ANNUAL REPORT 2010 -11

INDIAN INSTITUTE OF SCIENCE EDUCATION & RESEARCH
CET CAMPUS, THIRUVANANTHAPURAM - 695 016

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PREFACE

Indian Institute of Science Education and Research Thiruvananthapuram, established by the Ministry of Human Resource Development, Government of India, in 2008 has completed three years. I am happy to present this report of the remarkable progress made by the institute in many fronts during the past year, with the aim of providing high quality education in modern science, integrating it with outstanding research at the undergraduate level itself. During this year we have doubled the faculty strength with one professor and fifteen assistant professors joining us. A brief description of the research interests of the faculty forms a part of this report. Similarly the student strength also doubled with sixty BS-MS students and twentyone PhD students joining during the year. This has demanded an expansion in our physical infrastructure and was met by construction in the temporary campus at the College of Engineering, and also, by renting two buildings as hostels. Despite the limitations of space our faculty members have judiciously used the available space for office and laboratory and continue to enhance the experimental infrastructure so that the students, both the BS-MS and PhD, can carry out exciting research projects. Large number of sophisticated equipment has been added during this period. We also had generous help in teaching from several visiting faculty members. To maintain a high spirit of scientific enquiry we had several outstanding scholars visiting us to interact with the students and faculty, including Nobel laureates Anthony Leggett and Roald Hoffmann, and mathematical physicist Roger Penrose.

The best use of available space is made by the students by converting the lecture rooms into discussion rooms, study centers, place for film club, cultural club and so on during the evenings and Sundays. During the year Mr. Bharat Jyoti joined as registrar on deputation from the Indian Forest Service. Several consultants have helped us to continue with our developmental work in the temporary campus and the main campus.

Construction activities of the first phase have started in the main campus at Vithura by the end of the reporting year. Dr. E. Sreedharan, MD, Delhi Metro, bestowed valuable and important advisory support in this. Dr. E. Sreedharan also gave a public lecture in the institute on the topic-Ethics and Values for Engineers.

The enormous interest and effort that the teachers and students put in teaching, learning and research activities have started producing results which are seen in terms of publications, research grants, awards etc. These activities are whole-heartedly supported by a dedicated team of permanent and temporary staff and senior consultants so that the Institution keep running well, at the academic and non-academic fronts. The enormous task of facilitating anything from a high performance computing facility to a high field magnetic resonance spectrometer with a superconducting magnet kept at liquid temperature, from a spider enclosure to a Flowcytometer, is done silently by this dedicated team. To them, we are thankful. I also take this opportunity to record the support, encouragement and timely inputs given by the honorable Minister of Human Resource Development, the secretaries, and all officers of the ministry. We also had the support of the College of Engineering Trivandrum in many ways and also from all departments of the Government of Kerala. The performance of IISER-TVM is enhanced by all of these inputs and we record it here.

This year also saw a transition from the first Board of Governors to the second. We thank the Chairman Professor M. R. S. Rao and members of the pioneering Board of Governors for the constant support, encouragement and guidance they had given. We welcome Chairman Dr. Vishwa Mohan Katoch and members of the new Board of Governors who have begun to extend full support with immediate effect. Our third annual report (2010-2011) which describes the progress of the Institute is presented here, with a promise to do better in the coming years.

E. D. Jemmis

Date : 01 November, 2011

Director

1. Preamble

Introduction

The Indian Institutes of Science Education & Research were established by Government of India between 2006 and 2008 at Kolkata, Pune, Mohali, Bhopal and Thiruvananthapuram with the objectives mainly related to capacity enhancement for producing high calibre scientific manpower and the commensurate necessary reforms in the institutional framework for that purpose in the field of higher education and research in basic sciences.

The creation of Indian Institute of Science Education and Research Thiruvananthapuram was notified by Government of India vide no. 22-6/2007-TS.I dated 28th February, 2008 of Department of Higher Education, Ministry of Human Resource Development as an autonomous organization.

The institute came into being on 20th February, 2008 when it was registered as a society under the Travancore - Cochin Literary Scientific and Charitable Society Registration Act (12 of 1955) vide no. T.342/08 dated 20th February, 2008.

A statute to be enacted by the Parliament to cover its existence and functioning is also awaited.

The institute's setting up is also owed to the support of Government of Kerala that has provided 200 acres of land in Vithura Panchayat in Thiruvananthapuram district for its permanent campus and also handed over premises in the College of Engineering Trivandrum for transit campus to start functioning in June 2008.

IISER-Thiruvananthapuram Society

Chairman

Prof M R S Rao, Chairman, President, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore (up to 27 February, 2011)
Dr V M Katoch, Secretary to the Government of India, Department of Health Research, Ministry of Health & Family Welfare and Director General, ICMR, (From 07.03.2011)

Members:

Prof Seyed Hasnain, Vice Chancellor, University of Hyderabad (up to 27.02.2011)
Prof Sudhir K Sopory Vice Chancellor, JNU (From 07.03.2011)
Prof A Jayakrishnan, Vice-Chancellor, Kerala University, Thiruvananthapuram
Prof V Krishnan, Former President, Jawaharlal Nehru Centre for Advanced Scientific Research Bangalore (up to 27.02.2011)
Prof C S Poulose, Department of Bio-Technology, Cochin University of Science & Technology, Cochin (From 07.03.2011)
Dr J Gowrishankar, Director, Centre for DNA Fingerprinting and Diagnostics, Hyderabad (Up to 27.02.2011)
Dr Suresh Das, Director, National Institute of Interdisciplinary Science & Technology, Thiruvananthapuram (From 07.03.2011)
Prof M S Gopinathan, IISER-TVM, Thiruvananthapuram
Prof K George Thomas, IISER-TVM, Thiruvananthapuram

Ex-Officio Members:

Dr P Prabhakaran, Chief Secretary, Government of Kerala, Govt of India

Smt Vibha Puri Das, Secretary, Department of Higher Education, Ministry of Human Resource Development, Govt of India
Dr T Ramasami, Secretary, Department of Science and Technology, Govt. of India
Prof M S Ananth, Director, Indian Institute of Technology Madras, Chennai
Prof Sukhdeo Thorat, Chairman, University Grant Commission, New Delhi
Shri. Sumit Bose, Secretary, Dept. of Expenditure, Ministry of Finance, Govt of India
Dr M K Bhan, Secretary, Department of Biotechnology, Govt of India, New Delhi
Dr Srikumar Banerjee, Secretary (DAE) & Chairman (AEC), DAE, Govt of India
Dr V K Saraswat, Chairman, Defense Research & Development Orgn., Govt of India, New Delhi
Dr K Radhakrishnan, Secretary, Department of Space, Govt. of India, Bangalore
Dr Samir K Brahmachari, Director General, CSIR, Govt of India
Prof E D Jemmis, Director, IISER-TVM, Thiruvananthapuram
Prof P Balaram, Director, Indian Institute of Science, Bangalore
Prof K N Ganesh, Director, Indian Institute of Science Education & Research, Pune

Secretary: Shri B K Subburaman (up to 21.11. 010), Special Officer, IISER-TVM and
Shri Bharat Jyoti (From 22.11.2010), Registrar, IISER-TVM

The Society met once on 10th April 2010 during the year 2010-11.

Board of Governors

Chairman

Prof. M.R.S. Rao, President, Jewaharlal Nehru Centre for Advanced Scientific Research, Bangalore (up to 27.02.2011);
Dr V M Katoch, Secretary to the Government of India, Department of Health Research,
Ministry of Health & Family Welfare and Director General, ICMR, (From 07.03.2011)

Members:

Prof M S Ananth, Director, Indian Institute of Technology Madras, Chennai
Dr T Ramasami, Secretary, Department of Science & Technology, Govt. of India
Dr M K Bhan, Secretary, Department of Biotechnology, Govt. of India, New Delhi
Dr Srikumar Banerjee, Secretary, DAE, Govt. of India, Mumbai (up to27.02.2011)
Dr K S Radhakrishnan, Secretary, Department of Space, GoI (from 07.03.2011)
Prof V Krishnan, Former President, JNCASR, Bangalore (up to 27.02.2011)
Prof V Kannan, Deptt. of Mathematics & Statistics, University of Hyderabad(from 07.03.2011)
Dr J Gowrishankar, Director, Centre for DNA Fingerprinting & Diagnostics, Hyderabad
(up to 27.02.2011)
Prof V R Muthukaruppan, Director - Research, Arvind Medical Research Foundation, Madurai (from 7.3.2011)
Prof M V George, Honorary Professor, JNCASR, NIIST, Thiruvananthapuram (up to 27.02.2011)
Prof S M Chitre, Distinguished Faculty Member, UM-DAE Centre for Excellence in Basic Sciences, University of Mumbai (from 07.03.2011)
Prof S G Dani, School of Mathematics, Tata Institute of Fundamental Research, Mumbai (up to 27.02.2011)
Prof Gangan Pratap, Director, National Institute of Science Communication and Information Resources (NISCAIR), New Delhi (from 07.03.2011)
Prof M S Gopinathan, IISER-TVM, Thiruvananthapuram
Prof K George Thomas, IISER-TVM, Thiruvananthapuram

Ex-officio Members:

Smt Vibha Puri Das, Secretary, Department of Higher Education, Ministry of Human Resource Development, Govt. of India, New Delhi
Prof E D Jemmis, Director, IISER-TVM, Thiruvananthapuram

Prof P Balaram, Director, Indian Institute of Science, Bangalore
Prof K N Ganesh, Director, Indian Institute of Science Education & Research, Pune
Dr P Prabhakaran, Chief Secretary Government of Kerala
Shri S K Ray, Additional Secretary & Financial Advisor, MHRD, Govt. of India

Secretary: Shri B K Subburaman, Special Officer, IISER-TVM (up to 21.11.2010)
Shri Bharat Jyoti, Registrar, IISER-TVM,(from 22.11.2010)

The Board met thrice on 10.04.2010, 11.11.2010 and 25.02.2011 during the year 2010-11.

Finance Committee

Chairman
Prof M R S Rao, President, Jewaharlal Nehru Centre for Advanced Scientific Research, Bangalore (up to 27.02.2011)
Dr V M Katoch, Secretary to the Government of India, Department of Health Research, Ministry of Health & Family Welfare and Director General, ICMR, (From 07.03.2011)

Members
Prof E D Jemmis, Director, IISER-TVM, Thiruvananthapuram
Shri Ashok Thakur, Additional Secretary, Department of Higher Education, MHRD
Shri S K Ray, Additional Secretary & Financial Advisor, MHRD, Govt. of India
Dr J Gowrishankar, Director, Centre for DNAF&D, Hyderabad (up to 27.02.2011)
Prof M Radhakrishna Pillai, Director, R G Centre for Biotechnology, TVM (from 07.03.2011)
Prof M S Gopinathan, IISER-TVM, Thiruvananthapuram (up to 27.02.2011)
Prof K George Thomas, IISER-TVM, Thiruvananthapuram (from 07.03.2011)

Secretary: Shri B K Subburaman, Special Officer, IISER-TVM (up to 21.11.2010) and
Shri Bharat Jyoti, Registrar, IISER-TVM (From22.11.2010)

The Finance Committee met thrice on 09.04.2010, 11.11.2010 and 25.02.2011 during 2010-11.

Building and Works Committee

Chairman: Prof E D Jemmis, Director, IISER-TVM

Members:
Prof Ravindra Gettu, Department of Civil Engineering, IIT Madras
Shri V R Rengaswamy, Head, E M & C, NCBS-TIFR, Department of Atomic Energy, Bangalore
Shri Johnson Jacob, Kerala State Regulatory Authority Commission (Former Member, KSEB)
Shri P A Prabhakaran, Chief Consultant (Constructions), IISER-TVM (Former Chief Engineer, ISRO, Deptt of Space)
Prof. M.V. George, Honorary Professor, JNCASR, NIIST, Thiruvananthapuram (up to 27.02.2011);
Prof M S Gopinathan, IISER-TVM
Prof K George Thomas, IISER-TVM
Registrar, IISER-TVM (ex-officio)

Secretary: Shri G Munibhaskar (Up to December, 2010) and Shri J Anil, Project Engineer cum Estate Officer (from March, 2011)

The Building & Works committee met twice during the year for 6th and 7th meetings on 7th July, 2010 and 25th February, 2011 respectively.

Academic Advisory Committee

The Senate has not been constituted because of insufficient number of regular Professors. An Academic Advisory Council with the following expert members drawn from faculty of Indian Institute of Science,

Bangalore, IIT Madras and Institute of Mathematical Sciences, Madras has been reviewing and updating the curriculum, regulations and other elements of the academic programmes.

Prof E D Jemmis, Director, IISER-TVM - Chairman
Prof Umesh Varshney, IPC, Indian Institute of Science, Bangalore
Prof S Ramakrishnan, MCB, Indian Institute of Science, Bangalore
Prof V Balakrishnan, Department of Physics, Indian Institute of Madras,
Prof R Balasubramanian, Director, Institute of Mathematical Sciences, Chennai
Prof M Radhakrishna Pillai, Director, RGCB, TVM
Prof M S Gopinathan, School of Chemistry, IISER-TVM
Prof K George Thomas, School of Chemistry, IISER-TVM
Secretary - Shri B K Subburaman, Special Officer, IISER-TVM (up to 21.11.2010)
Shri Bharat Jyoti, Registrar, IISERTVM Secretary (From 22.11.2010)

The Academic Advisory Committee held its second meeting on 10th July 2010 to discuss the curriculum and regulations for BS-MS and Ph D courses.

