



President's Note

Dear Colleagues

It is indeed a matter of great pride to the Centre and the scientific community of the Country that Prof CNR Rao has been conferred the Bharat Ratna, the highest civilian award of the country. It is indeed a joyous moment for any institution to experience its founder being awarded with the country's highest civilian honor.



The Silver Jubilee celebrations have begun with an elaborate In-house Symposium with enthusiastic participation from faculty and students. In the 25th Year, it was also heartening to note that the Centre has been recognized as the institution with the "highest impact" based on a study of the Science Citation Index for 2010-11. Our publications and output metric is doing well.

Several eminent scientists from across the world visited JNCASR and have shared their research findings and explored possibilities of research collaboration. Our Science Outreach activities have seen enthusiastic participation by students and teachers of schools and colleges. Some of our faculty members have made efforts to engage with students at remote locations of the Country.

To further enhance our infrastructure, some new facilities and buildings have come up or are in process of completion, among the ones under construction are the Post-Doc Housing, new building for biology research and Auditorium.

President



Prof. CNR Rao receiving the Bharat Ratna, the highest civilian honour of the country from the Honourable President of India, Dr. Pranab Mukherjee

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FROM THE EDITOR'S DESK

Since its inception on 14th November 1989 to commemorate the Birth Centenary of Pandit Jawaharlal Nehru, our Centre has had a glorious journey over the past 25 years to become a world acclaimed centre of research and education. At a Press Meet on 8th November 2013 Prof. CNR Rao and Prof. MRS Rao formally declared that the Centre will celebrate the Silver Jubilee year by organizing several academic events between November 2013 to November 2014.

The celebrations were launched on 12th November with an exceptional Sarod Recital by Maestros Ustad Amjad Ali Khan and his sons Ayaan and Amaan. The JNCASR Silver Jubilee Faculty Meeting and In-house Symposium began with an inspiring talk by Prof. CNR Rao, followed by talks by Unit Chairs, Faculty members and students, Poster teasers and Poster presentations.

A Silver Jubilee lecture was delivered by Prof. Ross Griffiths of the Australian National University on "Balancing the Budget: What drives the global circulation of the oceans". The New Chemistry Unit took the lead in organizing a very stimulating one-day symposium.



Felicitation of Prof CNR Rao and Mrs. Indumati Rao at the inauguration of Silver Jubilee In-house Symposium on November 18, 2014.

JNC IN THE NEWS

Faster Super Computer to be set up at the Centre

The Thematic Unit of Excellence on Computational Materials Science at JNCASR, supported by the Nano Mission Council is establishing an advanced computer datacentre in the campus. Acquisition of a 80 Tflops high performance computing facility dedicated to this research activity is in progress.

In a press conference organised at JNCASR on November 08, 2014, Prof. CNR Rao announced the launch of Silver Jubilee events in the Centre.

Bangalore scientists offer hope in retinal implant

Polymers that replicate photoreceptors can do wonders: Scientists from Bangalore and their collaborators in Israel have discovered certain polymers that can do the function of photoreceptors in the retina. (Excerpts from Times of India, December 2, 2013)

Simplest Method for Purification of Carbon Nanotubes

In a recently granted US Patent (appl. no. 8,580,223B2), Prof. C. N. R. Rao and co-workers have shown a very efficient strategy for the quantitative

separation of metallic and semiconducting carbon nanotubes (CNTs) by utilizing selective charge transfer interactions with polyaromatic hydrocarbons. This invention is one of the simplest methods known in the literature for the purification of CNTs and hence holds great potential for industrial application.

European Union - Marie-Curie Actions Project

A project on Dynamics in and of Complex Systems, of which Subir Das is a co-PI, has been approved by the European Union via Marie-Curie Actions: Research Fellowship Programme.



ACADEMIC ACTIVITIES & SCIENCE OUTREACH

Understanding Quantum Dots from Inside Out

Dr. Ranjani Viswanatha and her colleagues have found that the nature of the crystal lattices within certain quantum dots dictates how efficiently the particles emit photons when excited (J. Phys. Chem. Lett. 2013, DOI: 10.1021/jz401958u). (Source: News reported on Chemical & Engineering News, October 21, 2013.)

