulum. (Dr. Girish Ratnaparkhi's Group)

the patient. VAPB/ ALS8 is one locus in humans where mutation can cause ALS. Dr. Ratnaparkhi's group has conducted a large genetics screen in *Drosophila* to identify pathways and molecules that interact with *Drosophila* VAPB and may therefore contribute to disease pathogenesis. They find that multiple ALS loci are connected in a gene network that may malfunction in the disease condition.



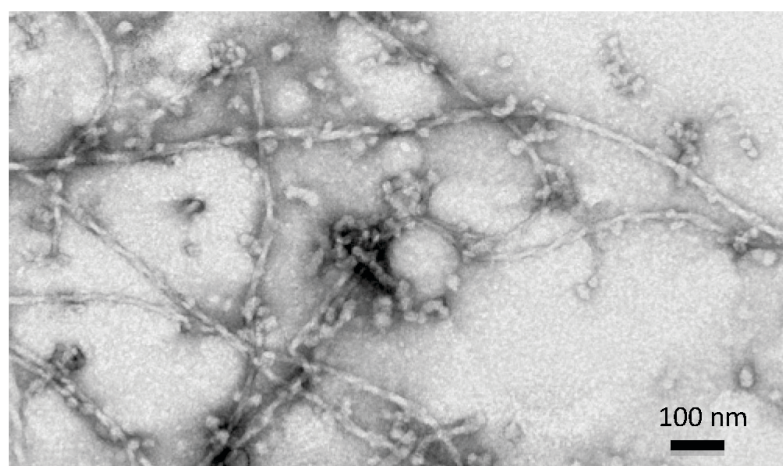
12 Biochemistry and Biophysics

12.1 Cell Motility and Bacterial Cytoskeleton

Cell motility is a fundamental process in biology. In many organisms, movement is mediated by appendages like cilia, flagella and pili. In addition, motility is also driven by the dynamics of assembly of cytoskeletal filaments, as in eukaryotic cell crawling. Research in bacterial cell biology has identified a few novel modes of motility based on the bacterial cytoskeleton. **Dr. Gayathri Pananghat's** research focus is to understand the molecular mechanism of motility based on the bacterial cytoskeleton using *Spiroplasma* and *Myxococcus xanthus* as model systems. The group utilizes the techniques of structural biology (mainly X-ray crystallography and electron microscopy) and single-molecule fluorescence microscopy to study the structure and dynamics of assembly of the macromolecular complexes involved in motility, thus capturing the assemblies at both spatial and temporal resolutions.

In the past year, **Dr. Gayathri Pananghat** has initiated work towards these research goals with the cloning and overexpression of the cytoskeletal proteins in *Spiroplasma* including Fibril (Fib) protein and MreBs (MreB1-5), and the components of the motility machinery namely MglA, MglB, MreB and FrzCD in *Myxococcus xanthus*. Transmission electron microscopy and scanning electron microscopy images of *Spiroplasma* Fib demonstrate that the heterologously expressed protein is functional and forms filaments in vitro (Figure 43). Domain-wise purification and characterization of the protein is also being attempted to obtain the crystal structure of the monomer. As an initial step towards structure determination of motility complexes in *Myxococcus xanthus*, structural studies of the purified proteins of MglA and MglB are under progress and the crystal structure of MglA complexed with GDP has been determined to 1.7 Å resolution. Further enzymatic studies on MglA, a Ras-like GTPase, and effect of the GTPase activating protein MglB have been planned, and crystallization of the complexes between interacting proteins are currently being pursued.

Figure 43: Negatively stained electron microscope image of purified Fib filaments (Dr. Gayathri Pananghat's Group)



12.2 Self Organization and Cell Morphogenesis

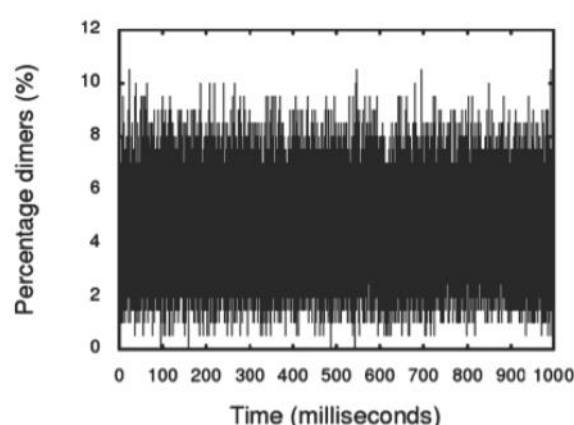
Research in **Dr. Chaitanya Athale's** laboratory examines the shape and organization of cells and their cytoskeleton using the approach of cellular biophysics. Recently the group has discovered a simple explanation for a long-standing problem in bacterial cell shape by applying image-analysis tools developed in-house (*Bioinformatics* 27:2944-2948). They found that the observed increase in cell-size variability in fast growing populations is due to coupling of the division process with replication.

The group has also been working to test the hypothesis that radial microtubule motility involves a tug-of-war of microtubule (MT) transport. They find that centrosomal asters break this tug of war in *Xenopus* extracts with a gradient of asymmetry (*Phys. Biol.* 11: 016008). However the role of these gradients is not so clear in intact cells. The group has now modeled the transport of such arrays in mouse oocytes. Development of an *in vitro* reconstitution system to study motor dependent MT gliding is currently underway.

In the process of developing image analysis tools to quantify sub-cellular processes, the group has developed an automated kymography tool that allows objective estimation of DNA segregation in bacteria but also can be applied to other systems.

Thus, Dr. Athale's group has developed some initial ideas about the growth dynamics and sizes of simple cells such as *E. coli* and have also begun to test their theories of collective effects in MT transport. In collaboration with molecular dynamics group in NCL, the group has developed a Monte Carlo simulation of membrane-receptor diffusion and aggregation to test ideas of membrane fluidity and receptor dynamics (*Phys. Chem. Chem. Phys.* 17:1390-1398).

Figure 44: Dimer percentages as a function of simulation time (milliseconds) from a Monte Carlo simulation of receptor diffusion and aggregation-disaggregation using experimentally measured on and off rates (Pawar et al. *Phys. Chem. Chem. Phys.* 17:1390-1398, Dr. Chaitanya Athale's Group).



12.3 Reconstitution of Cargo-Sorting during Coated-Vesicular Transport

Clathrin-mediated endocytosis (CME) is initiated by the formation of clathrin-coated pits (CCPs) that represent sites where adaptor protein complexes nucleate and cluster membrane receptors (or cargo). Clathrin-mediated endocytosis involves a complex hierarchy of interactions between clathrin, its adaptors and numerous accessory factors that coordinate and catalyze partial reactions leading to cargo sorting, membrane budding and fission. Cargo-specific, clathrin-associated sorting proteins (CLASPs) are an evolutionarily conserved set of adaptors that function to expand the repertoire of cargoes internalized via clathrin-mediated endocytic pathway. Each category of CLASPs internalizes membrane proteins such as the G-protein coupled receptors, nutrient receptors, cell adhesion and antigen-presenting molecules and membrane proteins destined for degradation. CLASPs recognize sorting motifs on specific cargoes; bind phosphoinositide lipids, clathrin in order to populate every budded clathrin-coated pit with a diverse array of cargoes. Clathrin assembly during coated-pit formation is a reaction that is essentially governed by the rate and extent of clathrin polymerization by the individual CLASPs on a membrane surface. Despite the nearly 40 years of research focused on clathrin polymerization since its discovery in the late 70s, sensitive monitoring of kinetics of clathrin polymerization on a membrane surface has not been possible.