2. Human Resource

Human resources of the institute comprised the following.

	Human Resources		
Academic Staff	Faculty		28
	Visiting Faculty		06
Administration & Non-Teaching Staff	Officers	Regular	06
		Consultants	09
	Others	Regular	05
		Temporary	16
		Contract	21
Students	BS-MS		140
	Ph.D.		39

Faculty

With recruitment of 16 faculty members: 15 Assistant Professor and 01 Professor during the year the regular faculty strength became 28 against sanctioned strength of 60; the discipline wise break-up is as under:

Assistant Professor	School of Biology - 06 School of Chemistry - 06 School of Physics - 09 School of Mathematics - 04
Associate Professor	0
Professor	School of Chemistry - 02

	Name	*Position*	*School*
1.	Dr Anil Shaji, Ph D (Texas, Austin)	Assistant Professor	Physics
2.	Dr Archana Pai, Ph D (IUCAA, Pune)	Assistant Professor	Physics
3.	Dr Ayan Datta, Ph D (JNCASR Bangalore)	Assistant Professor	Chemistry
4.	Prof E D Jemmis, Ph D(Princeton) FASc, FNA, FTWAS	Professor	Chemistry

5.	Prof K George Thomas, Ph D (University of Kerala), FASc	Professor	Chemistry
6.	Prof M S Gopinathan, Ph D (IIT Kanpur) FASc, FNA, Ex-Professor, IIT M, Chennai	Professor	Chemistry
7.	Dr Hema Somanathan, Ph D (University of Bombay)	Assistant Professor	Biology
8.	Dr Joy Mitra, Ph D (IISc, Bangalore)	Assistant Professor	Physics
9.	Dr Kalika Prasad, Ph D (IISc, Bangalore)	Assistant Professor	Biology
10.	Dr Mahesh Hariharan, Ph D (NIIST, Thiruvananthapuram)	Assistant Professor	Chemistry
11.	Dr Manoj A G Namboothiry, Ph D (JNCASR, Bangalore)	Assistant Professor	Physics
12.	Dr K T Nishanth Ph D (IISc, Bangalore)	Assistant Professor	Biology
13.	Dr Prakash Rajendran, Ph D (University of Madras)	Assistant Professor	Mathematics
14.	Dr M P Rajan, Ph D (IIT Madras)	Assistant Professor	Mathematics
15.	Dr Rajeev N Kini, Ph D (University of Nottingham)	Assistant Professor	Physics
16.	Dr Ramanathan Natesh, Ph D (IISc, Bangalore)	Assistant Professor	Biology
17.	Dr Ramesh Chandra Nath PhD (IIT Bombay)	Assistant Professor	Physics
18.	Dr Reji Varghese, Ph D (NIIST, Thiruvananthapuram)	Assistant Professor	Chemistry
19.	Dr M M Shaijumon, Ph D (IIT Madras)	Assistant Professor	Physics
20.	Dr S Shankaranarayanan, Ph D (IUCAA, Pune)	Assistant Professor	Physics
21.	Dr Sreedhar B Dutta, Ph D (IMSc., Chennai)	Assistant Professor	Physics
22.	Dr Sujith Vijay, Ph D (Rutgers University)	Assistant Professor	Mathematics
23.	Dr Sunish Radhakrishnan, Ph D (Pondicherry University)	Assistant Professor	Biology
24.	Dr Kana M Sureshan, Ph D (NCL, Pune)	Assistant Professor	Chemistry
25.	Dr R S Swathi, Ph D (IISc, Bangalore)	Assistant Professor	Chemistry
26.	Dr Tapas Kumar Manna, Ph D (Bose Institute, Kolkata)	Assistant Professor	Biology
27.	Dr Utpal Manna, Ph D (University of Wyoming, USA)	Assistant Professor	Mathematics
28.	Dr Vinesh Vijayan, Ph D (Max Planck Institute for Biophysical Chemistry, Gottingen)	Assistant Professor	Chemistry

Visiting Faculty

The following visiting faculty in addition to guest faculty for special topics rendered their services to meet the requirements of teaching and other academic works in view of the small strength of regular faculty.

1.	Prof V Unnikrishnan Nayar, Ph D, Kerala University, Ex-Dean, Cochin University of Science & Technology	Physics
2.	Prof M Padmanabhan, PhD (IIT Madras), Ex-Professor, MG Universiy, Kottayam	Chemistry
3.	Prof E K Narayanan, Ph D (ISI Calcutta) Associate Professor, Indian Institute of Science, Bangalore	Mathematics
4.	Prof M I Jinnah, Ph D (TIFR Mumbai), Kerala University	Mathematics
5.	Shri O Thomas, Ex-Lecturer, Government College for Women, Thiruvananthapuram	Lab Coordinator, Chemistry
6.	Dr T Ganga Devi, Ex-Principal, Government College for Women, Thiruvananthapuram	Lab Coordinator, Biology

Brief profiles of faculty's area of academic and research are given in the following pages.

Anil Shaji

Assistant Professor (School of Physics)
shaji@iisertvm.ac.in

Quantum information theory and quantum limited measurements

1. Studying the fundamental and practical limits on the precision with which measurements can be performed with probes that are quantum mechanical in nature. Numerical simulations of quantum limited measurements beyond the standard quantum limit using Bose-Einstein condensates as the probes.
2. Non-classical correlations in quantum systems, including but not limited to entanglement as a resource in quantum computing and quantum information theory.
3. Investigations into the physics of open quantum systems with the aim of recovering information about the environment knowing the dynamics of the system of interest.
4. Coherent energy transfer between parts of complex molecules.

Group members: Salini Jose (PhD scholar), Vinayak Jagdish (Ph D Scholar)

Archana Pai

Assistant Professor (School of Physics)
archana@iisertvm.ac.in

Gravitational Wave Physics, Statistical Signal Processing

The direct detection of gravitational waves with a multi-detector interferometric network involves devising a optimal, phase coherent and computationally tractable signal-specific detection strategy as well as designing veto scheme to rule out the gravitational wave candidate events which could have originated from the noisy instruments. We are focusing on both these problems specific to a binary chirp. Gravitational waves from inspiraling compact binaries (with neutron stars and black holes) are characterized by the mass, spin parameters, distance, sky-location and orientation of the source. The maximum likelihood approach for the binary chirp hunt in the data is an optimization problem over the multi-dimensional signal parameter space. This sky-search turns out to be computationally costly making the coherent search intractable and cannot be implemented in the LIGO-VIRGO data analysis pipeline. As a first step, we have devised a sky grid over the sky-locations based on greedy algorithm. The aim is to improve further on that in order to set-up a hierarchy in all-sky search. On the later front, we address the problem of multi-detector veto for designing matched-filtering templates for specific non-Gaussian features such that they can be removed.

Group members: Haris M. K. (PhD scholar)

Ayan Datta

Assistant Professor (School of Chemistry)
ayan@iisertvm.ac.in

Computational Chemistry of Materials, Magnetism and Molecular Aggregation

Currently the focus of our research is on the electronic structure of materials. Problems that we are looking at include:

- Quantum-mechanical investigation of reaction rates for application in catalysis and enzymology (homogeneous and heterogeneous).
- Molecular modeling of nanomaterials for new hydrogen and energy storage materials.
- Development of theoretical framework for quantum mechanical treatment of surface enhanced Raman scattering (SERS).
- Dimensionality Transfer: From Atoms to Molecules to Supramolecules to Self-Assemblies to Self-Organization.

Group members: Deepthi Jose (PhD scholar), A. K. Jissy (PhD scholar), Sharon Abraham (PhD scholar)

Eluvathingal D Jemmis

Professor (School of Chemistry)
jemmis@iisertvm.ac.in

Theoretical and computational chemistry

Major areas that we have concentrated in the last few years are: Transition Metal Organometallics, Analogies in the Main Group, C-H...pi Interaction, Electron Counting Rules, Chemistry of Boron, Fullerenes and nanoclusters. Attempt is to relate the electronic structure to reactivity and properties of molecules, clusters and solids. Special emphasis is placed to find explanations and models from numbers that can be transferred from one problem to another. Recent Publications: J. Am. Chem. Soc.; 131, 15695, 2009; 132, 4586, 2010; 133, 5463, 2011.

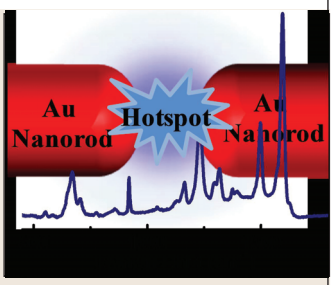
Group members: Hari Krishna Reddy, Dibyendu Mallik, Subhendu Roy, Vidya K, Priyakumari C P and Shyama R

K George Thomas

Professor (School of Chemistry)
kgt@iisertvm.ac.in

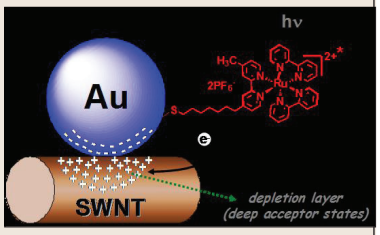
Photosciences, nanomaterials and surface properties

Some of the significant research activities during 2010-2011 include:



(1) Utlization of the anisotropic features of Au nanorods for producing enhanced Raman signals of analyte molecules by placing them at dimeric junctions. When two Au nanorods are brought together, their plasmon oscillations couple each other, creating regions of high electric field (hot spots) at the junctions, resulting in enhancement of Raman signals. The methodology developed can be extended for the detection of analytes of significance in environment, health and safety (J. Phys. Chem, Lett. 2011, 2, 610.)

(2) Investigation of the unidirectional electron flow from the excited state of Ru(bpy)32+ to carbon nanotubes when the chromophores were linked through Au nanoparticles. The charge equilibration occurring at the bundled carbon nanotube-Au nanoparticle heterojunctions, due to the differences in electrochemical potentials, results in the formation of a localized depletion layer which may act as acceptor sites of electrons from chromophore. (J. Phys. Chem, Lett. 2011, 2, 775)

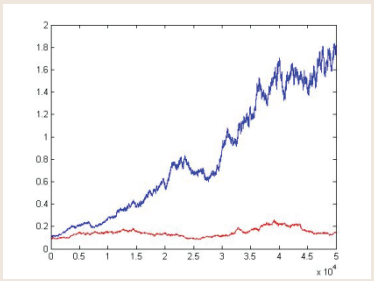


Group Members: Anoop Thomas (PhD scholar), K. B. Subila (PhD scholar), Pratap Zalake Mohan (PhD scholar), Reshmi Thomas (PhD scholar)

M S Gopinathan

Professor (School of Chemistry)
gopi@iisertvm.ac.in

Nonlinear dynamics in natural sciences



Continued interest in the nonlinear dynamics of biophysical , biochemical and chemical phenomena. Earlier studies focused on biophysical rhythms like human brain , human cardiac systems, circadian rhythms; biochemical dynamics of cell division cycles and effect of mutations; chemical dynamics of coupled chemical oscillators, oscillatory adsorption on surfaces, etc.

Current interest is in the dynamics of molecular motors in biology. Specifically, the mechanism of rectification of Brownian forces that leads to directed motion in biomotors like ribosome. Chemical reactions like the binding and hydrolysis of ATP are nonlinearly coupled to spatial diffusion in presence of an asymmetric potential. This "flashing ratchet" model involves nonlinear coupled equations of motion for the spatial and chemical variables. Study of this generic model is expected to reveal the mechanism operating in ubiquitous biomolecular motors in the living cell.

Typical preliminary result is shown in the diagram below which demonstrates unidirectional motion (in the +ve x direction) in presence of Brownian forces. The plot shows displacement (y-axis) against time (x-axis). Red line: no net displacement in presence of spatial asymmetry and Brownian force. Blue line: net displacement with additional chemical coupling.

Hema Somanathan

Assistant Professor (School of Biology)
hsomanathan@iisertvm.ac.in

Sensory ecology and Plant-animal interactions

Research in my lab focuses on establishing links between sensory physiology and evolutionary behavioural ecology using plant-animal mutualistic interactions as the model system. Why have animals evolved the senses they possess and how do these senses contribute to their foraging ecology and behaviour? The various projects that address this theme centre on: 1. the functional significance of visual floral signals, 2. innate or spontaneous colour preferences in Indian and European honeybees, 3. visual sensory modalities and partitioning along the nocturnal-diurnal axis in carpenter bees in the Western Ghats and 4. community insect pollination networks in the Myristica swamp ecosystem. The methods we use are multi-pronged incorporating field studies, behavioural experiments and genetic tools.