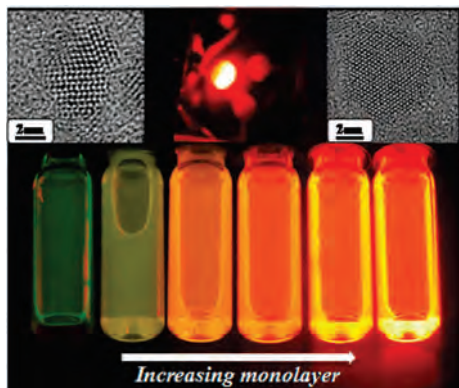


Fig.: Quantum dots glow when excited with 400-nm light and the efficiency increases from left to right with decrease in lattice defects as seen from TEM images. The typical LED obtained from these quantum dots is shown in the centre.

Academic Activities

The advertisement for admissions in Integrated Ph.D./Ph.D./M.S. degree programmes for the regular session of 2014-15 was announced on JNC web site and published in all the national English dailies and prominent Hindi newspapers during February 2014.

Written test for Integrated Ph.D. (Materials Science) was held on May 4, 2014. Interviews and written tests will be held from May 29 to June 12, 2014.

Advertisements for PGDSE and PGDMS programmes have been released during April, 2014.

Fellowships and Extension Programmes

Summer Research Fellowship Programme (SRFP)

The advertisement for SRFP 2014 was released in eight major newspapers and announced on JNCASR website. 2156 applications were received.

Project Oriented Chemical Education (POCE) and Project Oriented Biological Education (POBE) Programmes

Ten students each have been selected for POCE and POBE 2014 programmes respectively. The advertisement for the year 2014-17 was released during January in 10 leading newspapers and on the

Centre's website. The POCE and POBE classes for the batch of 2014 are scheduled to commence on May 15, 2014.

Visiting Fellowship Programme

The advertisement for the Visiting Fellowships 2014-15 will be announced on our web site and will be released during June, 2014.

International Collaboration

The Centre has established an international collaboration, with the Korea Institute of Science and Technology (KIST), Seoul to initiate and support cooperation in research.

Education Technology & Science Outreach

The CNR Rao Hall of Science, Education Technology Unit and New Chemistry Unit organised 'Program in Chemistry' on November 06, 2013. 'Program in Biology for students' was organized on December 12, 2013 on the subject of cancer where eminent researchers and clinicians from oncology research, Prof. Tapas K. Kundu (JNCASR), Dr. K.S. Gopinath (Bangalore Institute of Oncology) and Dr. Gopal C. Kundu (NCCS, Pune) addressed students and teachers.



INTELLECTUAL PROPERTY

The Centre has obtained four patents (US 3 + Europe 1) for the following inventions:

1. US Patent (No. 8,563,092): Title: Formation of Palladium Sulfide; Developers: Prof. G U Kulkarni and Boya Radha.

2. US Div. Appl. (No. 8,580,223B2): Title: 'Methods and Compositions for the Separation of Single-Walled Carbon Nanotubes; Developers: Prof. Chintamani Nagesa Ramachandra Rao, Dr. Subi Jacob George, K Venkata Rao and Rakesh Voggu.

3. US Patent (No. 8,642,764):

Title: Julolidine conjugates and methods for their preparation and use (Novel biocompatible julolidine conjugates for selective copper detection using near infrared and fluorescence detection); Developers: Dr. Govindaraju Thimmaiah, Debabrata Maity, Prof. Swapan Kumar Pati, Prof. Tapas Kumar Kundu, Arun Kumar Manna and Karthigeyan Dhanasekaran.

4. European Application (No. 7866744.1): Title: A High Sensitivity Assay for Molecular Typing of Biological Sample, Probes and a Kit Thereof; Developers: Prof. Ranga Udaykumar, Prof. Chandrabhas Narayana and Dr. Jayasuryan Narayana.

Six Indian Provisional Patent Applications have been filed for the inventions of:

1. Prof. G U Kulkarni, Ritu Gupta, Shanmugam Kiruthika, Kunala Durga Mallikarjuna Rao, Mikkel Jorgensen and Frederik Christian Kerbs.

2. Prof. Eswaramoorthy Muthusamy, Dr. Kesavan Subaharan and

Bosukondaveera Venkata Suryapavan Kumar.

3. Dr. Ujjal Kam Gautam and Moumita Rana.

4. Dr. Jayanta Haldar, Jiaul Hoque, Goutham Belagula Manjunath and Padma Akkapeddi.

5. Dr. Jayanta Haldar and Mohini Mohan Konai.

6. Dr. Govindaraju Thimmaiah, Prof. Tapas Kumar Kundu and Nagarjun Narayanswamy.

Three International Patent Applications under PCT have been filed for the inventions:

1. Antimicrobial Compounds, Their Synthesis and Applications Thereof; Developers: Dr. Jayanta Haldar, Chandradhish Ghosh, Gautham Belagula Manjunath and Padma Akkapeddi.