Dr. Thomas Pucadyil's group has developed an assay system to analyze clathrin polymerization capability of CLASPs. Using real-time fluorescence microscopy they find that epsin, an important member of the CLASP family of proteins and an adaptor for ubiquitinated membrane proteins, can alone lead to the rapid assembly of fluorescently-labeled clathrin with a typical time constant of ~ 75 s, similar to the time scales for coated pit formation seen in cells. The group now plans to extend this methodology to the entire repertoire of CLASPs.

12.4 Origins and Early Evolution of Life

Ongoing research in **Dr. Sudha Rajamani's** laboratory has implications for fundamental understanding of how life might have chemically originated. Research is focused on delineating the processes by which polymers capable of catalysis and replication emerged and propagated on early Earth. In one project, the group is delineating relevant processes that might have enabled the formation of complex mixtures of informational molecules (oligomers like nucleic acids and peptides) on prebiotic Earth. They are discerning the potential role of liquid crystalline matrices of amphiphiles on nonenzymatic polymerization of RNA nucleotides in fluctuating hydrothermal spring-like conditions. The group optimized various parameters that result in efficient nonenzymatic polymerization of nucleotides to RNA-like oligomers and characterized the resultant oligomers. Data indicates that these molecules lose most of their nitrogenous bases over the reaction time course. Interestingly, under these same conditions, sugar-phosphate oligomers however form readily, resulting in oligomeric backbones. Such backbones are thought to have allowed for sampling of larger informational (base) space, prior to the emergence of the RNA World.

In a second major project the group is looking at the role of co-solutes on prebiotic replication. For an RNA molecule that evolved catalytic property, it is crucial that it replicated this information faithfully in an early RNA World. Previous studies that characterized nonenzymatic replication rates were carried out in solution phase, without addition of any co-solutes. This is unrealistic as prebiotic soup would have been a solution containing a mixture of many different molecules, rather than being a concentrated solution of only certain kinds of molecules. Thus, it is critical to consider this while studying enzyme-free replication, as addition of correct or incorrect monomers could get exaggerated by concentration effect, resulting from molecular crowding in such scenarios. This would increase the concentration of otherwise diluted molecules, which will potentially have important consequences for nonenzymatic replication fidelity in such scenarios. In this project, the group is delineating the role of molecular crowding on template-directed primer extension reactions. Preliminary results indicate a very intriguing effect playing out in these scenarios, which is increasing the overall error rate associated with such replication.

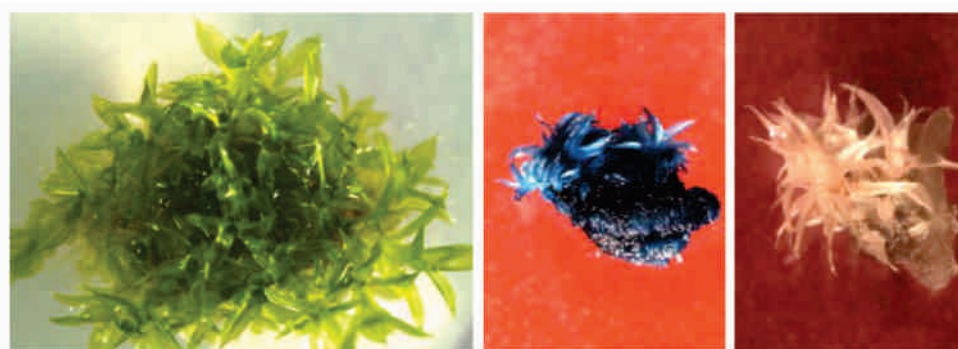
13 Epigenetics and Immunology

13.1 Long Distance Signaling and Gene Regulatory Networks in Plants

a) Shoot Apical Meristem (SAM) development in lower plants

Modular body plan is one of the mechanisms plants have adapted to respond to various environmental fluctuations. In plants, modular body plan is laid out by apical cells as they take up the tasks of post embryonic organogenesis. Being essential for plant development, apical cell is one of the major characters innovated in plant kingdom as early as green algae and bryophytes. Though higher algae exhibited apical cell mediated growth, it was highly developed in bryophytes. Mosses are a group of bryophytes, whose body plan is controlled by 8 different apical cells. Considering evolutionary importance of moss in plant development, **Dr. Anjan Banerjee's** group has established *Physcomitrella patens* as a model organism in the laboratory (shown in Figure). Despite the striking morphological similarities between gametophytic (n) and sporophytic (2n) generation, recent studies suggest that genetic program for the body plan is distinct. Hence, the group has chosen a forward genetics approach to understand the apical cell regulatory network in Moss and developed T-DNA mutant lines (shown in Figure). Presently, screening techniques are being standardized for identification of apical cell mutants. Overall, this project would address a very fundamental question of gene regulatory network evolution in the plant kingdom.

Figure 45: (Left): 30 days old *Physcomitrella patens* in culture; (Middle): 35S::GUS transgenic line developed by Agrobacterium mediated transformation showing GUS gene activity. (Right): Wild type plant lacking GUS gene activity (-ve control) (Dr. Anjan Banerjee's Group)

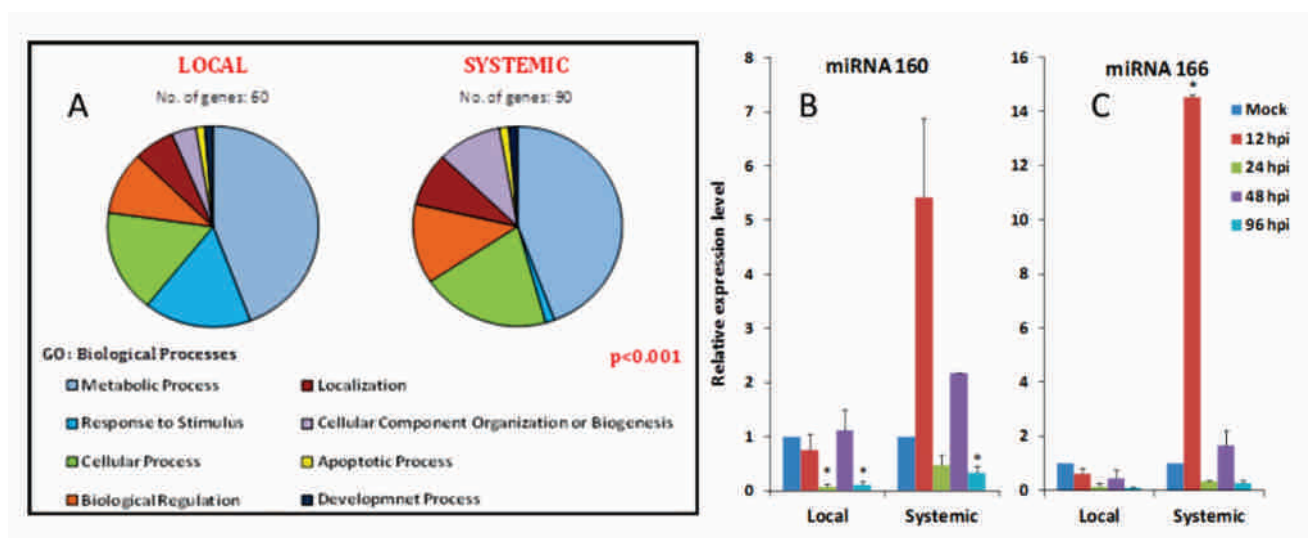


b) Dynamics of micro RNAs in plant-pathogen interaction

Presence of macromolecules in phloem, the major component in plant vascular bundle, has been well documented in the last several years. This has prompted researchers to explore the possibility of macromolecules acting as long distance defense signal in plant-pathogen interaction apart from all known Systemic Acquired Resistance (SAR) signals in plants. Considering that phloem is the central route for macromolecular transport in plants, the group has carried out an RNA