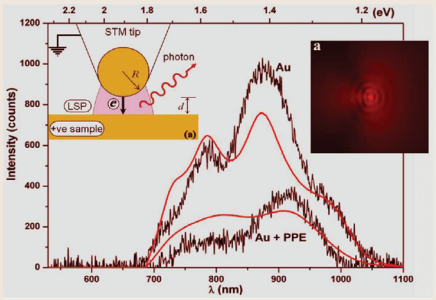
Group members: Balamurali MGS (PhD scholar), Shivani (PhD scholar),

Joy Mitra

Assistant Professor (School of Physics)
j.mitra@iisertvm.ac.in

STM tunnelling induced light emission and Plasmonics

1. Low Temperature Scanning tunnelling microscopy (STM) and Spectroscopy (STS): Instrumentation and Applications.
2. STM tunnelling induced light emission from metals, semiconductors and molecules.
3. Optical switching in azobenzene molecules probed by STM spectroscopy.
4. Finite difference time domain simulations of surface plasmon resonances of plasmonic nanostructures (e.g. STM tip sample junctions, tip enhanced Raman spectroscopy and nanostructured surfaces). Phenomenological modelling of STM light emission.
5. Metal -Semiconductor Schottky Junctions (micro to nanoscale)
6. Schottky Junction devices for high sensitivity (1 ppm) H2 sensing.
7. Study of ZnO thin films and nanostructures via optical spectroscopy, scanning tunnelling spectroscopy and STMLE.
8. ZnO nanostructure based devices for photovoltaic applications



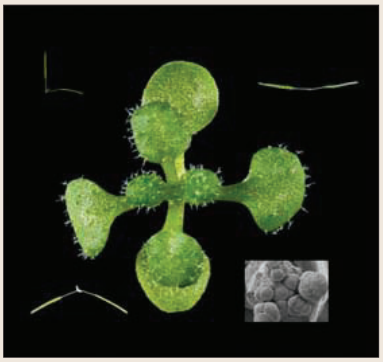
Experimental and theoretical emission spectra for STM tunnelling induced light emission from Au(111) surface and same covered with polyphenyl ether (Vbias=1.8 V and IT=10 nA). Left inset: schematic of STM light emission through localised surface plasmons. Right inset: simulation of LSP modes in the STM tip-sample junction.

Group members: Vijith K. (PhD scholar)

Kalika Prasad

Assistant Professor (School of Biology)
kalika@iisertvm.ac.in

Evolution of regulatory logic controlling organ positioning in plants



The mathematical beauty of plant organ initiation at the shoot apex, phyllotaxis, has long intrigued botanists and mathematicians. Over the last decade, a central role for the plant growth regulator auxin has been established in shoot organ initiation. Our recent work reveals that plant specific transcription factors modulate polar auxin transport at shoot apex to typify the pattern of organ initiation (Curr. Biol. 2011). While these studies explain the emergence of key patterns, how plants utilize mechanistic or evolutionary modules to transit from a pattern of leaf arrangement to a pattern of floral organ arrangement during their life cycle remains elusive. To gain insights into the evolution of pattern formations we are exploiting floral organ positioning that occurs at the periphery of determinate meristem. We aim to investigate whether evolutionary tinkering with mechanistic modules contributed to generation of the striking natural diversity of floral organ arrangements seen in vascular plants.

Mahesh Hariharan

Assistant Professor (School of Chemistry)
mahesh@iisertvm.ac.in

Biophysical Chemistry, Photophysics of Biomolecules (Effect of Light on DNA and Proteins)

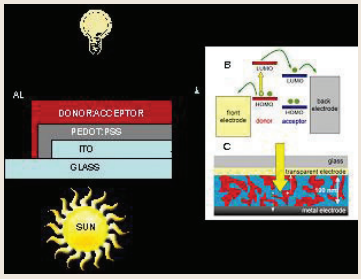
Our focus is to understand the effect of light, primarily ultraviolet radiations, on nucleic acids in the absence and presence of proteins and vice versa. Steady state and time-resolved measurements of photoinitiated reactions of biomolecules can provide insight on photomutations such as melanoma. Nuclear magnetic resonance studies and computational modeling will allow the determination of the structure of nucleic acids and proteins. Our major aim is to understand the correlation between structure and reactivity of such biomolecules using various techniques.

Group members: Rijo T. C. (PhD scholar), Shinaj K. R. (PhD scholar),Jimmy Joy (Undergraduate student) and Hitesh K. (Undergraduate student)

Manoj A G

Assistant Professor (School of Physics)
manoj@iisertvm.ac.in

Optoelectronics Laboratory



Our research focuses on the transport and photophysical properties of conjugated polymers and its application in the optoelectronic devices such as light emitting devices, field effect transistors, photovoltaic and memory devices. A major thrust has been given in the area of photovoltaics. Organic photovoltaic (OPV) devices were made on different architectures in order to improve their efficiency. The efficiency of OPV depends on light collection, exciton generation and diffusion , charge creation by exciton dissociation, free carrier transport and transfer to the electrode. We address each of these issue in our research by modifying device geometries, incorporation of metal and inorganic nanoparticles and studying its effects on device performance.

Nishant K T

Assistant Professor (School of Biology)
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Mechanisms for maintenance of genome stability in Saccharomyces cerevisiae

Key areas of research into genome stability mechanisms in our laboratory are:

a) Mechanisms of chromosome segregation during meiosis: Crossovers establish physical connections between homologs and ensure their accurate segregation. In S. cerevisiae and mammals, meiotic crossing over is controlled by a subset of the mismatch repair related factors MSH4-MSH5 and MLH1-MLH3. We make use of a sensitized system of msh4, msh5 mutants that can segregate chromosomes in S. cerevisiae with upto a two-fold reduction in crossovers to ask: how are crossover number and placement on homolog pairs optimized to assure disjunction? What mechanisms maintain crossover assurance on all homolog pairs? Errors in this process are linked to congenital birth defects in humans such as Down syndrome.

b) Mechanisms of mutagenesis: We investigate the scale of mutation rate variation in S. cerevisiaein different genetic backgrounds. These studies are relevant for understanding cancer progression, genome evolution and architecture.

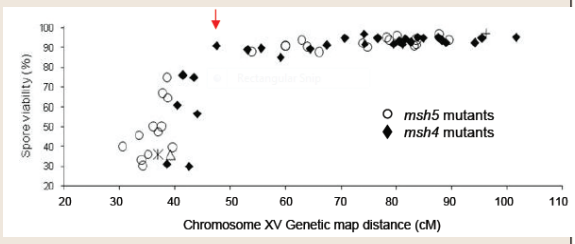


Figure 1: Meiotic crossovers can be reduced to a threshold level (arrow) without affecting viability (Nishant et al., PLoS Genetics, 2010)

Prakash Rajendran

Assistant Professor (School of Mathematics)
rprakash@iisertvm.ac.in

Abstract Harmonic Analysis

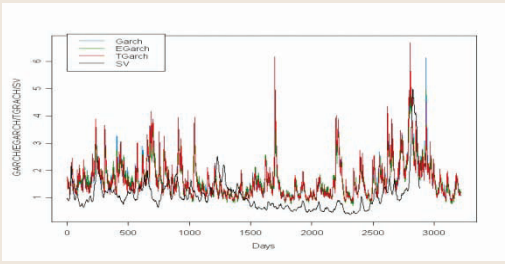
Dr. Rajendran's research interests are related to spectral synthesis and operator synthesis in Fourier algebras. His recent work extends Mallavin's theorem for weak synthesis on non-Abelian groups, showing that weak spectral synthesis holds for the Fourier algebra of a locally compact group if and only if the group is discrete.

M P Rajan

Assistant Professor (School of Mathematics)
rajanmp@iisertvm.ac.in

Numerical Functional Analysis/Functional Analysis Financial Engineering/ Mathematical Finance

Numerical Functional Analysis/ Functional Analysis: Dr. Rajan's research focuses on solving inverse and ill-posed problems. The idea is to get stable approximate solution for problems that are ill-posed in nature. He also works on a certain class of parameter identification problems in non-linear PDEs.



Financial Engineering/Mathematical Finance: This multidisciplinary research area focuses on developing financial models that integrate financial theory, methods of engineering, tools of mathematics and the practice of programming.

Group members: Damodhar Reddy (PhD scholar)

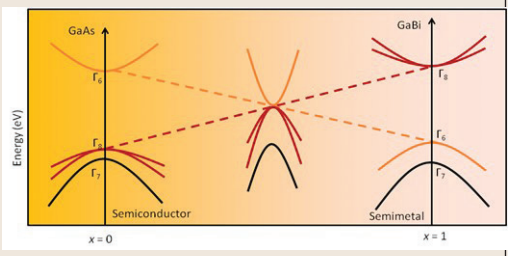
Rajeev N Kini

Assistant Professor (School of Physics)
rajeevkini@iisertvm.ac.in

Ultrafast and Terahertz spectroscopy of semiconductors

My primary research interests are in the understanding of the physics of semiconductors and its application to develop novel optical and electronic nanostructure devices. Some of the specific areas that I am working on now are:

i) Terahertz and ultrafast spectroscopy of novel dilute Bismide compounds: GaAs:Bi and GaN:Bi
ii) Ultrafast optical studies of semiconductor nanostructures.
iii) Nonlinear optical properties of metal iodates and borates.



Group members: Joshya Shyamala (PhD scholar)

Ramanathan Natesh

Assistant Professor (School of Biology)
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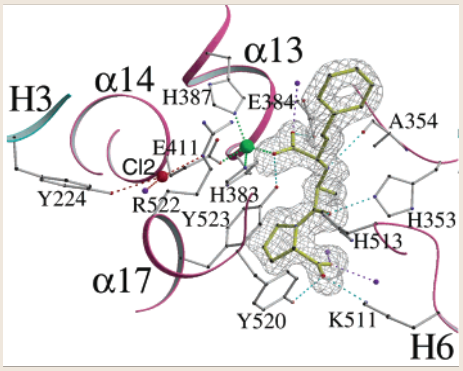
Molecular Structural Biology, Crystallography and CryoEM structural studies of complexes of signal transduction proteins in cardiovascular disease, Proteins involved in Mycobacterium Tuberculosis

Life shows its spectacular colors in its myriad diversity, yet shares certain fundamental common elements like proteins, DNA etc. Students and researchers can build upon knowledge gained from observations in simple models to study more complex problems. Our lab aims to study the individual and complex multi-protein, protein-ligand.) interactions by tackling the individual problems and assembling them to get a broader view. Towards this we use two principal techniques viz., Protein Crystallography and Single particle negative stain and Cryo-EM and image processing (3D reconstruction) along with a range of other biophysical and biochemical techniques. We also use bioinformatics and scientific programming.



Group members: Abyson Joseph (PhD scholar) & Balachandar C (Project Assistant).

Ramesh Chandra Nath

Assistant Professor (School of Physics)
rnath@iisertvm.ac.in

Quantum Phase Transition in Frustrated Low-dimensional Spin Systems and Unconventional Superconductivity

Our present research interests are: (i) quantum phase transition in frustrated low-dimensional spin systems, (ii) pnictide superconductors, and (iii) molecular/nano magnets. We synthesize various oxide and intermetallic compounds both in polycrystalline and single crystal forms via solid state and liquid state synthesis routes. Structural characterization is done using X-ray diffraction measurements as a function of temperature. For investigating their physical properties we perform magnetization, heat capacity, and transport measurements. For more precise information about the ground state, static and dynamic properties, we employ solid state NMR technique down to mK temperature range and at different applied fields (or frequencies). An interesting system in the pnictide series is Sr2Mn3As2O2 which has alternating CuO-type MnO and FeAs-type MnAs layers Currently we are trying to replace MnO layers by CuO layers and MnAs layers by FeAs layers so that the compound will have an intermediate structure of high-TC cuprates and pnictide superconductors.

Reji Varghese

Assistant Professor (School of Chemistry)
reji@iisertvm.ac.in

Supramolecular Chemistry with DNA, DNA Nanotechnology, Functional Nanomaterials

Construction of functional supramolecular nanoarchitectures with an ultradense array of addressable elements that is densely ordered over nanoscopic or macroscopic length scales is an important challenge in the field of nanotechnology and material science. The unique structural features of DNA have showed that it offers an excellent addressable structural element in various DNA based nanostructures. The remarkable optical properties of linearly conjugated organic molecules have received considerable attention in recent years for the development of organic materials. Taken together, the addressability of DNA and the unique optical properties of conjugated organic molecule offer DNA-organic hybrid systems as promising candidates in the crafting of functional and addressable nanostructures. Our research focuses on the synthesis of DNA-linearly conjugated molecular hybrid systems and investigating their supramolecular organization in solution and solid phase. The unique feature of these nanostructures is the DNA-directed addressability that allows the integration of other functional nanomaterials such as metal nanoparticles (NPs) into extremely complex NP superstructures that are otherwise hard to achieve. We also aim to demonstrate the potential of these biocompatible structures as drug carriers by exploiting the high affinity of these nanostructures towards hydrophobic drugs and remarkable modulation of optical properties of the conjugated molecules upon assembly/disassembly process.