2. 'Cd-based-Chalcogenide/CDs Core-Shell Nanomaterial, Defective/Defect-Free Core Nanocrystal, Methods and Applications Thereof; Developers: Dr. Ranjani Viswanatha, Prof. Kavassery Sureshwaran Narayan, Avijit Saha, and Kishore Velichappattu Chellappan.

3. Composition, Substrates and Methods Thereof; Developers: Prof. G U Kulkarni, Kunala Durga Mallikarjuna Rao, Ritu

Gupta, Boya Radha and Shanmugam Kiruthika.

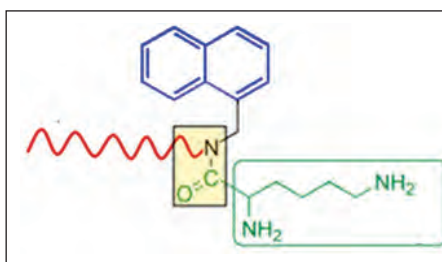
Two US Patent Applications have been filed for the inventions:

1. Artificial Retina Device (Bulk heterojunction/electrolyte polymers as novel biocompatible photoactive multi color-sensing technology); Developers: Prof. Kavassery Sureshwaran Narayan, Vini Gautam and Monijit bag.

2. Title: Manufacturing Strain Sensitive Sensors and/or Strain Resistant Conduits From a Metal and Carbon Matrix; Developers: Prof. G U Kulkarni, BoyaRadha and Abhay A Sagade.

One China, One Japan and One South Korean patent Applications have been filed for the invention 'Manufacturing Strain Sensitive Sensors and/or Strain Resistant Conduits from a Metal and Carbon Matrix; Developers: Prof. G U Kulkarni, Boya Radha and Abhay A Sagade.

Title: Antimicrobial Compounds, their synthesis and applications thereof
Inventors: Jayanta Haldar, Chandradhish Ghosh, Gautham Belagula Manjunath and Padma Akkapeddi
International Patent Application under PCT: No. PCT/IB2013/061090



- Active against multidrug resistant clinical isolates including NDM-1
- Bactericidal
- Less toxic than Antimicrobial Peptides
- Cost effective

For the first time it was discovered that the antimicrobial compounds which can be used to treat infections caused by bacteria and parasites, can also have uses in prevention of infection as well as in sterilization of surfaces.



APPOINTMENTS & AWARDS

New Appointments

Faculty Fellow

Dr. Sarit Agasti (CPMU)

Visiting Scientists

Dr. Diabate Donourou

Dr. Adalikwu Stephen Adie

Dr. Seung-Cheol Lee

Visiting Scholars

Ms. Shiny Joy

Mr. Mathieu Senghor

Mr. Ruban Preet Singh Sran

Mr. Koushik Ghosh

Mr. Santosh Konangi

Mr. Ronak Gupta

Awards & Recognitions

Prof. C.N.R. Rao

The Bharat Ratna, the highest civilian award of Government of India.

Elected as Honorary Foreign Member of the Chinese Academy of Sciences.

Chosen as one of the 25 Greatest Global Living Legends by NDTV.

Honorary D.Sc. from the University of St. Andrews, U.K.

Basavashri Prasasthi 2014 from Basava Vedike, Bangalore on occasion of Basava Jayanthi.

Prof. Roddam Narasimha

IETE Diamond Jubilee Medal awarded by the Institution of

Electronics and Telecommunication Engineers, New Delhi.

Prof. M.R.S. Rao

SERB Distinguished Fellow

Prof. K.B. Sinha

SERB Distinguished Fellow

Prof. S. Balasubramanian

Sheikh Saqr RAK CAM Senior Fellowship

Prof. Shobhana Narasimhan

Named one of "India's most Inspiring Women Engineers and Scientists" by Engineering Watch.

Prof. Umesh V. Waghmare

Adjunct Professor at the Tata Institute of Fundamental Research (TIFR).

J.C. Bose National Fellowship.

2nd Young Career Award in Nano Science & Tech-2014.

Prof. Meheboob Alam

Outstanding Referee Award (2014) from American Physical Society's Physical Review and Physical Review Letters Journals.