Figure 46: Gene ontology of RNA-seq data obtained from local and systemic leaves infected with *Phytophthora infestans* (A). Alteration of micro RNA160 (B) and 166 (C) levels in different time periods post *Phytophthora* infection in local and systemic tissues. (Dr. Anjan Banerjee's Group)

sequencing approach to decipher the long distance signals associated in phloem cells of potato upon oomycete (*Phytophthora infestans*) infection. Additionally, the group has identified two micro RNAs in potato and tobacco that showed altered regulation during potato-*Phytophthora* interaction and knock-down transgenic lines generated by miRNA-mimicry and eTM (endogenous target mimicry) strategies further establish the dynamics of micro RNAs in potato and tobacco, indicating their role in SAR. Presently, GC-MS and HRMS systems are being attempted to analyze the known SAR signals in these knock-down lines to understand the micro RNA dynamics in plant defense.

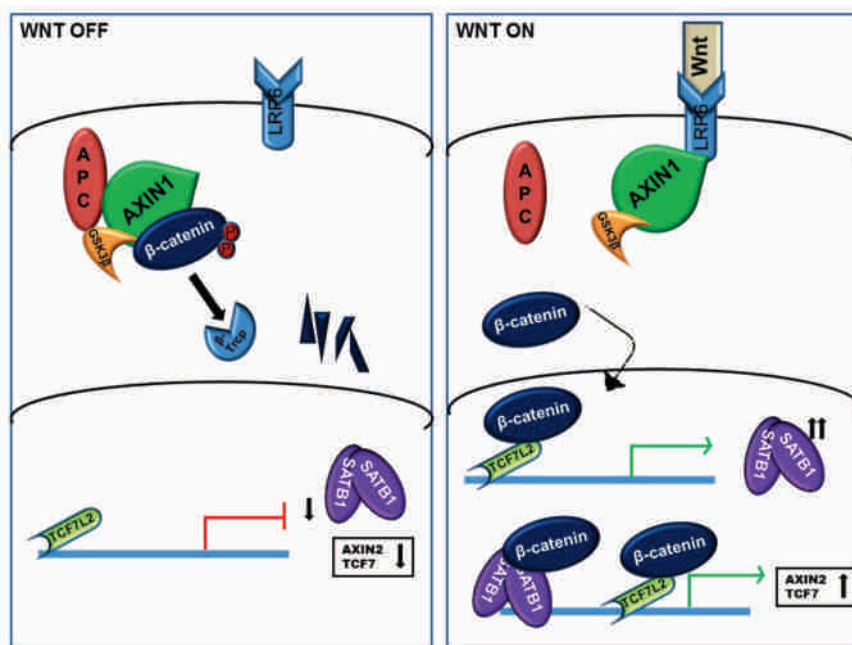


13.2 Wnt/ β -Catenin Signaling regulated SATB1 promotes Colorectal Cancer Tumorigenesis and Progression

The chromatin organizer SATB1 has been implicated in the development and progression of multiple cancers including breast and colorectal cancers. However, the regulation and role of SATB1 in colorectal cancers is poorly understood. Prof. Sanjeev Galande's group demonstrated that expression of SATB1 is induced upon hyperactivation of Wnt/ β -catenin signaling and repressed upon depletion of TCF7L2 (TCF4) and β -catenin. Using several colorectal cancer cell line models and the APC min mutant zebrafish *in vivo* model, the group has established that SATB1 is a novel target of Wnt/ β -catenin signaling. This work showed that direct binding of TCF7L2/ β -catenin complex on Satb1 promoter is required for regulation of SATB1. Moreover, SATB1 is sufficient to regulate the expression of β -catenin, members of TCF family, multiple downstream effectors and mediators of Wnt pathway. SATB1 potentiates the cellular changes and expression of key cancer-associated genes in nonaggressive colorectal cells, promotes their aggressive phenotype and tumorigenesis *in vivo*. Conversely, depletion of SATB1 from aggressive cells reprograms the expression of cancer-associated genes, reverses their cancer phenotype and reduces the potential of these cells to develop tumors *in vivo*. The group also found that SATB1 and β -catenin bind to the promoters of TCF7L2 and the downstream targets of Wnt signaling and regulate their expression. These findings suggest that SATB1 shares feedback regulatory network with TCF7L2/ β -catenin signaling and is required for Wnt signaling-dependent

Figure 47: Model depicting the proposed molecular mechanism for regulation of SATB1 and its functional consequences. In Wnt OFF state (left), the levels of β -catenin are low and therefore the expression of Wnt responsive genes and SATB1 is reduced. In Wnt ON state (right), β -catenin levels increase. Subsequent to nuclear accumulation of β -catenin, the TCF7L2/ β -catenin complex binds to Satb1 promoter thereby inducing its expression. SATB1/ β -catenin complex binds to Tcf7L2 promoter to maintain its expression. The TCF7L2/ β -catenin and SATB1/ β -catenin complexes then bind to Wnt responsive genes to induce their expression. (Prof. Sanjeev Galande's Group)

regulation of β -catenin. Collectively, these results provide unequivocal evidence to establish that SATB1 reprograms the expression of tumor growth- and metastasis-associated genes to promote tumorigenesis and functionally overlaps with Wnt signaling critical for colorectal cancer tumorigenesis.