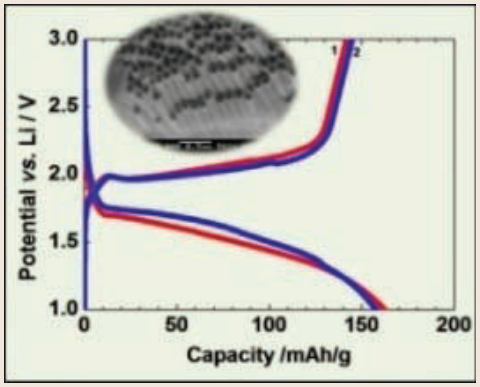
Group members: Shine K. Albert (PhD scholar), Libin K. Joseph (Research Fellow)

M M Shaijumon

Assistant Professor (School of Physics)
shaiju@iisertvm.ac.in

Multifunctional Nanostructured Materials and Energy Storage

My research lies in the broad areas of Nanoscience and Energy technology. Our research focuses on the materials science and physics of various energy storage and conversion systems that will have great impact on our society. Some of our current research interests include: Advanced electrode materials for Li-ion battery, Nanoarchitectured materials for 3-dimensional microbatteries, Synthesis of graphene and graphenenanocomposites, Hybrid electrodes for Electrochemical supercapacitors, Hydrogen storage and Carbon dioxide capture in nanoporous materials. Various one-dimensional nanostructured materials with multifunctional properties are synthesized in our laboratory using several techniques including chemical vapor deposition, sol-gel technique, electrodeposition, etc. We do various experimental analyses to understand the physical phenomena underlying these systems.



Galvanostatic cycling behavior for TiO2 nanotube electrodes at a rate of C/10 vs. Li

S Shankaranarayanan

Assistant Professor (School of Physics)
shanki@iisertvm.ac.in

Black-holes, Cosmology and Quantum Gravity

My main fields of interest are field theory, general relativity and theoretical cosmology. My research has been interdisciplinary; it has centered on aspects of black-hole physics, cosmological inflation, cosmological perturbation theory, modified gravity models, quantum gravity phenomenology and semi-classical gravity. I am interested in both building and testing new theoretical extensions to standard models. Over the last few years, I have been interested in the following areas:

- Alternate models of cosmological inflation
- Higher order cosmological perturbations
- Using cosmic microwave background as a tool to probe new physics near the scale of inflation
- Quantum entanglement as the source of black-hole entropy

Group members: Santhosh Kumar (PhD scholar) & Suman Ghosh (Post-doctoral fellow)

Sreedhar Dutta

Assistant Professor (School of Physics)
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Statistical Physics and Quantum Field Theory

Systems with macroscopic degrees of freedom that are not in equilibrium are ubiquitous in nature. There is yet no established framework to describe these out-of-equilibrium systems. With the objective of finding suitable frameworks of description, I study various statistical mechanics models subjected to a variety of non-equilibrium dynamics. Many non-equilibrium systems also exhibit universal properties, and show scaling behavior. I study the large-scale properties (in particular, correlation functions) of such systems in order to classify these universality classes, and to find the criteria, if any, to identify the class to which a system belongs to. The universality classes are intimately connected to quantum field theories, and I explore the possibility of establishing and exploiting these connections in systems that are at, near and far-away from equilibrium.

Group members: Sreerekha (PhD scholar), Sankaran Namboothiry (PhD scholar)

Sujith Vijay

Assistant Professor (School of Mathematics)
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Ramsey theory on the integers

Dr. Vijay's current area of research is Ramsey theory, a branch of combinatorics where the goal is to determine the size of a host structure H with the property that whenever H is partitioned into a given number of parts there is always a regular substructure of a given size. When H is a finite initial segment of positive integers, and the substructures are arithmetic progressions of a given length, the sequence of minimal host structure sizes are called the Van der Waerden numbers. Dr. Vijay's recent work focuses on the analogue of Van der Waerden numbers for generalised arithmetic progressions and random partitions.

Sunish Kumar Radhakrishnan

Assistant Professor (School of Biology)
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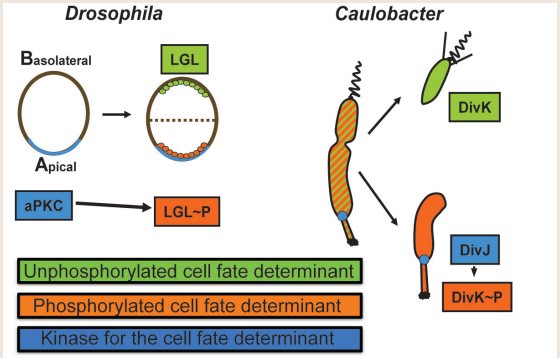
Cellular asymmetry and cell division in bacteria

Precise timing in localization of signaling molecules is fundamentally important for differentiation, proliferation, morphogenesis and function of single-celled and metazoan organisms alike. Cellular components, including signaling molecules are not uniformly distributed in a cell but are present in distinct microenvironments. Often, these microenvironments are themselves deposited asymmetrically in the cells, thereby endowing specific functions to each cell type upon division. Such asymmetric or stem cell-like divisions give rise to dispersal daughter cells destined for differentiation, and progenitor cells which retain the identity of the precursor cell. The molecular mechanisms that govern such asymmetric cell divisions have not been completely understood. The research in our laboratory is focused towards understanding the underlying principles of asymmetric cell division using the genetically tractable, dimorphic, easy to grow bacterium, Caulobacter crescentus as a model organism. The basic knowledge gained from this research will help us to develop better cures for biomedical complications arising from perturbations in developmental processes that rely on asymmetric division mechanism(s).



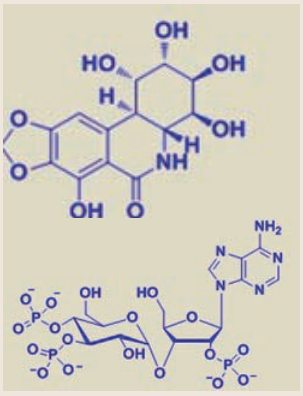
Conceptually similar mechanism of asymmetric cell division in *Drosophila* neuroblast and *Caulobacter crescentus*

Kana M Sureshan

Assistant Professor (School of Chemistry)
kms@iisertvm.ac.in

Organic synthesis, Medicinal Chemistry, Supramolecular chemistry

Total synthesis of natural products and analogues:
Synthesis of glycosidase inhibitors, Design and synthesis of IP3 receptor agonists,
Synthesis of glycosyl transferase inhibitors, Kinase inhibitors
Natural product like libraries: These libraries will be used for protein-based, cell-based and organism-based biological studies. These libraries will also be used for stem cell differentiation.
Weak non-covalent interactions: Their role in conformation, self-assembly etc
Supramolecular chemistry: Organogels, hydrogels, host-guest chemistry, developing sensors



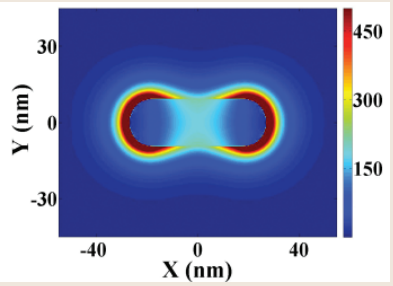
Group members: Pathigoolla Atchutarao (PhD scholar), Adiyala Vidyasagar (PhD scholar), Amol M. Vibhute (PhD scholar), Soumik Mondal (PhD scholar), Baiju P. Krishnan (PhD scholar), Prathap Annamalai (Project Assistant) & Pradeep D. (PhD scholar) Rajamohan Rao (Project Assistant)

R S Swathi

Assistant Professor (School of Chemistry)
swathi@iisertvm.ac.in

Theoretical Spectroscopy and Quantum Chemistry

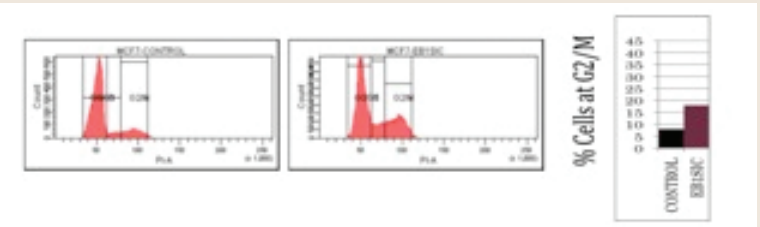
Our research work focuses on the theoretical understanding of optical excitations in metal
nanostructures with an emphasis on their implications for the surface enhanced spectroscopy
of molecules in vicinity. We are also interested in the quantum chemical studies of interesting
phenomena involving molecules and materials



Tapas Kumar Manna

Assistant Professor (School of Biology)
tmanna@iisertvm.ac.in

Cell cycle regulation in eukaryotic cells: structure -function of microtubule, centrosome and kinetochore proteins.



Microtubules are major cytoskeletal components essential for cell proliferation and differentiation. During cell cycle, tight regulation of microtubule assembly is very critical for their ability to search and capture various cellular components. During mitosis, spindle microtubules stay attached with two major components, kinetochore and centrosome. Kinetochore, a multi-protein component of mitotic chromosome, attaches with plus ends of spindle microtubules. Centrosome, another multi-protein organelle, nucleates microtubules and divides into two forming poles for mitotic spindle assembly. Proper attachment of mitotic spindles to both these components is essential for accurate segregation of chromosomes and optimal progression of cell cycle. Microtubules are intrinsically dynamic, exhibiting rapid switch between polymerization and depolymerization. Despite such dynamicity, how centrosomes and kinetochores stay attached with spindles continuously throughout mitosis is still an intriguing and unresolved question. Research interests in my laboratory are to identify key components regulating mitotic spindle assembly-dynamics, kinetochore-microtubule attachments and centrosome functions during cell division and uncover the molecular pathways involved. We employ biochemical, biophysical and cell biological tools for our research.

Group members: Gireesh KK (PhD scholar), Geethu Emily Thomas (PhD scholar), Puja Singh (PhD scholar), Sreeja JS (Project JRF)

Utpal Manna

Assistant Professor (School of Mathematics)
manna.utpal@iisertvm.ac.in

Stochastic Partial Differential Equations, Stochastic Processes, Stochastic and Harmonic Analytic Approaches to Fluid Dynamics Models

Dr. Manna works in nonlinear partial differential equations arising mostly from fluid dynamics (e.g. Navier-Stokes equations, vorticity equations, shell model of turbulence, magneto-hydrodynamic systems etc.) driven by Wiener or Le'vy processes. He studies existence, uniqueness, regularity, large deviation and control of these fluid models using tools from stochastic analysis, harmonic analysis, nonlinear functional analysis and PDE theory.

Group members: Manil T Mohan (PhD scholar)

Vinesh Vijayan

Assistant Professor (School of Chemistry)
vinesh@iisertvm.ac.in

NMR investigation of structure and dynamics of biomolecules

Solution and solid-state NMR (Nuclear magnetic resonance) provides high-resolution structural and dynamic information of biomolecules in near physiological condition. My main research focuses on the NMR structural elucidation of proteins, particularly membrane proteins and protein aggregates. Currently we are interested in the dynamics of peptides derived from proteins involved in different neurodegenerative diseases. We are particularly interested in the conformational study of their native as well as their aggregated forms. We are also interested in method development in both solid and solution-state NMR. Presently we have a Bruker500 MHz NMR spectrometer equipped with 3 solution-state probes for routine organic and biomolecular studies.

Administrative & Support Personnel

The institute has been operating with skeletal regular staff and with 11 Consultants and contractual experienced professionals.
Recruitment of 9 personnel was done during the year and regular strength in position became 11 against a sanctioned strength of 16. The administrative personnel are enlisted as under:

Administration

1. Shri Bharat Jyoti, IFS, Registrar
2. Shri G Munibhaskar (upto Dec, 2010);
   Shri J Anil (from 02 March, 2011), Project Engineer cum Estate Officer
3. Shri B V Ramesh, Assistant Registrar (Finance & Accounts)
4. Shri Hariharakrishnan, Assistant Registrar (Administration & Academics)
5. Shri Sainul Abideen, Assistant Librarian
6. Shri P Y Sreekumar, Scientific Officer
7. Shri Krishnakumar, Junior Engineer
8. Shri Ajith Prabha, Office Assistant(Multi- Skill)
9. Smt Nimi Joseph Chaly, Accountant
10. Smt Navya Paul, Technical Assistant
11. Smt Divya J, Technical Assistant

Consultants and Contractual Officers

1. Shri B K Subburaman, Special Officer
2. Shri C M Abraham, Officer on Special Duty
3. Shri S B Jayaram, Consultant (Purchase & Stores)
4. Shri P N Mohanan, Consultant (Finance & Accounts)
5. Shri V P Nair, Consultant (Human Resources)
6. Shri P A. Prabhakaran, Chief Consultant (Constructions)
7. Shri P R Balakrishna Pillai, Consultant (Civil)
8. Shri K Muraleedharan Nair, Consultant (Civil)
9. Shri R Vasudevan Nair, Consultant (Electrical)
10. Shri Velappan Nair, Technical Assistant (Civil)
11. Shri K S G Kurup, Manager (Administration)

Students

BS-MS Dual Degree Programme

60 students joined the third batch of Five Year BS-MS Dual Degree Programme in August 2010 at the Transit Campus in the College of Engineering Trivandrum.