Dr. Subi J George

Sheikh Saqr Career Award Fellow (2014)

Emerging Investigator by Journal of Materials Chemistry (2014)

Dr. Ranjani Viswanatha

INSA Young Scientist Award -2014

Dr. T. Govindaraju

Sheikh Saqr Career Award Fellow (2014).

Prof. G.U. Kulkarni

Fellow of the National Academy of Sciences, Allahabad

Fellow of the Indian Academy of Sciences, Bangalore.

Prof. Anuranjan Anand

National Academy of Sciences, Allahabad.

Prof. N. S. Vidhyadhiraja

Appointed adjunct faculty at Department of Physics and Astronomy, Louisiana State University.

Awards received by students

Mr. B V V S Prasanna Kumar and **Mr. Rana Saha** received Sheik Saqr RAK CAM Fellowship 2014.

Ms. Bhawani N (Ph.D. student, NCU; Research supervisor: Dr. Subi J. George) was awarded best poster prize in the 16th CRSI National Symposium in Chemistry at IIT Bombay held during February 7-9, 2014.

Mr. Mohit Kumar (Ph.D. student, NCU; Research supervisor: Dr. Subi J. George) was awarded the best poster prize in the Indo-US conference on 'Bio-inspired Supramolecular and Polymer Assemblies' held at Trivandrum, during December 15-17, 2013.



SEMINARS & LECTURES

Fluid Dynamics Colloquia

1. Flow Transitions in Turbulent Thermal Convection, seen from Mechanical Energy Budget, Prof. Ross W. Griffiths, Australian National University, Canberra, Australia.
2. Modelling and analysis of surface and boundary layer processes in weak and strong wind conditions, Prof. Maithili Sharan, IIT-Delhi, New Delhi.

Endowment Lectures

Darwin Lecture:

Detecting the footprint of natural selection from genomic patterns of variation, Prof. Brian Charlesworth, FRS, University of Edinburgh, UK.

6th International Materials Lecture:

Prof. Mercouri G Kanatzidis, Northwestern University, U.S.A.

3rd Annual Sheik Saqr Materials Lecture:

Prof. Sir Andre Geim, FRS Kt, University of Manchester, U. K.

4th Sheikh Saqr Materials Lecture:

Nanomechanics, Prof. John Pethica, FRS, Trinity College, Dublin, U. K.

A.V. Rama Rao Lecture:

The Baylis-Hillman reaction: our vision and thirty years of experience, Prof. Deevi Basavaiah, School of Chemistry, University of Hyderabad; Prize Lecture: Activation of unreactive chemical bonds in small molecules, Prof. Balaji Jagirdar, Indian Institute of Science, Bangalore.

Silver Jubilee Lecture

1. Silver Jubilee Inaugural Lecture: Celebration of Science, Prof. CNR Rao, National Research Professor, Linus Pauling Research Professor & Honorary President, JNCASR.
2. Balancing the Budget: what drives the global circulation of the oceans?, Prof. Ross Griffiths, The Australian National University.

Discussion Meetings

1. Numerical many body methods for quantum systems in chemistry & physics.
2. International Union of Materials Research Society, Materials Research Society of India (IUMRS) - International Conference in Asia (ICA) 2013.
3. Molecular Immunology Forum meeting.
4. Short term course in Materials Science.
5. The 17th Transcription Assembly Meeting.

Symposia/Workshops/Conference

1. JNCASR Silver Jubilee In-house Symposium.
2. Magnetism in diluted magnetic semiconductors: From homogeneous systems to nanoscale inhomogeneities, Dr. Akash Chakraborty, Jacobs University, Germany.
3. International Meeting on Challenges & Opportunities in S&T in Developing Countries, TWAS ROCASA.

4. Optical and hydrodynamical effects in chiral nanostructures and their interplay, Prof. Ambarish Ghosh, Indian Institute of Science.

5. National Fluorescence Workshop.

6. Flow Cytometry Workshop - 2.

7. International Conference on Directions in Materials Science.

8. Winter School - 2013 on Frontiers in Materials Science.

9. International Symposium on Fragility of Glass Formers 2014.

10. 27th International Carbohydrate Symposium of the International Carbohydrate Organization.

11. International Union of Theoretical and Applied Mechanics (IUTAM) Symposium.

12. 3rd International Conference on Physics at Surfaces and Interfaces.