13.3 Epigenetics and Transcriptional Regulation in *Plasmodium falciparum*

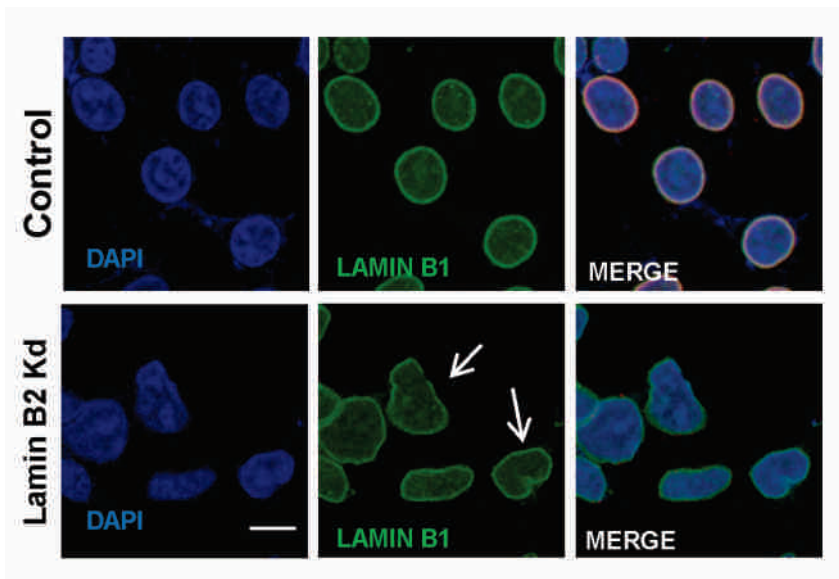
Malaria is a major public health problem in many developing countries, with the *Plasmodium falciparum* causing the most malaria-associated mortality. Efforts are on for malaria eradication, which are mainly focused on the vaccine development. However, vaccine approach has failed world over because parasite is able to mutate continuously. How these mutations are generated at the levels of genome, transcriptome and epigenome is poorly understood. Dr. Krishanpal Karmodiya's projects aim to address the issue of epigenetic regulation of gene expression in the malaria parasite. Epigenetics is defined by heritable changes in gene expression that are not associated with changes in DNA sequence. It is mainly reflected in methylation of DNA and post-translational modifications of DNA-associated proteins, histones. This research project will take advantage of the genome sequence to identify regulatory regions that may undergo epigenetic regulation, an approach that is poorly understood. Better understanding of the basics of epigenetic regulations in *Plasmodium falciparum* and their comparison with the human system would open the hitherto unexplored pathways for targeting the malaria parasite.

13.4 Chromosome Biology

The focus of the Dr. Kundan Sengupta's laboratory is to understand how chromosomes are placed in the cell's nucleus. Chromosomes with more genes

(example: human chromosome 19) reside towards the center of the nucleus while chromosomes with fewer genes (example: human chromosome 18) are closer to the boundary of the nucleus. Lamins are proteins that maintain the structure and integrity of the nucleus. The group lowered the levels of Lamins to study their effect on the nucleus and chromosomes by silencing the Lamin gene. This resulted in a striking distortion of nuclear shapes. However, the chromosomes were not found to show a change in their positions, which suggested the presence of other proteins that maintain chromosome positions in the nucleus. Furthermore, the question of placing chromosomes at specific locations in the nucleus assumes importance in cancer cells, as they typically show an increase in chromosome numbers, which imparts a survival advantage and an uncontrolled ability to multiply. These studies are directed to understand how chromosomes are maintained at specific locations within the nucleus and how chromosome numbers and their locations are affected in cancer cells.

Figure 48: Control: Lamins are located towards the boundary of the nucleus as marked by Lamin B1. Lamin B2 Knockdown (Kd): Depleting Lamin B2 in cells shows distortions in nuclear shapes. Lamin B1 marks the nuclear boundary and is unaffected upon depletion of Lamin B2. (Dr. Kundan Sengupta's Group)



14 Neurobiology and Computational Biology

14.1 Computational Neuroscience

Neurons in the hippocampus and the entorhinal cortex form exquisitely precise representations of the spatial location of an animal. Place cells in the hippocampus are activated only when the animal is located within a circumscribed region of space. Grid cells in the entorhinal cortex fire when the animal is located at the vertices of a hexagonally symmetric grid in space. Any path through space is thus uniquely represented by a sequential pattern of spikes generated by place and grid cells.

Investigations over the last year from **Dr. Collins Assisi's** group shed light on the mechanisms that generate sequences in the entorhinal cortex and the hippocampus. Simulations and analyses employ realistic conductance based models of neurons in the entorhinal cortex coupled via network motifs that are based on extant experimental data. The group has demonstrated the role of oscillatory theta drive from the medial septum in generating precise sequences of spikes. Theta oscillations are modulated by changes in the external world and the state of the animal. For example, the frequency of theta oscillations is modulated by the velocity of the animal. Further, theta oscillations are coupled to the sniff cycle and may be reset by multisensory inputs from the lateral entorhinal cortex where these oscillations are not as prominent as in the medial entorhinal cortex. The group observed that the coupling between theta oscillations and neuronal spike sequences (events that differ in time scales ranging over an order of magnitude) is orchestrated by the detailed biophysical properties of single neurons and the topology of the networks they create.

These simulations were carried out using a library of routines that efficiently integrate large arrays of differential equations over a cluster of compute nodes. The library, that we call 'InSilico', was developed in Dr. Assisi's laboratory under an open access license and is available for download through the lab website.

14.2 Neural Circuits and Behavior

a) Cytoskeleton remodelling in neuronal development

Dr. Aurnab Ghose's group has uncovered a novel regulator of filopodial function in neuronal growth cones. They have identified a previously uncharacterized formin family member in the regulation of axon pathfinding *in vivo*. They showed that, distinct from its other family members, this protein regulates the integrity of actin bundles and influences the mechanical stability and traction forces generated by filopodia.

b) Neuromodulation of innate behaviours

Using zebrafish **Dr. Aurnab Ghose's** group has demonstrated the regulation of the feeding drive by interoceptive inputs that change the excitability of a novel group of neurons. The latter, in turn, control the release of hunger-satiety associated behaviours. Similarly, they have identified a neuropeptide-based mechanism that tunes olfactory sensitivity to food cues in a nutritional state dependent manner.

14.3 Synaptic Transmission in Normal and Pathological States

Dr. Suhita Nadkarni's group has developed a biophysically detailed, 3D model of CA3-CA1 synapse in the hippocampus. This allows carrying out in-silico experiments to study synaptic plasticity in this synapse. One of the main goals is to understand the changes in intracellular calcium dynamics as a basis of cognitive dysfunction in Alzheimer's disease (AD). A common form of familial AD is associated with mutations in the gene that encodes, an ubiquitous endoplasmic reticulum (ER) membrane protein, Presenilin (PS). The proposed model predicts over-load of cytosolic calcium due to selective inactivation of Presenilin in the presynaptic terminal of the synapse. This dysfunctional ER calcium release is seen

to change the short-plasticity profile of the synapse and suggests a role in the pathogenesis of AD.

In a conductance-based neuron network model that generates awake thalamic alpha, the group studies the effect of enhancing the inhibitory drive to mimic the pathology in AD. Enhancing the inhibitory drive in this thalamocortical network slows the alpha rhythm down. Reduced power and frequency of Alpha rhythm is suggested to be one of EEG signatures of AD patients.

Computational Model of Purinergic Modulation of Synaptic Transmission by Astrocytes: Recent studies suggest ATP release from glial cells as a potential mechanism through which astrocytes are able to influence synaptic transmission. However, the contribution of ATP, to ongoing activity, unlike glutamate, is difficult to quantify. This is due to the presence of multiple receptor subtypes which lack specific antagonists and the relatively large diversity in their time profile. Dr. Nadkarni's group has developed a biophysically detailed model of gliotransmitter release from astrocytes that is in agreement with experimental data. Further, the group has investigated synaptic modulation at a hippocampal synapse by ATP and glutamate released from astrocytes at a tripartite synapse.

14.4 Neurobiology of Movement Initiation

With extensive repetition, even complex learned movement sequences like speech become automatic and one hardly notices initiating them. The importance of movement initiation is apparent when initiation becomes difficult in diseases like Parkinson's disease. Yet, how learned movement sequences are initiated and why they fail to initiate in disease conditions remains poorly understood. **Dr. Raghav Rajan's** laboratory uses the zebra finch (songbird) to understand how the brain initiates learned movement sequences.