This year, in addition to selection from KVPY and IIT-JEE merit list qualifiers, direct admissions were given to students who were in the top 1% of class X and XII exams of all the State Boards, CBSE and ICSE (who are also eligible for INSPIRE scholarships of Deptt. of Science & Technology, Govt. of India) based on all-India aptitude test conducted jointly for all the 5 IISERs.

The category distribution is as follows:

SC	ST	OBC	GEN	TOTAL	MALE	FEMALE	Admission Source		
							KVPY	IIT-JEE	DIRECT
8	3	20	29	60	30	30	5	7	48

Name	Qualifying Examination	Name	Qualifying Examination
Adara B	DIRECT	KVS Akhilesh	IIT-JEE
Aditya Singh	KVPY	Lekshmi M R	DIRECT
Aiswarya S.Sasidharan	DIRECT	Lekshmi RS	DIRECT
Aiswarya Sara Mathew K	DIRECT	Merrin Jospeh	DIRECT
Akhil Suresh S	DIRECT	Mithun Tampi	DIRECT
Anjana P Joy	DIRECT	N Sumanta Reddy	IIT-JEE
Anu Thomas	DIRECT	Neethu Anand	DIRECT
Ardra A	DIRECT	Niya Thomas	DIRECT
Aromal A	DIRECT	Niyor Borah	IIT-JEE
Rathod Suman	DIRECT	P T Rajagopalan	DIRECT
Asna M	DIRECT	PR Kavyasree	DIRECT
Aswani P V	KVPY	Prasanna D Patil	IIT-JEE
Aswathi Raveendran	DIRECT	Ramarani Sethy	IIT-JEE
Aswathy C	DIRECT	Ramasubramonian D	DIRECT
Aswathy J R	DIRECT	R Viswanathan	KVPY
Athira George	DIRECT	Reshma Soman	DIRECT
Athira Raj S R	DIRECT	S Vanathi	DIRECT
Avanthika P	DIRECT	Sagil G Satyan	DIRECT
D.Arun Chaithainya	DIRECT	Salina Tigga	DIRECT
Daniel Sylvinson M R	KVPY	Sarang Mahajan	DIRECT
Deepak Suryavanshi	DIRECT	Sisira K	DIRECT
Devansh Agarwal	KVPY	Sreekanth K.M	DIRECT
Dhanya S R	DIRECT	Sreenath.K.M	DIRECT
Divya Ram J	DIRECT	Sreeram PG	DIRECT
Gali Amaranadha	DIRECT	Steny Simon	DIRECT
Gopikrishnan C R	DIRECT	S S Agashe	DIRECT
Harish Banda	IIT-JEE	Vaisakhan GS	DIRECT
Jery Joy	DIRECT	Vishnu Anand	DIRECT
Joseph PJ	DIRECT	VPS Ritwika	DIRECT
Karthik R	IIT-JEE	Yadu Krishnan S	DIRECT

Ph.D. Programme

21 students were admitted for Ph.D. Programme during the academic year 2010-11. Students admitted to the doctoral program are those qualified in one of the National Eligibility Tests such as GATE/ CSIR-UGC JRF/ JEST.

List of students admitted for Ph.D. Programme

Name	Eligibility Test	Name	Eligibility Test
Puja Singh	GATE	Abyson Joseph	CSIR
Geethu Emily Thomas	GATE	Balamurali GS	GATE
P K Baiju	UGC	Jaspreet Singh	GATE
A. Hanna Thamleena	GATE	Shivani	GATE
Soumik Mondal	GATE	Vignesh K	GATE
K R Shinaj	CSIR	A Madhukar Vibhute	UGC
R Shyama	UGC	Damodar Reddy	GATE
Reshmi Thomas	CSIR	Joshya Shyamala	GATE
M. K. Haris	GATE	Santhosh Kumar S.	CSIR
P S S Nampoothiri	GATE	Sreenadh S.	JEST
K Vijith	GATE		

2.3.3 student strength in 2010-11

Programme	2008-2009 admissions	2009-10 admissions	2010-11 admissions	Total
5 Yr Integrated BS-MS	15	53	60	128
Ph. D	--	18	19	37
Total	15	71	79	165

Scholarship / Fellowship

As all the students admitted to the BS-MS Programme are drawn from KVPY, IIT/JEE merit list and INSPIRE scholarship eligible category of students of State Boards, CBSE and ICSE, they are awarded Fellowships of Rs 5000/- per month under KVPY or INSPIRE Programme of Department of Science & Technology, Government of India.

The Ph D scholars who are JRFs/SRFs of CSIR/UGC/ICMR/DBT etc. draw fellowships and contingency according to the granting organizations. The other qualified students admitted to Ph D Program have also been given scholarship of Rs 16000/- p. m. by the institute.

3. Academic Programmes

The institute offers integrated BS-MS programme and Ph D programme in basic sciences.

The first 2 years of the BS-MS Programme consist of core courses common to all students. From the third year onwards, the students specialise in one of the major subjects (Biology, Chemistry, Physics or Mathematics) and one or more minors, and the final year devoted to a research project.

The minimum credits required for BS-MS degree is 175 in the 5-year programme split into 10 semesters. Evaluation is done by relative grading system and the minimum cumulative grade point average (CGPA) required for award of BS-MS degree is 5 (on a 10-point scale). The fellowship is contingent upon good academic performance with CGPA of 6 or above.

4. Research Activities

The Institute has been active in frontier research apart from the regular teaching activities. The faculty members have initiated research work in the laboratories constructed in the temporary campus and have also started collaborative research work with researchers in premier institutions in India and abroad. The faculties also undertook sponsored projects from various funding agencies. Many faculties have obtained new projects from various funding agencies. The new and on-going sponsored projects are enlisted hereunder.

Sponsored Projects

New Sponsored Projects

	Project Title	Principal Investigator	Sponsoring Agency / Amount Sanctioned / Duration
1.	Synthesis of IP3 analog libraries using click chemistry and their biological evaluation	Dr. K. M. Sureshan, School of Chemistry	CSIR Rs 14.0 lakh 2010-2013
2.	Quantum metrology with Bose-Einstein condensates	Dr. Anil Shaji, School of Physics	DST Rs14 Lakh; 2010-13
3.	Structure-function aspects of microtubule end-binding EB family proteins.	Dr. Tapas K. Manna, School of Biology	CSIR Rs. 18.65 lakh 2010-2013
4.	Designing New Catalysts for Organic and Bio-organic Reactions using nano-particles	Dr Ayan Datta, School of Chemistry	CSIR Rs 7.83 lakhs 2010-2013
5.	Design and development of 3-dimensional Li-ion micro-batteries	Dr M M Shaijumon, School of Chemistry	DST Rs 18.0 lakh 2011-2014
6.	Ecology and behavior of group-living spiders	Dr. Hema Somanathan, School of Biology	CSIR Rs 17.34 Lakh 2011-2014

Ongoing Sponsored Projects

	Name of Project	Principal Investigator	Sponsoring Agency / Amount Sanctioned / Duration
1	Modeling and predicting novel molecular materials for hydrogen storage: The inorganic route	Dr Ayan Datta, School of Chemistry	D S T Rs 23.20 lakh 2009-2012
2.	Probing Adenophostin Mediated IP3R Activation using Click Chemistry Approach	Dr K M Sureshan School of Chemistry	D S T Rs 19.32 Lakh 2009-2012

Fellowships

	Awardee	Fellowship	Sponsoring Agency	Amount Sanctioned and duration
1	Dr Anil Shaji School of Physics	Ramanujan Fellowship 2010-2015	DST, India	Rs 73 lakh;
2	Dr K M Sureshan School of Chemistry	Ramanujan Fellowship	DST, India	Rs 73 lakh; 2010-2015
3	Dr S Shankaranarayanan School of Physics	Ramanujan Fellowship	DST, India	Rs 73 lakh; 2010-2015
4	Dr. Ramanathan Natesh School of Biology	Ramalingaswami Fellowship *Structural analysis of proteins and its interacting partners.*	DBT, India	Rs 70 lakh; 2010-2015
5	Dr. Sunish Kumar Radhakrishnan School of Biology	Wellcome Trust-DBT Intermediate Fellowship *A multilayered approach to decipher unchartered mechanisms of asymmetric cell division*	Wellcome Trust/ DBT India Alliance	Rs 267.62 lakh 2011-2016

5. Research Publications

Faculties of the institute have kept up remarkable pace of research publications and in the last year published 60 research papers in refereed journals of high impact and one book chapter. The list of these publications is in the annexure.

The number of publications is more than 75 over the last three years of the institute's existence

List of Research Publications during 2010-11 *(Author, Title, Journal, Issue respectively with IISER-TVM faculty names in bold)*

Journal Publications

1) Carlton M. Caves and **Anil Shaji**, Quantum-circuit guide to optical and atomic interferometry, *Optics communications* 283, 695-712, 2010

2) Alexandre B. Tacla, Sergio Boixo, Animesh Datta, **Anil Shaji** and Carlton M. Caves, Nonlinera Interferometry with Bose-Einstein condensates, *Phys. Rev. A*. 82 053636, 2010.

3) A. K. Jissy, U. P. M. Ashik, **Ayan Datta**, Nucleic Acid G-quartets: Insights into Diverse Patterns and Optical Properties, J. Phys. Chem. C, , 115, xxxx, 2011.

4) X. Zhang, D. A. Hrovat, **Ayan Datta**, Weston Thatcher Borden, Effects of geminal methyl groups on the tunneling rates in the ring opening of cyclopropylcarbinyl radical at cryogenic temperatures, Org. Biomol. Chem. (communication), 9, 3142, 2011.

5) A. Nijamudheen, D. Jose, **Ayan Datta**, Metal Encapsulation Mediated Planar to Three Dimensional Structural Transformation in Au-Clusters: The Venus Flytrap Effect, Comput. and Theor. Chem, 966, 133, 2011.

6) D. Jose, **Ayan Datta**, Structures and electronic properties of silicene clusters: a promising material for FET and hydrogen storage, Phys. Chem. Chem. Phys., 13, 7304, 2011.

7) A. Nijamudheen, D. Jose, **Ayan Datta**, Why Does Gold(III) Porphyrin Act as a Selective Catalyst in the Cycloisomerization of Allenones?, J. Phys. Chem. C, 115, 2187, 2011.

8) Jissy A. K, **Ayan Datta**, Designing Molecular Switches based on DNA-Base Mispairing, J. Phys. Chem. B, 114, 15311, 2010.

9) X. Zhang, **Ayan Datta**, D. A. Hrovat, Weston Thatcher Borden, D. A. Singleton, Experimental Evidence for Heavy-Atom Tunneling in the Ring-Opening of Cyclopropylcarbinyl Radical from Intramolecular 12C/13C Kinetic Isotope Effects, J. Am. Chem. Soc. (communication), 132, 12548, 2010.

10) D. Jose, **Ayan Datta**, Molecular Rotor Inside a Phosphonate Cavitand: Role of Supramolecular Interactions, J. Phys. Chem. Lett., 1, 1363, 2010.

11) A. Nijamudheen and **Ayan Datta**, Odd-even oscillations in structural and optical properties of gold clusters, Journal of Mol. Structure (THEOCHEM), 945, 93, 2010.

12) V. Mohan and **Ayan Datta**, Structures and Electronic Properties of Si – Substituted Benzenes and their Transition – Metal Complexes, J. Phys. Chem. Lett., 1, 136, 2010.

13) Sounik Saha, Dibyendu Mallick, Ritankar Majumdar, Mithun Roy, Rajan R. Dighe, **E.D. Jemmis** and Akhil R Chakravarty, "Structure-Activity Relationship of Photocytotoxic Iron (III) Complexes of Modified Dipyridophenazine Ligands", *Inorg. Chem.*, **,** 50, 2975-2987, 2011.

14) R.M. Muir, A.M. Ibanez, S.L. uratsu, E.S. Ingham, C.A. leslie, G.H. McGranahan, N. Batra, S. Goyal, J. Joseph, **E.D. Jemmis** and A.M. Dandekar, Mechanism of gallic acid biosynthesis in bacteria (E.coli) and walnut (J.regia), *Plant Mol. Biol*., 75, 555-565, 2011.

15) Manasi Maji, Dibyendu Mallick, Sayantan Mondal, Anakuthil Anoop, Subhendu Sekhar Bag, Amit Basak and **E.D. Jemmis**, Selectivity in Garratt-Braverman Cyclization: An Experimental and Computational Study, *Organic Letters*, 13, 888-891, 2011.

16) Sovan Roy, Subhendu Roy, Sounik Saha, Ritankar Majumdar, Rajan R. Dighe, **E.D. Jemmis**, Akhil R Chakravarty, Cobalt (II) complexes of terpyridine bases as photochemotherapeutic agents showing cellular uptake and photocytotoxicity in visible light, *Dalton Trans*, 40, 1233-1242, 2011.