13. TWAS ROCASA International Conference of Young Scientists on Recent Trends in Physical and Biological Sciences.

14. National Workshop on Frontiers in Chemistry.

15. Flow Cytometry Workshop on Multicolor and Sorting.

16. JNCASR - University of Melbourne Workshop on Functional Materials.

Seminars & Lectures

1. Asymmetric Aza-Morita-Baylis-Hillman reaction: A useful strategy for the preparation of heterocyclic compounds, Prof. Akio Kamimura, Yamaguchi University, Japan.
2. Understanding pure electronic and



SEMINARS & LECTURES

ionic systems via computer, Dr. Rajaraman Ganesh, Institute for Plasma Research.

3. Attenuating Innate Immunity in Stroke: From Animal Models to Bedside, Dr. Thiruma Arumugam, Yong Loo Lin School of Medicine National University of Singapore.

4. Scales and Scaling in Convective Turbulence, Prof. Jayanta Bhattacharjee, Harish-Chandra Research Institute.

5. Metaplastic regulation of synaptic cooperation and competition and its implications in physiology and pathology of long-term memory, Dr. Saji Kumar Sreedharan, National University of Singapore.

6. Understanding Cancer Biology Using Genomic Approaches; and Translating to Medicine, Dr. Amit Dutt, Tata Memorial Centre, ACTREC.

7. Efficient enhancement of circularly polarized luminescence from chiral molecular aggregates, Prof. Tsuyoshi Kawai, Nara Institute of Science and Technology, Japan.

8. Insights from statistical irregularities in finance, Prof. Matteo Marsili, Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste.

9. Phenotypic constraints drive the architecture of biological networks, Dr. Areejit Samal, The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste.

10. Teaching Science as Blind Faith vs. Rational Inquiry, Prof. K. P. Mohanan, IISER, Pune.

11. What decides the charge carrier mobility in small organic molecule based semiconductors and organic

transistors: Disorder or Correlation?, Dr. Subhasis Ghosh, Jawaharlal Nehru University.

12. Electrode materials for lithium ion batteries, Dr. M. V. Venkatasamy Reddy, National University of Singapore (NUS).

13. Dye Aggregates for Organic Electronics and Photovoltaics, Prof. Dr. Frank Wuerthner, Universitaet Wuerzburg, Germany.

14. DP103, a new player in NF- κ B-induced breast cancer metastasis, Dr. Alan Prem Kumar, National University of Singapore.

15. Targeting Signal Transducer and Activator of Transcription (STAT)3 Signaling Pathway for Prevention and Therapy of Hepatocellular Carcinoma: Evidence from cell based and preclinical studies, Dr. Gautam Sethi, National University of Singapore.

16. Boolean and Non-Boolean Computation with Spin Devices, Prof. Kaushik Roy, Purdue University.

17. Characterizing VLS-Grown InP: Simulation and Experiment, Prof. Peter Bermel, Purdue University.

18. Advanced Dynamic AFM Methods for the Nanoscale Characterization of Complex Materials, Prof. Arvind Raman, Purdue University.

19. Nanomaterials for Sensing, Diagnosis & Drug delivery applications, Prof. Suresh Bhargava, RMIT University, Melbourne.

20. The origins and functional consequences of ETS gene fusions in prostate cancer, Ram Shankar Mani, University of Michigan.

21. Structural and vibrational aspects in III-V Nitride Nanostructures, Dr. Sandeep Dhara, IGCAR, Kalppakam.

22. Evolution of predatory cannibalism in *Drosophila melanogaster* larvae, Dr. Roshan Vijendravarma, University of Lausanne.

23. Functional Analysis of Human Breast Cancer Susceptibility Genes, Shyam K Sharan, National Cancer Institute at Frederick.

24. Asymmetric Reactions Using Bifunctional HB-Donor Catalysts 2. Development of new powerful HB-donor organocatalysts, Prof. Yoshiji Takemoto, Kyoto University, Japan.

25. Raw betel-nut induced genomic changes and chromosome instability leading to cancer, Prof. Anupam Chatterjee, North-Eastern Hill University.

26. Defining the HIV-1 subtype B and C X4/R5 genotypes beyond the envelope, Dr. Brian Wigdahl, Drexel University, USA.

27. HIV-1 TAT genetic variation, drugs of abuse, and neurocognitive impairment, Dr. Michael Nonnemacher, Drexel University.