The learned song sequence of an adult zebra finch consisting of a stereotyped sequence of sounds, has many parallels to human speech. Each song bout begins with a variable number of short syllables called introductory notes (INs) before song sequence production. Previous work by Dr. Rajan has shown that INs converge onto a behavioral/neural "ready" state just before song sequence production. This suggests that INs represent a process where the brain gets "ready" to initiate song sequences. Thus, understanding why INs are produced and whether and how they help in song sequence initiation will provide general insights into how the brain initiates learned movement sequences.

Current work in Dr. Raghav Rajan's lab is focused in 3 major directions:

- 1) Distinct brain pathways exist for producing learned and un-learned vocalizations. Given that INs are partly un-learned and partly learned, the group is currently using pharmacological manipulations in awake singing birds, to examine relative contributions of these different pathways to IN production.
- 2) Hearing is necessary for song learning and maintenance. We are currently analyzing data from deaf birds to test the hypothesis that INs represent a hearing-dependent calibration process used by the brain to get "ready" to initiate song.

- 3) Finally, birds produce more INs when courting females. Using behavioral experiments coupled with pharmacological manipulations in awake singing birds, we are testing the hypothesis that INs represent a means to capture the attention of females.

14.5 Computational Structural Biology

Dr. M.S. Madhusudhan's group has refurbished and enhanced a previously published method. This method, CLICK (<http://mspc.bii.a-star.edu.sg/click>) superimposes the 3D structures of biomolecules and biomolecular complexes. The group showcased this method to look at similarities in protein-DNA complexes especially in cases where the proteins binding double stranded DNA in 2 different complexes were not related to one another in sequence or structure.

The group also developed a web server to predict temperature sensitive mutations in a protein - TSPred (<http://mspc.bii.a-star.edu.sg/TSPred>). This server uses residue depth to determine what residues in a protein when mutated leads to temperature sensitive alteration of protein function.

15 Algebra and Number Theory

15.1 Special Values of L -Functions Associated to Automorphic Forms

Dr. Baskar Balasubramanyam is interested in special values of L -functions associated to modular forms or more generally automorphic forms. Problems relating to p -adic deformations of these objects are also being looked at. In particular, the behavior of various arithmetic quantities attached to modular forms/automorphic forms over p -adic families is being studied. Specific examples of these arithmetic quantities are special values of L -functions, Hecke eigenvalues, and Galois representations.

15.2 Arithmetic Geometry and Automorphic Forms

Dr. Debargha Banerjee studies the integral solutions of polynomial equations like $x^p + y^p = z^p$ investigating the solutions of equations over integers rather than rational numbers. Rich theory of modular forms (more generally, automorphic representations) are used to find these solutions. Dr. Banerjee is working toward a deeper understanding of space of modular symbols and its connection to Eisenstein ideals and p -adic L -functions. The aim is to explore different periods to explore the rationality questions. These may require a careful understanding of the theory of (g, K) -modules.

Along with Loic Merel of University of Paris VI, Dr. Banerjee is working to write down the Eisenstein elements completely inside the space of modular symbols using Hecke operators. In another work, they wish to compute the Eisenstein elements completely for general modular curves without using Hecke operators.

In a joint work with Dipramit Majumdar (IISER Pune) and V.G. Narasimha Kumar (IIT, Hyderabad), Dr. Banerjee is studying the index of Eisenstein ideals and as a consequence multiplicity one statements about Jacobians of modular curves.

In an ongoing project with A. Raghuram (IISER Pune), Dr. Banerjee is studying p -adic L -functions for Sym^3 transfers of automorphic representations of GL_2 over any number fields.

With undergraduate student Sameer Kulkarni, Dr. Banerjee is studying the extra zeros of the p -adic L -functions and with PhD student Tathagata Mandal, Dr. Banerjee is investigating the extra zeros of p -adic L -functions of "motives" associated with automorphic forms over GL_2 and their endomorphism algebras.

15.3 Number Theory, Representation Theory and Spectral Theory of Symmetric Spaces

Dr. Chandrasheel Bhagwat has been working on the following research projects.

a) Period relations for motives

The period relations for motives associated to cuspidal automorphic representations of algebraic groups like GL_n , $\text{Sp}(2n)$ are being studied. In a joint work with A. Raghuram, certain results for the ratios of Deligne periods of tensor product motives have been proved. When at least one of the motives is of even rank, these results together with the Deligne conjecture predict the rationality results for ratios of critical values for Rankin-Selberg L -functions of Raghuram and Harder. Dr. Bhagwat has been working on similar results for other groups and also for various other motives obtained functorially (for example, motives corresponding to symmetric square $\text{Sym}^2(\pi)$ of a representation π).

b) Special values of Rankin-Selberg L -functions

The aim of this project is to prove rationality results for ratios of critical values for Rankin-Selberg L -functions. In a joint work, Raghuram and Harder have used the rank-one Eisenstein Cohomology for GL_n over a totally real field to prove such results. This project is in parallel to the above project; where Eisenstein Cohomology for certain classical groups will be studied with the hope to prove the arithmetic properties of Langlands L -functions and the emphasis being on those L -functions which are not captured by the work of Raghuram and Harder.

c) On arithmetic lattices and their representation equivalence

In a joint work with Rajan and Pisolkar, some of the results of Prasad and Rapinchuk have been proved in the context of weak commensurability of S -arithmetic lattices under different hypotheses like characteristic equivalence and representation

equivalence. Dr. Bhagwat hopes to address some more questions, such as those about cocompactness of lattices in real semisimple Lie groups, in terms of these criteria.

15.4 Analytic Number Theory and Arithmetic of Modular Forms

Dr. Kaneenika Sinha works on fundamental questions related to 1) Arithmetic statistics of Fourier coefficients of modular cusp forms and 2) Analytic properties of L -functions of modular cusp forms and their arithmetic interpretation.

For a positive prime number q and a positive even integer k , let $S_k(q)$ denote the linear space of cusp forms of “weight” k and “level” q . Generally speaking, these are complex-analytic functions which satisfy certain transformative conditions (parametrized by the weight and level) and appropriate growth conditions. Such forms play an extremely important role in number theory and their Fourier coefficients carry fundamental information about points of elliptic curves over finite fields, values of the partition function, class numbers and representations of integers by quadratic forms.

Dr. Sinha's research program revolves around fundamental statistical properties of these Fourier coefficients. Properties like equidistribution, limiting theorems and pair correlations related to these families (where one either fixes a level and varies the forms or fixes a form and varies the coefficients) are studied. Dr. Sinha aims to understand whether the laws satisfied by such families have deeper patterns predicted by random matrix theory.

Corresponding to certain special kinds of cusp forms called newforms, one constructs appropriate L -functions and studies them as functions of complex variables. A central theme in number theory is to study the analytic properties of these L -functions, including their analytic extension, points of singularity and their order of vanishing at critical points. In the case $k=2$, this last issue, namely the order of vanishing of an L -function at what we call the critical point has important geometric implications: by the Birch and Swinnerton-Dyer conjectures, it directly yields information about ranks (over the rationals) of Jacobian varieties of modular curves. Dr. Sinha's current research centers on such questions and their generalizations to Rankin-Selberg L -functions.