17) Subhendu Roy, **E.D. Jemmis**, Martin Ruhmann, Axel Schulz, Katharina Kaleta, Torsten Beweries, Uwe Rosenthal, Theoretical studies on the structure and Bonding of Metallacycloumulenses, cyclopentynes and cycloalleness, *Organometallics*, 30, 2670-2679, 2011.

18) Katharina Kaleta, Martin Ruhmann, Oliver Theilmann, Torsten Beweries, Subhendu Roy, Perdita Arndt, Alexander Villinger, **E.D. Jemmis**, Axel Schulz, Uwe Rosenthal, Reactions of Group 4 Metallocene Alkyne Complexes with Carbodiimides: Experimental and Theoretical Studies of the Structure and Bonding of five-membered Hetero-Metallacycloallenes, *J. Am. Soc*., 133, 5463-5473, 2011.

19) David A. Addy, Glesni A. Pierce, Dragoslav Vidovic, Dibyendu Mallick, **E.D. Jemmis**, Jose M. Goicoechea and Simon Aldridge, Generation of Cationic Two- Coordinate Group-13 Ligand Systems by Spontaneous Halide Ejection: Remarkably Nucleophile-Resistant (Dimethylamino) borylene Complexes, *J.Am.Chem. Soc.*, 132, 4586-4588, 2010.

20) **E.D. Jemmis**, Subhendu Roy, V.V. Burlakov, H. Jiao, M. Klahn, S. Hansen and U. Rosenthal, Are Metallocene-Acetylene (M=Ti, Zr, Hf) Complexes Aromatic Metallacyclopropenes?, *Organometallics*, 29, 76-81, 2010.

21) Rajendra S Dhayal, Satyanarayan Sahoo, K. Hari Krishna Reddy, SShaikh M. Mobinn, **E.D. Jemmis** and Sundargopal Ghoshsh, "Vertex-Fused Metallaborane Clusters: Synthesis, Characterization and Electronic Structure of [(C5Me5Mo)3MoB9H18], *Inorganic Chemistry*, 49,900-904, 2010.

22) Dasari L.V.K. Prasad and **E.D. Jemmis**, Stuffed fullerene-like boron carbide nanoclusters, *Appl. Phys. Lett*.96, 023108-023110, 2010.

23) Jatish Kumar and **K. George Thomas,** Surface-Enhanced Raman Spectroscopy: Investigations at the Nanorod Edges and Dimer Junctions, *J. Phys. Chem. Lett***.** 2, 610–615, 2011.

24) P. Pramod, C. C. Soumya, and **K. George Thomas,** Gold Nanoparticle-Functionalized Carbon Nanotubes for Light-Induced Electron Transfer Process, *J. Phys. Chem. Lett*., 2, 775–781, 2011.

25) Jino George and **K. George Thomas**, Surface Plasmon Coupled Circular Dichroism of Au Nanoparticles on Peptide Nanotubes, *J. Am. Chem. Soc*., 132, 2502–2503, 2010**.**

26) A. R. Ramesh and **K. George Thomas**, Directional hydrogen bonding controlled 2D self-organization of phenyleneethynylenes: from linear assembly to rectangular network, *Chem. Commun*., 46, 3457–3459, 2010.

27) Pratheesh V. Nair and **K. George Thomas,** Hydrazine-Induced Room-Temperature Transformation of CdTe Nanoparticles to Nanowires, *J. Phys. Chem. Lett*., 1, 2094–2098, 2010.

28) P. Dawson, L. Feng, L. Penate-Quesada, **J. Mitra** and G. Hill, The electrical characterisation and response to hydrogen of Schottky diodes with a resistive metal electrode – rectifying an oversight in Schottky diode investigation. (*accepted Journal of Physics* D, 2011).

29) Seow Jecg Chin, Peter Hornsby, Damjan Vengust, Dragan Mihailovic´, **J. Mitra**, P. Dawson and Tony McNally, Composites of poly(ε-caprolactone) and $Mo_6S_3I_6$ nanowires, (Polymers Advanced Technologies, 2010 *published online*, DOI: 10.1002/pat.1838)

30) Dhonukshe P, Huang F, Galvan-Ampudia CS, Mähönen AP, Kleine-Vehn J, Xu J, Quint A, **Prasad K**, Friml J, Scheres B, Offringa R., Plasma membrane-bound AGC3 kinases phosphorylate PIN auxin carriers at TPRXS(N/S) motifs to direct apical PIN recycling. *Development* 137:3245-3255, 2010.

31) **Prasad K**, Zhang X, Tobón E, Ambrose B.A., The Arabidopsis B-sister MADS-box protein, GORDITA, represses fruit growth and contributes to integument development. *Plant Journal* 62:203-214, 2010.

32) **M. Hariharan**, and F. D. Lewis* Conformation of a Dodecane DNA Hairpin Linker. Multiple Gauche Bonds Cover the Bases K. Siegmund, *J. Phys. Chem. B, 115*, 3740–3746, 2011.

33) P. Neelakandan, Pan, Z., **M. Hariharan**, Y. Zheng, F. D. Lewis*, H. Weissman, and B. Rybtchinski* Hydrophobic Self-Assembly of a Perylenediimide-Linked DNA Dumbbell into Supramolecular Polymers, *J. Am. Chem. Soc*., *132*, 15808-1581, 2010.

34) **M. Hariharan**, M. McCullagh, G. C. Schatz, and F. D. Lewis, Conformational Control of Thymine Photodimerization in Single-Strand and Duplex DNA Containing Locked Nucleic Acid TT Steps, *J. Am. Chem. Soc*., *132*, 12856-12858, 2010.

35) **M. Hariharan**, K. Siegmund, and F. D. Lewis, Structure and Stability of Alkane-Linked DNA Hairpin Conjugates, *J. Org. Chem*., **75**, 6236–6243, 2010.

36) **M. Hariharan,** K. Siegmund, Y. Zheng, H. Long, G. C. Schatz, and F. D. Lewis, Perylenediimide-Linked DNA Dumbbells: Long-Distance Electronic Interactions and Hydrophobic Assistance of Base-Pair Melting, *J. Phys. Chem*., 114, 20466–20471, 2010.

37) **T. A. Zeidan**, M. Hariharan, K. Siegmund, and F. D. Lewis, DNA Base-Pair Flipping with Perylenediimide Pincers, *Photochem. Photobiol. Sci*., 9, 916-922, 2010.

38) **M. Hariharan**, F. D. Lewis, D. Markovitsi, T. Douki and G. C. Schatz, Conformational Control of TT-Dimerization in DNA Hairpins. A Molecular Dynamics Study M. McCullagh, *J. Phys. Chem. B*, *114*, 5215-5221, 2010.

39) **V. S. Jisha**, K. T. Arun, M. Hariharan and D. Ramaiah, Squaraine Dye-Serum Albumin Complexes with Enhanced Fluorescence and Triplet Yields, *J. Phys. Chem. B*, *114*, 5912-5919, 2010.

40) **Nishant, K.T.**, Wei, W., Mancera, E., Argueso, L., Schlattl, A., Delhomme, N., Ma, X., Bustamante, C.D., Korbel, J., Gu, Z., Steinmetz, L.M. and Alani, The baker's yeast diploid genome is remarkably stable in vegetative growth and meiosis. E. *PLoS Genetics*, 6:e1001109, 2010.

41) **Nishant, K.T.,** Chen, C., Shinohara, M., Shinohara, A. and Alani, Genetic analysis of baker's yeast MSH4-MSH5 reveals a threshold crossover level for meiotic viability. E. *PLoS Genetics*, 6: e1001083, 2010.

42) **M.P. Rajan**, A parameter choice strategy for the regularized approximation of Fredholm integral equations of the first kind, *International Journal of Computer Mathematics*, 87(11), 2612-2622, 2010

43) **R N Kini**, A. J Ptak, B Fluegel, R France, R C Reedy and A Mascarenhas, Effect of Bi alloying on the hole transport in the dilute bismide alloy $GaAs_{1-x}Bi_x$,*Phys. Rev. B.* , 83, 075307, 2011.

44) S. Pal, **R. Varghese**, Z. Deng, Z. Zhao, A. Kumar, Y. Liu, H. Yan, Site-specific synthesis and in situ immobilization of fluorescent silver nanoclusters on DNA nanoscaffolds by use of the Tollens reaction, *Angew. Chem. Int. Ed.*, *50*, 4176, 2011.

45) P. K. Dutta, **R. Varghese**, J. Nangreave, S. Lin, H. Yan, Y. Liu, DNA directed artificial light harvesting antenna *J. Am. Chem. Soc.*, 133, 11985–11993, 2011

46) A.A. Tsirlin, **R. Nath**, A. M. Abakumov, R. V. Shpanchenko, E. V. Antipov, C. Geibel, and H. Rosner, Frustrated square lattice with spatial anisotropy: Crystal structure and magnetic properties of $PbZn(VO)(PO_4)_2$, *Phys. Rev. B 81,174424, 2010.*

47) **R. Nath**, V. O. Garlea, A. I. Goldman, and D. C. Johnston, Synthesis, Structure and Properties of Tetragonal $Sr_2M_3As_2O_2$ (M_3 = Mn_3, Mn_2Cu and $MnZn_2$) Compounds Containing Alternating CuO_2-Type and FeAs-Type Layers, *Phys. Rev. B* ***81***, 224513, *2010.*

48) A.A. Tsirlin, I. Rousochatzakis, D. Kasinathan, O. Janson, **R. Nath**, F. Weickert, C. Geibel, A. Lauchli, and H. Rosner, Bridging frustrated-spin-chain and spin-ladder physics: one-dimensional magnetism of $BiCu_2PO_6$, *Phys. Rev. B 82, 144426, 2010.*

49) L. Bossoni, P. Carretta, **R. Nath**, M. Moscardini, M. Baenitz, and C. Geibel, NMR and ìSR study of spin correlations in SrZnVO(PO4)2: An S=1/2 frustrated magnet on a square lattice, *Phys. Rev. B 83, 014412, 2011*

50) A. A. Tsirlin, **R. Nath**, J. Sichelschmidt, Y. Skourski, C. Geibel, and H. Rosner, Frustrated couplings between alternating spin-1/2 chains in $AgVOAsO_4$,*Phys. Rev. B 83, 144412, 2011.*

51) S. R. Gowda, A. L. M. Reddy, **M. M. Shaijumon**, L. Ci and P. M. Ajayan, Conformal of coating of thin polymer electrolyte layer on nanostructured electrode materials for 3D Battery applications, *Nano Lett.* 11, 101-106, 2011.

52) **M. M. Shaijumon**, E. Perre, B. Daffos, P.-L. Taberna, J. -M. Tarascon and P. Simon Nanoarchitectured 3-dimensional cathodes for Li-ion microbatteries, *Adv. Mater.* , 22, 4978-4981, 2010.

53) **S. Shankaranarayanan,** Corrections to Bekenstein-Hawking entropy – Quantum or not-so quantum?, *Entropy* 13, Pg. 11, 2011.

54) **Sreedhar B. Dutta** and Su-Chan Park, Critical dynamics of nonconserved N-vector model with anisotropic nonequilibrium perturbations, *Physical Review E*, 83, 011117, 2011.

55) **S. Vijay**, On a variant of van der Waerden's theorem, Integers 10, A17, 2010.

56) **S. Vijay** and T. D. LeSaulnier, On permutations avoiding arithmetic progressions, *Discrete Mathematics 311*, 205-207, 2011.

57) M. Rossi, **K. M. Sureshan,** A. M. Riley, B. V. L. Potter and C. W. Taylor, Selective determinants of IP_3 and adenophostin A interactions with type-I IP_3 receptors, *British J. Pharmacol.* , 161, 1070-1085, 2010.

58) **Manna, U.,** and Mohan, M.T**.,** Shell Model of Turbulence Perturbed by Levy Noise, Nonlinear Differential Equations and Applications (NoDEA), DOI: 10.1007/s00030-011-0110-9, 2011.

Book-Chapter

1. Agrawal, S., **Nishant, K.T**. and Rao, M.R.S (2010) Analysis of Meiotic Recombination Hotspots: A Bioinformatics Approach, In Gabriel P.C. Fung's *A Practical Guide to Bioinformatics Analysis* (pp. 133-149) Queensland, Australia: iConcept Press.

6. Awards and Honours

The following faculty members have received awards/honours for their outstanding performance and academic standing during this year.