28. Imaging Simian immunodeficiency in real time in vivo. Harnessing total body viral distribution, dynamics and reservoirs, Prof. Francois Villinger, Emory University.

29. Simple Molecules and Simple Chemistry Yield Complex Materials through Self-assembly, Prof. Richard G. Weiss, Georgetown University.

30. Optogenetic Approaches in Neuroscience, Dr. Govindaiah, University of Illinois.



PAST AND FORTHCOMING EVENTS

31. Cancer immunoediting: Integrating the role of FoxP3 in cancer progression, Prof. Gaurisankar Sa, Bose Institute.

32. Detecting the footprint of natural selection from genomic patterns of variation, Prof. Brian Charlesworth, FRS, University of Edinburgh, UK.

33. Systems biology : From proteins in a cell to neural circuits in a brain, Dr. Nitin Gupta, National Institute of Health, Bethesda, USA.

34. Non-coding and coding function of a single mRNA dictates skin homeostasis in wound healing and cancer, Dr. Gopinath M, Institute of Medical Biology, Singapore.

35. New collaborations of formins in actin assembly and organization, Dr. Richa Jaiswal, Brandeis University, USA.

36. IFN-I Programs Innate Myeloid Dynamics and gene expression in the Virally Infected Nervous System, Debasis Nayak, National Institute for Neurological Disorders and Strokes (NINDS), NIH, USA.

37. Using transformative coarse-graining methods to unravel sub-cellular and cellular processes in biological systems at multiple length and time scales, Dr. Anand Srivastava, University of Chicago.

38. Introduction to Majorana modes in one-dimensional systems, Prof. Diptiman Sen, Indian Institute of Science.

39. Structure-function-property correlations in blend films of perylene diimide: polymer composites for photovoltaic applications, Dr P. E.

Keivanidis, Polimi Istituto Italiano di Tecnologia Via Giovanni Pascoli, Italy.

40. Thermal Plasticity of Body & Organ Size in *Drosophila melanogaster*: Developmental Physiology, Genetics, Genomics & Quantitative Variation, Dr. Shampa M. Ghosh, Bionivid Technology Private Limited.

41. Needle Free Injection Technology in Your Hands Today, Dr. Rick Stout, Bioject Inc, USA.

42. Viral determinants of HIV associated neurocognitive disorders, Prof. Vinayaka Prasad, Albert Einstein College of Medicine, USA.

43. Evolutionary Host-Parasite Interaction in *Plasmodium vivax* Malaria Infection in India, Dr. Aparup Das, National Institute of Malaria Research, New Delhi.

44. Lattice Based Computing: Role of Symmetry and Structures, Dr. Santosh Ansumali, EMU, JNCASR.

45. Universal Statistics of Records in Random Sequences, Dr. Satya Majumdar, Universite Paris-Sud, France.

46. Quantum Molecular Sieving of Light Isotopes, Prof. Suresh Bhatia, University of Queensland, Australia.

47. Improving cerebral plasticity by activating acetyltransferase enzymes: application in normal and pathological aging, Dr. Anne-Laurette Boutillier, University of Strasbourg, France.

48. Cellular and molecular mechanisms of cigarette smoke-induced proliferation of human lung cells and its prevention, Neekkan Dey, University of Calcutta.

49. Some applications of random matrix theory to the study of entanglement, Dr. Arul Lakshminarayan, IIT Madras.

50. COMSOL Multiphysics Modeling, Dr. Siddharth Gadkari, COMSOL Multiphysics Pvt Ltd, Bangalore.

Forthcoming Events

1. Prof. Ramalingaswamy Memorial Lecture, speaker: Prof. Siddhartha Roy, Indian Institute of Chemical Biology, Kolkata, July, 2014.

2. Catalysis Workshop, August 18 - 22, 2014.

3. Molecular Dynamics @ 50, August 26 - 28, 2014.

4. DAE-Raja Ramanna Lectures in Physics, speakers: Prof. Rohini Godbole, Indian Institute of Science, Bangalore and Dr. Madhavan Varadarajan, Raman Research Institute, Bangalore, October, 2014

5. JNCASR - FCBS workshop for chemistry students and teachers, October 31 - November 2, 2014.

Annual Faculty Meeting

The Annual Faculty Meeting of the Centre is scheduled to be held on November 12, 2014 which will be followed by lectures by the faculty and honorary faculty members. An In-house Symposium is scheduled to be held on November 12 - 14, 2014 at Jakkur Campus.