15.5 Conjugacy Questions and Representation Theory of Groups

In recent times **Dr. Anupam Kumar Singh** has gotten interested in computational group theory problems. In particular, he looks at classical Chevalley groups where one is given natural Chevalley generators. An algorithm similar to the Gaussian elimination for Symplectic and Orthogonal groups to solve the word problem has been developed. This algorithm further computes spinor norm in the case of split orthogonal group and gives Bruhat-like decomposition for certain maximal parabolics.

15.6 K_1 Stabilization of General Quadratic and General Hermitian Groups

16 Analysis and Applicable Mathematics

16.1 Several Complex Variables, Potential Theory and Differential Geometry

Dr. Diganta Borah has previously studied various properties of a Kahler metric, known as the Robin metric defined on bounded pseudoconvex domains in $\mathbb{C}^n$, $n > 1$. The motivation for studying this metric was from the classical Kahler metric of Bergman which has many pleasant properties and several applications to the function theory. It is worth mentioning that by investigating the Bergman kernel function and boundary behavior of the geodesics of the Bergman metric, C. Feffermann obtained the breakthrough result that a biholomorphic mapping between two strongly pseudoconvex domains extends smoothly up to the boundary. Dr. Borah's results show that the Robin metric shares many properties with the Bergman metric. Recently, he studied the existence of geodesic spirals of the Robin metric and obtained interesting results. Dr. Borah has also studied various questions related to the motion of critical points and the differential geometry of level lines of the Green function of a bounded multiply connected domain in the complex plane. This project is based on the work of B. Gustafsson and A. Sebbar. Using a new approach to answer these questions, Dr. Borah is applying scaling techniques and is able to strengthen many of the results.

Bo-Yong Chen has recently constructed a new invariant Kahler metric in his article *A new invariant Kahler metric on relatively compact domains in a complex manifold* (*Ann. Polon. Math.* 91(2007):147-159). This metric is the Bergman metric associated to a certain weighted Bergman space. Generally, the Bergman metric with respect to a weighted Bergman space is not invariant under biholomorphisms. The weight considered by him was obtained by M.S. Narasimhan and R.R. Simha in their article *Manifolds with ample canonical class* (*Invent. Math.* 5(1968):120-128). Dr. Borah plans to explore this work. In addition, and apart from this, Dr. Borah is also studying the boundary behavior of invariant volume forms on pseudoconvex domains in $\mathbb{C}^n$ near boundary points of finite type.

16.2 Shape Optimization Problems

Dr. Anisa Chorwadwala works on shape-optimization problems including the isoperimetric problems. The details of the research work are as described below.

Let S be a Riemannian manifold with metric g and Laplace-Beltrami operator Δ . Let B_1 be an open (geodesic) ball in S . Let B_0 be an open ball whose closure is contained in B_1 . Let $\Omega = B_1 \setminus B_0$. Consider the following problems:

$$-\Delta u = 1 \text{ in } \Omega, u = 0 \text{ on } \partial \Omega, \text{ --- (1)}$$

$$-\Delta u = \lambda u \text{ in } \Omega, u = 0 \text{ on } \partial \Omega. \text{ --- (2)}$$

In the case that S is Euclidean space, Kesavan (*Proceedings of the Royal Society of Edinburgh Section A* (2003); 133:617-624) (and also Ramm-Shivakumar (*Math. Inequalities and Appl.* (1998) 1:559-563)) proved the following:

- (I) If u is a solution of problem (1), the energy functional $\int_{B_1 \setminus B_0} \|\nabla u\|^2 dx$ attains its minimum if and only if B_0 and B_1 are concentric.
- (II) The first eigenvalue λ_1 of problem (2) attains its maximum if and only if the balls are concentric.

The proofs described earlier by Kesavan and Ramm-Shivakumar rely on shape differentiation and the moving plane method. In the application of the moving plane method, the commutativity of the Laplacian and reflection in the hyperplane was used.

Dr. Chorwadwala has studied the behaviour of the above-mentioned functionals associated to a non-linear differential operator namely the p -Laplacian. The Shape-calculus for the p -Laplacian is developed. The existence and uniqueness of non-negative solution of a particular boundary value problem involving the p -Laplacian with non-vanishing boundary conditions is derived. As a consequence, a weak comparison principle for the p -Laplacian (with non-vanishing boundary condition) is proved.

Dr. Chorwadwala has proved a generalized version of a famous conjecture made by Lord Rayleigh. The conjecture was as follows: The first eigenvalue of the Laplacian on an open domain of given measure with Dirichlet boundary conditions is minimum when the domain is a ball and only when it is a ball. This conjecture was proved simultaneously and independently by Faber and Krahn. Dr. Chorwadwala's work dealt with the p -Laplacian version of this Theorem.

16.3 Mathematical Biology

Dr. Pranay Goel studies Type II diabetes using both experiments and mathematical modeling. It is well recognized that the two approaches complement each other. This work uses modeling to understand data better and design new experiments, and experiments in the laboratory are carried out with the intention of building mathematical models that can serve as coherent theories of the phenomena the group studies.

Work is carried out in an interdisciplinary, collaborative fashion: some of the experiments are carried out at IISER Pune and some in the lab of Dr. Saroj Ghaskadbi at the University of Pune along with help from Dr. C.S. Yajnik of KEM Hospital in Pune.

Two areas of focus are:

1. Constructing and analyzing models of the pancreatic islets of Langerhans to understand glucose-stimulated insulin secretion (GSIS).
2. Oxidative stress (OS) in the development of diabetes: Dr. Goel is working on the interesting hypothesis that OS is central to the development of diabetes because it is the locus of the development of both insulin resistance as well as impaired beta-cell secretion. With graduate student Rashmi Kulkarni, Dr. Goel is carrying out experiments to better understand the mechanistic processes that underlie OS leading to IR. Human diabetic data (collected at KEM and University of Pune) has been analyzed in terms of OS along with designing a new method to assess the recovery of newly-diagnosed diabetics on antidiabetic medication.

16.4 Math Finance

Dr. Anindya Goswami has worked on the following topics along with three internal and one external MS project students this year.

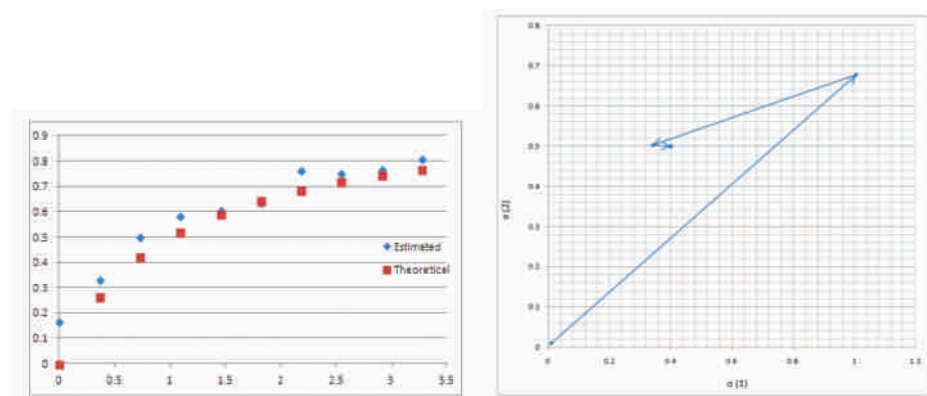
a) An approximation of option price in a semi-Markov modulated market model: Using stochastic analysis, it is shown that the solution of the price equation is continuous with respect to the transition rate of the semi-Markov process which appears as a functional parameter in the equation. Then it studies the techniques of statistical inference of transition rate of a semi-Markov process. In particular, it shows the consistency of the MLE in an appropriate sense. Thus this work establishes the validity of numerical approximation of price using the estimated transition rate.