	Faculty	Honours/Awards
1	Dr Ayan Datta School of Chemistry	INSA Medal for Young Scientists, 2010; Associate of Indian Academy of Sciences, Bangalore
2	Dr M P Rajan School of Mathematics ,	Member, Board of Governors, Indian Institute of Quantitative Finance, Mumbai; Associate Editor: Journal of Economics, Banking and Finance; Journal of Mathematics, Statistics and Allied Fields; Best Teacher Award-2010, IISER-TVM
3	Dr Ramesh Chandra Nath School of Physics	DST-MPG fellowship jointly sponsored by DST India and Max-Planck Society, Germany for the period 2011-2014
4	Dr Reji Varghese School of Chemistry	Ramanujan Fellowship 2010
5	Dr S Shankaranarayanan School of Physics	1. INSA-Young Scientist Award 2010 awarded by the Indian National Science Academy, New Delhi 2. Associate of Indian Academy of Sciences (2010-2013), Bangalore 3. Head of the Max Planck Partner group on Cosmology and Gravity (2011-2015) Awarded by SERC, India and Max Planck Society, Germany
6	Dr Archana Pai School of Physics	Max Planck-India Partner group Award by the Department of Science and Technology, India and Max Planck Society, Germany. Visiting Associate of IUCAA for three years from 1.08.2010.
7	Dr Sunish Kumar Radhakrishnan School of Biology	Intermediate Fellowship from Wellcome Trust/DBT India Alliance.
8	Dr Ramanathan Natesh School of Biology	Ramalingaswami Fellowship from DBT, Govt. of India

7. Other Academic Activities

Faculty Activities

The faculties of the institute have been invited by many organizations and they have attended Conferences/ Symposia during 2010-11 as enlisted hereunder

Conferences & Workshops Attended

Faculty	Conference / Workshop	Place	Date(s)	International/ National
Prof E D Jemmis	Molecular Quantum Mechanics: From Methylene to DNA and Beyond	University of California, Berkeley	24-29 May, 2010	International
	Talk on Opportunities at IISERs, A presentation to Postdoctoral Fellows from India.	University of California, Berkeley	27 May 2010	
Dr. Hema Somanathan	The Rank Prize Funds Symposium on sensory aspects of pollination	Grasmere, UK	May 24-27, 2010	International
	9th International Neuroethology Congress	Salamanca, Spain	Aug 2-7, 2010	International
Dr. Ramanathan Natesh	HFSP investigator meeting 10th Annual Meeting of the Human Frontier Science Program (HFSP)	Trivandrum, Kerala	Oct 31 - Nov 4, 2010	International
Dr. Tapas K. Manna	Poster presented in International Cancer Research Symposium at RGCB, TVM	Trivandrum, Kerala	Dec 20-22, 2010	International
Dr. Reji Varghese	3rd Inter IISER Chemistry Meet	IISER-Mohali	Feb, 20-21,	National 2011
Dr. Vinesh Vijayan	3rd Inter IISER Chemistry Meet	IISER-Mohali	Feb, 20-21, 2011	National
Dr. Ayan Datta	Conference on Hydrogen Bonding	Coorg	Nov 2010	International
	Chennai Chemistry Conference	Chennai	Jan 2011	International
Dr. K M Sureshan	CRSI annual meeting	Bhubaneshwar	Feb, 4-6, 2011	National
	Recent Trends Organic Synthesis	Trichi	Feb, 24-26, 2011	National
	5th Mid CRSI symposium in Chemistry	Trivandrum, Kerala	Jul 23-24, 2010	National
Dr. R. S. Swathi	Theoretical Chemistry, Symposium	IIT, Kanpur	Dec, 8-12, 2010	International

Dr. Anil Shaji	Quantum Communication Measurement and Computation - 2010	Brisbane Australia	Jul 19-23, 2010	International
	National Workshop on Quantum Information	IMSc, Chennai	Nov 22- Dec 4, 2010	National
	Kerala Science Congress	Trivandrum Kerala	Jan, 23-30, 2010	National
	National Workshop on recent trends in theoretical Physics	Cochin, Kerala	Mar 19-21, 2011	National
Dr. Archana Pai	First IndIGO School on Gravitational Wave Astronomy (ISGWA-2010)	University of Delhi	Dec 13-24, 2010	National
	IndIGO-ACIGA Meeting on LIGO-Austrailia	Jamia Milia University	Feb 09, 2011	International
	Workshop on eAstronomy and Statistics	M. G. University	Jan 18, 2011	National
Dr. Rajeev N. Kini	6th JNC Research Conference on chemistry of materials	Kochi	Oct 02-04, 2010	National
Dr. Ramesh Chandra Nath	International Conference on Magnetic Materials (ICMM 2010)	SINP, Kolkata	Oct 25-29, 2010	International
	International conference on Current Trends in Condensed Matter Physics 2010 (CTCMP 2010)	NISER, Bhubaneswar	Dec 15-19, 2010	International
Dr. S. Shankaranarayanan	21st Mid-year meeting of Indian Academy of Sciences	IISc, Bangalore	Jul 2-4, 2010	National
	Primordial Fluctuations and Non-Gaussianity	HRI, Allhabad	Dec 16-22, 2010	International
	Anniversary meeting of Indian National Science Academy	IISc, Bangalore	Dec 28-31, 2010	National
	QFT-2011	IISER-Pune	Feb 23-27, 2011	International
	Chandrayana	IMSc, Chennai	Jan 3-7, 2011	International
	Impact of quantum effects on the classical world	MG University, Kottayam	Jan 26-29, 2011	National
Dr. M. M. Shaijumon	6th JNC Research conference on chemistry of materials	Kochi, India	Oct 2-4, 2010	National
	Nanotech India 2010	Kochi, India	Nov 19-21, 2010	International

Invited Lectures and Seminars Delivered

Faculty	Name of Lecture	Name of Institute / Organization	Place	Date
Prof E D Jemmis	A Structural Chemistry for Boron	University of Miami, Florida	Florida, USA	21 May, 2010
		Institute of Inorganic Chemistry, University of Zurich	Zurich, Switzerland	25 March, 2011
		Tata Institute of Fundamental Research	Mumbai	15 September, 2010
	Some Thoughts on Impact of Computational Chemistry	Inter IISER Chemistry Meet	IISER Kolkata	24, December 2010.
		Centre for Modelling Simulation and Design, University of Hyderabad,	Hyderabad	13 August, 2010
	Some Applications of Computational Chemistry	Theoretical Chemistry Symposium (TCS-10), IIT Kanpur	Kanpur	8-12 December, 2010
	A Tale of Two Elements, INSPIRE-INTERNSHIP-2011	A National Programme of DST, Nirmala College,	Muvattupuzha	12 January, 2011
Dr Anil Shaji	Science on a T-Shirt Non Classical Measures of Correlations in quantum states	St. Thomas School Institute of Mathematical Sciences	Trivandrum Chennai	May 2010 December 2010
	Quantum Metrology	Institute of Mathematical Sciences	Chennai	December 2010
	Non Classical Measures of Correlations in quantum states	Cochin University of Science and Technology	Cochin	March 2011
	Quantum Computing	Amrita Viswa Vidyalaya	Amritapuri	March 2011
	Measurements and Quantum Mechanics	Pondicherry University	Pondicherry	March 2011
Dr Archana Pai	Hands-on session on Octave	College of Engineering,	Trivandrum	December 2010
	Time-series Analysis in Gravitational Wave Astronomy	M. G. University	Kottayam	January 2011

	1. Matched Filtering in GW 2. Multi-Detector GW Analysis	IRC, University of Delhi (ISGWA2010)	Delhi	December 2010
	Gravitational Wave Coherent Search Veto	Jamia Milia University	Delhi	February 2011
	Teachers training programme arranged in International school of Photonics, CUSAT Cochin.	International school of Photonics, CUSAT Cochin	Cochin	September 2010
Dr Manoj A G Namboothiry	Department of Physics, CUSAT, Physics Alumni meet lecture	Department of Physics, CUSAT Cochin	Cochin	October 2010
	"Lasers and Bose-Einstien Condensate"	NIIST, CSIR program on youth for leadership in science (CPYLS)	Trivandrum	December 2010
Dr Rajeev N Kini	Nanotechnology for Energy Storage	National Seminar on Energy Conservation, S.N. College, Cherthala, Kerala	Cherthala, Kerala	March 2011
Dr M M Shaiju-mon	Nanomaterrials for Energy Applications-Challenges and Prospects	Dept. of Optoelectr-onics, Kerala University, India	Thiruvanan-thapuram, India	January 2011
	Hybrid nanostructures for Energy Applications	Nanoteh India 2010, International confere-nce	Kochi, India	November 2010
	Nanomaterials for Energy Applications	School of Nanoscience, NIT Calicut, Kerala	Calicut, Kerala	July 2010
Dr M P Rajan	Inspire Lecture-Career after +2	NIT Calicut	Calicut	December 2010
	Interest Rate Derivatives Fourier Series - Academy Lecture Workshop-	Bank of NewYork	Pune IISER, Trivandrum	January 2011
	Foundations of Analysis Inflation driven by spinor condensate	IRC, Delhi University	Delhi	April 2010
Dr S Shankarana-rayanan	Entanglement entropy in all dimensions	Institute of Mathematical Sciences	Chennai	January 2011

	Scalar field inflation and alternatives	MG University	Kottayam	January 2011
	Origin of Universe: Seeking links between fundamental physics and cosmology	MG University	Kottayam	January 2011
	Ambiguities in second-order cosmological perturbations	IISER-Pune	Pune	February 2011

Internship Offered

10 Students from other Universities/Colleges carried out their projects with faculty members of IISER-TVM during the year 2010-11; details enlisted in annexure.

Outreach Programme

IISER-TVM faculty teams visited schools and colleges and conducted Awareness Programme about research in science and encourage the students to choose science as a career as well as delivered lectures to ignite the interests in research in sciences.

National Science day was celebrated on 28th February, 2011 in the institute and Science Quiz programme was conducted for school children and a popular lecture was organized as part of this programme. Prof Kankan Bhattacharya, Chair Professor, Physical Chemistry, Indian Association for Cultivation of Science, Kolkata delivered a popular lecture on this occasion.

A structured workshop has also been organized in Mathematics jointly with Indian Academy of Sciences, Bangalore; Indian National Science Academy, New Delhi ; and National Academy of Sciences India, Allahabad for college students. Meritorious students of local government school were invited for special sensitization towards science programme. The faculty has also offered internship for students from other Universities/Colleges for carrying out their projects.

Distinguished Visitors

A large number of well-known Scientists and Academicions from abroad and within the country visited the Institute and they have given seminars or lectures and interacted with the faculty and the students. The eminent visitors are:

1 Prof Sir Anthony Leggett, 2003 Nobel Laureate in Physics, University of Illinois
2 Prof Roald Hoffmann, 1981 Nobel Laureate in Chemistry, Cornell University
3 Prof P Rama Rao, ARCI, Hyderabad
4 Prof Ashoke Sen, Harish Chandra Institute, Allahabad
5 Prof Sir Roger Penrose, Mathematical Institute, University of Oxford, UK
6 Prof Richard Packard, University of California, Berkeley
7 Prof Henry F Schaefer, University of Georgia
8 Prof S Chandrasekaran, IISc, Bangalore
9 Prof Pulickel M. Ajayan, Rice University, Houston, Texas
10 Prof Sankaran Subramanian, NIH, Bethesda, USA
11 Prof Vladimir I. Bregadze, Russian Academy of Sciences, Moscow

12 Prof Prasad L Polavarapu, Vanderbilt, USA
13 Prof S G Rajeev, University of Rochester, USA
14 Prof Anna Painelli, University of Parma, Italy
15 Prof Paul Dawson, University of Belfast, UK

Lectures, Colloquia and Seminars

Foundation Day Lecture

The institute celebrated its second foundation day on November 10, 2010. Prof P Rama Rao, ARCI, Hyderabad delivered the second foundation day lecture on "Glimpses of Materials History". The lecture traversed development, internal structure of materials of specific properties and present status of India in developing materials for this purpose.