b) Implied volatility in a regime switching market: A regime switching market model is considered which generalizes the renowned Black-Scholes model. In such a market, this work aims to propose the notion of implied volatility, which is well known only for Black-Scholes case. In the Black-Scholes case, the market parameters, such as bank rate, volatility are constants. It is shown in this work that even if those are allowed to follow a Markov chain with low transition rate, one can introduce a well defined notion of implied volatility. It is interesting to note that the problem of establishing the implied volatility is indeed an inverse problem. One has to check the invertability of a map which sends the volatility coefficient to the price of an option. The difficulty arises due to the unknown nature of this map.

c) Risk sensitive portfolio optimization in a semi-Markov modulated jump diffusion market model: Under some suitable generalized model assumptions, risk sensitive optimization of a portfolio in both finite and infinite time horizons are studied. The corresponding HJB equation is shown to possess classical solutions. The optimal controls are also obtained.

Apart from these, Dr. Anindya Goswami is also collaborating with mathematicians from within and outside India on a stability problem of stochastic differential equations with semi-Markov switching.

Figure 49: (Left): Convergence of MLE of hazard rate function; (Right): Convergence of numerical scheme for finding implied volatility vector (Dr. Anindya Goswami)



17 Geometry and Topology

17.1 Low-Dimensional Topology: 3-Dimensional Manifolds

Low-dimensional topology is an active area of research with several longstanding conjectures proved fairly recently, such as Thurston's Geometrization conjecture (which implies the Poincaré conjecture) and the Virtual Fibration conjecture. **Dr. Tejas Kalelkar's** research focus is mainly on foliations, triangulations and Heegaard splittings of 3-dimensional manifolds.

A closed book looks like a solid 3-dimensional object but on closer analysis is observed to consist of 2-dimensional pages stacked in parallel tightly together. In a similar way, every 3-manifold can be built by stacking 2-dimensional surfaces tightly together into what is called a foliation. Dr. Kalelkar is studying a special class of foliations called taut foliations which imply useful topological properties for the 3-manifold. In a previous paper with Rachel Roberts, his work showed that the fiber structure of a punctured surface bundle can be perturbed to taut foliations that realize all boundary slopes in a neighbourhood of the boundary slopes of the fiber. In the case of a surface bundle with pseudo-Anosov monodromy, Dr. Kalelkar is now attempting to pin down such an interval explicitly expressed in terms of the slope of the fiber.

On cutting open a 3-manifold along a special embedded surface called the Heegaard-splitting surface, we end up with two simpler pieces called handlebodies. Every closed 3-manifold has such a splitting surface, which may not be unique. All known examples of 3-manifolds with infinitely many irreducible Heegaard splittings have splitting surfaces of the form $H + nK$ where H is a fixed

splitting surface, nK denotes n parallel copies of an incompressible surface K and where addition is understood to be their Haken sum. Using branched surface techniques developed by Tao Li, Dr. Kalelkar is attempting to prove a weaker version of this observation. In particular, the aim is show that whenever a 3-manifold has infinitely many irreducible Heegaard splittings, infinitely many of them are of the form $H + K_n$ where K_n are all incompressible surfaces carried by a fixed branched surface.

17.2 Intersection Theory, Derived Categories and T-Varieties

Over the last year, **Dr. Vivek Mallick** has made some progress on characterizing triangulated subcategories in the derived category of coherent sheaves on a variety. Derived categories provide us with an indispensable tool in Algebraic Geometry to study algebraic varieties, which are naively the zero loci of a collection of polynomials. Most of modern algebraic geometry somehow relate to the study of these exotic structures. Recently there has been a lot of activity to unravel the structure of these categories. Interestingly, the new theories are applicable across different subjects of mathematics, namely representation theory, stable homotopy theory and KK theory. In algebraic geometry, there has been a conjecture that most of the properties of the variety can be deduced by just studying the derived category. This was proved to be true by Paul Balmer. One of the earliest tools in modern algebraic geometry was cohomology theory. Grothendieck gave a very abstract recipe to mimic the construction of cohomology theories from algebraic topology, by introducing what is now known as Grothendieck topologies. In a few recent papers by Neeman, Balmer and others there has been some interest in finding a category theoretical construction of one such topology: étale topology. For this they modified a classical construction by Eilenberg and MacLane to characterize one particular aspect of étale topology: étale morphisms. Along with Dr. Umesh Dubey, Dr. Vivek Mallick is working with DG categories for some time and has found that upon generalizing Eilenberg MacLane's construction to DG categories, a method to characterize images of more general morphisms can be developed.

Along with Prof. José Ignacio Burgos, Dr. Mallick has found an algorithm to compute hodge numbers of varieties which admit a torus action. Such varieties are called T-varieties. Hodge numbers are classical invariants used to study algebraic varieties and are closely related to better known invariants like betti numbers and Euler characteristic. Now they are using this algorithm to find mirror pairs for low dimensional T-varieties. Their construction generalizes the well known results by Batyrev.

17.3 Algebraic Geometry

There are various equivalence relations which one can put on the group of algebraic cycles on a smooth and projective variety. The theory of algebraic cycles studies the relationship between these equivalence relations. Voevodsky defined a new equivalence relation called smash equivalence and conjectured that it coincides with numerical equivalence. This is an interesting problem since this

would show that smash equivalence, homological equivalence and numerical equivalence coincide. There are not many results known about this conjecture. **Dr. Ronnie Sebastian's** work on examples of smash nilpotent cycles on rationally connected varieties shows that the conjecture holds for smooth and projective varieties for rationally connected 4-folds.

In an ongoing work with Harald Grobner and A. Raghuram, Dr. Sebastian is working to prove results about special values of L -functions. A conjecture of Deligne states that there are two periods and each value of the L -function at a critical point is the product of one of these periods with a power of π and a number which satisfies a polynomial equation with rational coefficients. In this work the team is trying to show that the L -value at one critical point is related to the L -value at other critical points by a number which satisfies a polynomial equation with rational coefficients. As a consequence we would get that if the conjecture of Deligne is true for one critical value then it is true for all.

18 Discrete Mathematics

18.1 Public Key Cryptography

Dr. Ayan Mahalanobis works in cryptography, especially public key cryptography. In modern public key cryptography, there are currently two computationally hard problems in use. On these two, we build the one way functions. These one way functions form the backbone of the public key cryptosystems. These problems are: 1. Factoring any large integer, especially those that are product of two primes. Used in RSA, and 2. The discrete logarithm problem, used in Diffie-Hellman key exchange and El Gamal cryptosystem. The discrete logarithm problem is not always secure, it is the group on which the discrete logarithm works that makes the protocol secure.

It is known that for some groups, like the abelian group of integers modulo a prime, the discrete logarithm problem is insecure. On the other hand in the group of rational points of an Elliptic curve it is believed to be secure. One aspect of security is diversity, and modern public key cryptography depends only on one primitive (discrete logarithm problem on Elliptic curves) and we have no backup. Dr. Mahalanobis works to find new cryptographic primitives and build protocols from that. He looks for groups in which the discrete logarithm problem in the automorphism group is secure. Recently, at the end of 2009 he made a breakthrough described below:

About 10 years back, Alfred Menezes and Yi-Hong Wu, in a paper titled, "The discrete logarithm problem in $GL(n, q)$ ", published in *Ars Combinatoria* 47(1998):23-32, argued that there is no hope to build a better, more secure cryptosystem, using the discrete logarithm problem on matrices over a finite field.

Dr. Mahalanobis proved that their argument is wrong and provided a counter-example. In his paper, "The discrete logarithm problem in the group of non-singular matrices" *Groups-Complexity-Cryptology* 2(2010):83-89, he showed that circulant matrices over a finite field has some properties that makes it a better choice over the discrete logarithm problem on a finite field. This opens a new venue in research of public key cryptography. Recently, Dr. Mahalanobis along with his collaborator Anupam Singh came out with a novel algorithm in Chevalley groups while studying cryptography in finite non-abelian groups.

18.2 Combinatorics, Hypergraph Theory

Dr. Soumen Maity is interested in combinatorial problems that have applications and require expertise in hypergraph theory and combinatorial designs. Current projects are new generalizations of covering arrays for software testing applications, and constructions of covering arrays.

Covering arrays are combinatorial objects that have been successfully applied in the design of test suites for testing systems such as software, circuits and networks, where failures can be caused by the interaction between their parameters. Dr. Maity performed a new generalization of covering arrays called covering arrays on hypergraphs. In these arrays, only specified choices of distinct parameters need to be tested and these choices are recorded in hypergraphs. This is useful in situations in which some combinations of parameters do not interact; in these cases, they do not insist that these interactions are to be tested, which allows reductions in the number of required test cases. A detailed study of constructions for optimal mixed covering arrays on some special classes of hypergraphs has been carried out.

The columns of a covering array provide a test suite for software testing. These require a very small number of test cases compared to the total number of possible test cases. For most applications it is desirable to construct covering arrays with minimum number of columns. Dr. Maity's work from has provided an algebraic construction that improves some of the best known covering arrays of strength four.

18.3 Probability Theory and Control Theory

Dr. Anup Biswas has recently completed a project on infinite dimensional Skorohod map and EDF scheduling in collaboration with Prof. Rami Atar, Prof. Haya Kaspri and Prof. Kavita Ramanan. Here, they proved the existence of an infinite dimensional map which appears naturally in many queuing networks. Existence of such maps helps to obtain some macroscopic behavior of the queuing networks and also a key tool to study asymptotic study of queues. The team has addressed some of the unresolved questions for EDF scheduling with the help of such maps.

In a different project with Prof. Ari Arapostathis and Prof. Vivek Borkar, Dr. Biswas has studied a phenomenon for a dynamical system when it has an effect from a Gaussian noise, may be small, and also from an expensive control. Small noise

dynamical systems have rich and profound history. Dr. Biswas's contribution in this project is to study the effect of additional control and how it can affect the selection of equilibrium.

Dr. Biswas has also worked on multi-class queuing network in the Halfin-Whitt regime which is based on a model that can be viewed as a Generalized processor sharing scheduling in many-server settings. This model is new in the context that it deals with a full-fledged optimal control set up instead of its analysis under a particular scheduling policy. Dr. Biswas has also started couple of other projects with collaborators. One of the interesting questions that they are trying to understand is the macroscopic behavior of many server network working under EDF. Such networks are important in medical service, emergency control etc. Another line of work Dr. Biswas is pursuing is a model of load balancing network with Prof. Kavita Ramanan.



Accounts At a Glance

Indian Institute of Science Education and Research (IISER) Pune
Balance Sheet as on March 31, 2015

Amount in Rupees

Sources of Funds	Schedule	Current Year 2014-15	Previous Year 2013-14
Corpus/Capital Fund	1	4,858,669,216	4,258,711,683
Designated/ Earmarked / Endowment Funds	2	161,823,534	120,473,596
Current Liabilities & Provisions	3	514,016,584	579,607,469
TOTAL		5,534,509,334	4,958,792,749

Application of Funds	Schedule	Current Year 2014-15	Previous Year 2013-14
Fixed Assets	4		
Tangible Assets		1,627,288,283	1,263,306,897
Intangible Assets		170,000	170,000
Capital Works-In-Progress		3,231,210,933	2,995,234,786
Investments from Earmarked /Endowment Funds	5		
Long Term		21,372,694	80,658,272
Short Term			
Investments - Others	6	114,265,502	23,162,855
Current Assets	7	133,854,650	340,800,119
Loans, Advances & Deposits	8	406,347,270	255,459,818
TOTAL		5,534,509,334	4,958,792,749
Significant Accounting Policies	23		
Contingent Liabilities and Notes to Accounts	24		

For and on Behalf of IISER Pune

sd/-

Mrs. Mariamma John
OSD (F&A)

sd/-

Col. G. Raja Sekhar (Retd.)
Registrar

sd/-

Prof. K.N. Ganesh
Director

Place: Pune

Date: May 25, 2015

Indian Institute of Science Education and Research (IISER) Pune

Income & Expenditure Statement as on March 31, 2015

Amount in Rupees

Application of Funds	Schedule	Current Year 2014-15	Previous Year 2013-14
INCOME			
Academic Receipts	9	21,151,363	17,056,245
Grants / Subsidies	10	456,000,000	526,833,000
Income from Investments	11	15,010,404	21,168,198
Interest Earned	12	1,813,223	6,408,427
Other Income	13	1,209,960	6,429,862
Prior Period Income	14	75,465	14,374
Deferred Income for the year (in proportion to depreciation charged)	4	226,735,685	189,726,909
TOTAL (A)		721,996,100	767,637,015
EXPENDITURE			
Staff Payments & Benefits (Establishment Expenses)	15	240,542,942	164,706,905
Academic Expenses	16	135,466,485	180,199,118
Administrative and General Expenses	17	207,007,338	193,407,719
Transportation Expenses	18	7,817,032	10,162,618
Repairs & Maintenance	19	34,298,408	38,290,161
Finance Costs	20	68,296	31,953
Depreciation	4	226,735,685	189,726,909
Other Expenses	21	1,043,525	
Prior Period Expenses	22	7,625	701,619
TOTAL (B)		852,987,336	777,227,002
Balance being excess of Income over Expenditure (A-B)			
Transfer to / from Designated Fund			
Other - Institute Reserves Fund (Sch 9 + Sch 13)		22,361,323	23,486,107
Balance being unspent carried to			
Grant Balance in Current Liabilities		(153,352,559)	(33,076,094)
Significant Accounting Policies	23		
Contingent Liabilities and Notes to Accounts	24		

For and on Behalf of IISER Pune

sd/-

Mrs. Mariamma John
OSD (F&A)

sd/-

Col. G. Raja Sekhar (Retd.)
Registrar

sd/-

Prof. K.N. Ganesh
Director

Place: Pune

Date: May 25, 2015



A Warli composition the size of a football field has been put together by students of IISER Pune as part of Karavaan 2014, the annual cultural festival of the institute. The day-long event organized by the Art Club of IISER Pune, with support from Pidilite, saw over 400 volunteers synergize their efforts toward a coherent composition. (Photo Courtesy: Pidilite)



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