Colloquia and Seminars

During the year, 14 colloquia and 63 seminars were organised in which many distinguished expert researchers and academicians delivered talks on contemporary research topics; the same are listed below

Colloquia

Speaker	Institute or Organisation	Title of the talk	Date
Prof Ashoke Sen	Harish-Chandra Research Institute, Allahabad	Search for a unified theory	11-02-2011
Prof Sir Anthony J. Leggett, Nobel Laureate	University of Illinois at Urbana-Champaign, USA	Why can't time run backwards?	01-02-2011
Prof Sir Roger Penrose	Mathematical Institute University of Oxford, UK	Seeing Through the, Big Bang into Another World	01-01-2011
Prof Roald Hoffmann, Nobel Laureate	Cornell University, Ithaca, NY, USA	The concept of a chemical bond	20-12-2010
Prof Richard Packard	University of California, Berkeley	Superfluid weak links; physics and applications	16-11-2010
Prof L S Shashidhara	Indian Institute of Science Education and Research, Pune	Behavioural adaptations and evolution	12-11-2010
Prof Henry F Schaefer	Graham Perdue Professor of Chemistry, Georgia University	GaN Nanorods	08-11-2010
Prof V Balakrishnan	Department of Chemistry, IIT Madras	Can You Hear The Shape of a Drum? A Revisit	21-10-2010
Prof Sunil Mukhi	Department of Theoretical Physics, TIFR, Mumbai	String Theory and The Superworld	24-09-2010
Prof T P Radhakrishnan	School of Chemistry, University of Hyderabad	Harmony of Metals and Polymers: Fabrication of Nanocomposites and their Applications	03-09-2010

Prof S Chandrasekaran	Department of Organic Chemistry, IISc, Bangalore	Organic Synthesis: Excitement, Challenges and Introspection	27-08-2010
Prof N Mohan Kumar	Department of Mathematics, Washington University, St. Louis, USA	Equations defining varieties	10-08-2010
Prof Nitin Nitsure	School of Mathematics, TIFR, Mumbai	Curvature and Topology of Surfaces	30-04-2010
Prof Bidyendu Mohan Deb	Indian Institute of Science Education and Research Kolkata	Glimpses Into Classical Indian Art	16-04-2010

Seminars

Speaker	Institute/Organisation	Title of the talk	Date
Prof A N Ramaprakash	IUCAA, Pune	Astronomy Ahead: Technology Challenges & Opportunities	17-03-2011
Prof Puspendu Kumar Das	Department of Inorganic and Physical Chemistry, IISc Bangalore	Chemical applications of second harmonic light scattering from solution	17-03-2011
Prof S Parameshwaran	Institute of Mathematical Sciences, Chennai	An invitation to algebraic topology	16-03-2011
Dr Anirban Banerjee	San Diego State University	Passport Across The Blood-Brain Barrier: The GBS Way	16-03-2011
Dr Kavita Babu	Harvard Medical School	Synaptic Plasticity at the C. elegans Neuromuscular Junction	15-03-2011
Dr Ajay Venugopal	Institute for Inorganic Chemistry, RWTH-Aachen, Germany.	Recent Developments in Organolanthanide Chemistry	14-03-2011
Prof V Venkataraman	Indian Institute of Science, Bangalore	Micro-patterned Polymer Devices for Biological Applications	11-03-2011
Dr Kaushik Dutta	DESY, Germany	Models of Inflation: New Developments	03-03-2011
Prof Hermann Nicolai	Director, Max Planck Institute for Gravitational Physics, Potsdam, Germany	Symmetry and Unification	01-03-2011
Prof Diptiman Sen	Centre for High Energy Physics, IISc, Bangalore	The Kitaev model	15-02-2011
Dr Ashish Mahabal	Caltech, USA	Transient Science: The New Astronomy	25-01-2011

Prof Ratnakumar P K	Harish Chandra Research Institute, Allahabad	On the convergence of Fourier series	19-01-2011
Prof S Vasudevan	Inorganic and Physical Chemistry Department,		
IISc, Bangalore	Sol-to-Gel Transition in Dispersions of Layered Solids		14-01-2011
Dr P Ajith	California Institute of Technology, USA	Coalescing compact binaries: From birth to death	06-01-2011
Dr George John	Department of Chemistry, City University of New York	Renewable Bioproducts -A Chemists' Perspective	04-01-2011
Dr Kavita Jain	JNCASR, Bangalore	Biological Evolution on correlated fitness landscapes	30-12-2010
Prof Pulickel M Ajayan	Mechanical Engineering and Materials Science Department Rice University, Houston, Texas	Engineering at the Nanoscale: Future and Challenges	27-12-2010
Dr Maria Entrialgo Castano	Materials Design, Germany	Computational Materials Science	17-12-2010
Dr Animesh Datta	University of Oxford	Quantum limited metrology in the real world	15-12-2010
Prof Sankaran Subramanian	National Institutes of Health Bethesda, USA	Pulsed EPR Imaging: Development and applications to tumor hypoxia	07-12-2010
Dr Ashavani Kumar	Oceanit Laboratories Inc., Honolulu, Hawaii- USA	Simple approaches for synthesis of hybrid nanomaterials and their applications	06-12-2010
Prof Vladimir I. Bregadze	A.N. Nesmeyanov Institute of Organoele-ment Compounds, Russian Academy of Sciences, Moscow	Boranes, Carboranes, Metallacarboranes: history, development, new results	06-12-2010
Prof Prasad L Polavarapu	Vanderbilt University, USA	Emergence and Applications of Chiroptical Spectroscopy	26-11-2010
Dr Sanil Unnikrishnan	IUCAA, Pune, India	Distinguishing Dark Energy Models with Large Scale Structures formation	24-11-2010

Prof Jean Cadet	Institut Nanosciences et Cryogénie /CEA/ Grenoble Grenoble, France. Department of Nuclear Medicine and Health Science, University of Sherbrooke, Québec, Canada	UVB and UVA radiation reactions of DNA in cells and human skin: photoproduct formation and repair	23-11-2010
Prof Bradley Smith	University of Notre Dame	Molecular Imaging	23-11-2010
Dr Sujith Vijay	University of Illinois Urbana Champaign	Glimpses of Ramsey Theory and Discrepancy Theory	18-11-2010
Prof Vijay Kumar	Department of Mathematics, Cochin University of Science and Technology, Cochin	Mathematics is everywhere	02-11-2010
Prof Mythily Ramaswamy	TIFR-CAM, Bangalore	Story of Maxima and Minima	01-11-2010
Dr Sandhya Kaushika	National Centre for Biological Sciences, Bangalore	Regulation of pre-synaptic vesicle transport	30-10-2010
Dr Parthasarathy Sampathkumar	Lily Biotechnology California	Centre, San Diego, Structures of T. burcei PEX5, M. tuberculosis ThyX, and PHR domains	28-10-2010
Prof Ajit Kembhavi	Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune	Supermassive black holes	19-10-2010
Prof Bernd Epe	University of Mainz	DNA damage induced by reactive oxygen species and its relevance for carcinogenesis	14-10-2010
Prof Kumaresan	University of Hyderabad, Hyderabad	A Confluence of Geometry, Linear Algebra and Analysis	08-10-2010
Prof P Gautam	Centre for Biotechnology, Anna University	Bioanalysis Using Porphyrin Derivatives	08-10-2010
Prof Ramakrishna Ramaswamy	School of Physical Sciences, JNU, New Delhi	Flavours of Synchrony in the Natural World	07-10-2010
Prof Jacqueline Belloni-Cofler	Laboratoire de Chimie Physique, Université Paris-Sud	Synthesis of Nanoparticles: Nucleation Mechanism and Properties	28-09-2010

Prof Paul Dawson	Centre for Nanostructured Media, Queen's University of Belfast, UK	Optical antenna structures for surface enhanced scattering	06-09-2010
Dr Sudipto Muhuri	Institute of Physics, Bhubaneswar	Lattice-gas model for by molecular active with vesicle transport motors opposite polarities	02-09-2010
Prof S G Rajeev	University of Rochester, USA	Charged Particles in a Magnetic Field	26-08-2010
Dr Rajesh Das	Singapore-MIT Alliance	Dissecting Malaria Parasite Egress From Infected Red Blood Cells Using Chemical Biology and Bio-Mechanics	19-08-2010
Dr Aldrin Antony	Grup d'Energia Solar, University of Barcelona, Spain	Current Trends in Thin Film Silicon Solar Cells: From Laboratory Cells to Industrial Modules	18-08-2010
Dr Vasudevan Nampoothiri	University of New Mexico, Albuquerque	Generation of laser pulses in the mid-infrared and THz spectral regions: principles and applications	13-08-2010
Dr Ram Mohan	Department of Chemistry, Illinois Wesleyan University, Bloomington	Environmentally Friendly Organic Synthesis Using Bismuth Compounds.	11-08-2010
Dr Anil K Thakur	University of Bordeaux, IMS Laboratory, France	Origin of the VOC in polymer-fullerene solar cells: A combined effect of charge transfer states and bimolecular radiative recombination	11-08-2010
Dr Babu Ponnusamy	Department of Medicinal Chemistry, University of Utah, Salt Lake City, USA	Glycomics of Cells of the Immune System	04-08-2010
Dr Shivakumar Vasanth	Laboratory of Respiratory Biology. National Institutes of Health, USA.	Cytoplasmic tail of Polycystin-1: Triggering a mechanosensory pathway in Polycystic Kidney Disease	02-08-2010
Dr P Ravindran	Center for Materials Science and Nano technology, University of Oslo, Norway.	Modelling of Metal Hydrides and Complex Hydrides	16-07-2010

Dr P Poulose	Indian Institute of Technology, Guwahati	Ideas in Electroweak Symmetry Breaking	02-07-2010
Dr Bobby Ezhuthachan	Harish-Chandra Research Institute, Allahabad	A Lagrangian for membranes	30-06-2010
Dr Suresh Valiyaveettil	National University of Singapore	What can we learn from eggshells?	19-06-2010
Dr Prasanth P Jose	University of California at Irvine	Computational Modeling of Materials	11-05-2010
Dr Santosh K Haram	University of Pune	Electrochemistry of Materials	05-05-2010
Prof Anna Painelli	Department of Chemistry, University of Parma, Italy,	How molecular functional materials respond to the environment: Solvation to cooperativity	04-05-2010
Prof Nitin Nitsure	School of Mathematics, TIFR, Mumbai	Determinants	29-04-2010
Dr Pravabati Chingangbam	KIAS, Seoul	Primordial non-Gaussianity in the CMB	23-04-2010
Dr R Rajesh	Institute of Mathematical Sciences, Chennai	Shock Propagation in a Granular Gas	22-04-2010
Dr Felix Kahle	Max Planck Soceity India	Basic research at the frontier of science	20-04-2010
Prof Bidyendu Mohan Deb	Indian Institute of Science Education and Research Kolkata	An Experiment in Nonlinear Dynamics	17-04-2010
Prof Bidyendu Mohan Deb	Indian Institute of Science Education and Research Kolkata	Being and Becoming : Imaginary-time and Real-time Dynamics of Quantum Systems	17-04-2010
Dr Unnikrishnan Pillai	Researcher Specialist Dow Corning Corporation, USA	World of Silicones	08-04-2010
Dr Prakash Koodathingal	Department of Molecular Genetics and Cell Biology University of Chicago, USA	Proofreading and Discard Mechanisms in pre-mRNA splicing	07-04-2010
Dr Sebastian C Peter	Department of Chemistry, Northwestern University	Synthesis and Structure - Property relationships in Intermetallic compounds	03-04-2010

8. Facilities

Laboratories

The Institute has created modern laboratory facilities equipped with sophisticated instruments to facilitate high quality research and teaching. The notable equipments are: SEM, Confocal Raman Spectrometer, Steady State and time resolved spectrophotometers, CD Spectrophotometer, HPLC, GCMS, CHN Analyser, AFM and STM Particle size Analyzer, DNA Synthesizer, Peptide Synthesizer, Ultrafast Laser System etc.

During the year 2010-11, 28 high-end equipments valuing more than Rs 15 lakh have been procured that include NMR Spectrophotometer, Zeta Potential Analyzer, Thermal Galvanometer Analyzer, Differential Scanning Calorimeter, RT-PCR, Ultra-Centrifuge, Micro Ultra Centrifuge, Refrigerated Centrifuge, Spectroscopy Package and Linear Ingass Sensor, Parameter Anlayser, Flowcytometer, Inverted Microscope, Motorized Microscope, QTH Measurement System, Crystal X-Ray Diffractometer, Femtosecond Transient Absorption System, Ultrafast Amplifier System, Multipurpose Growth Chamber, Fully Automated Volumetric Gas Analyzer, Protein Purification Systems, Cryostat.

Library

Library of IISER Thiruvananthapuram is growing fast to meet the academic and research needs. Library adopts state of the art technologies to facilitate access to online and print resources to its users.

The library possess more than 5000 books, monographs and conference proceedings in Physics, Chemistry, Mathematics, Biology, Computer Science and other interdisciplinary areas.

The major international journals and online resources in Physics, Chemistry, Biology, Mathematics and related specializations and interdisciplinary areas have been subscribed.

The Library's extensive electronic resources include full text e-journal databases, journal archives, e-books, and bibliographic databases, standards which are useful for the academic and research activities of the IISER community.

Full-text e-Journals and Archives that include the publications of more than 30 international societies, institutes and scientific publishers and around 10000 E-books have been subscribed during 2010-11.

Library has memberships/affiliations in national bodies like INDEST & UGCINFONET.

During 2010-11 the institute with the other IISERs initiated the IISER Library Consortium for collective efforts to subscribe electronic resources to maximize benefits and also for mutual cooperation. Through these initiatives IISER Thiruvananthapuram is subscribing e-resources from publishers like Oxford University Press, Cell Press, Royal Society, Project Euclid, World Scientific, Thieme etc. at a much reduced pricing and with better terms and conditions.

Computing and Networking Facility

The institute has efficient IT resources and internet capability. The Computer Lab has over 50 workstations. Three Linux based computational clusters with 96, 64 and 128 cores respectively are available with scientific computing software viz. MATLAB, SCILAB, Mathematica, Gaussian 09, TURBOMOLE, ADF and BAND COSMO.

During 2010-11, the institute joined the National Knowledge Network (NKN) with 1Gbps uplink. NKN connects all the research/educational institutes in India and provides Internet connectivity. As part of the NKN project, a virtual class room facility is being set up in the transit campus itself that can use the 1Gbps bandwidth to host and receive real time, interactive, classes and lectures to and from other institutions including the four other IISERs.

Hostels

The Institute provides hostel facilities to the students. In the third year of the establishment of the Institute, two additional buildings in the vicinity of the present campus were taken on rent for housing all the boys students of the 5 year integrated BS-MS dual degree and Ph.D. Programme. In all, 6 buildings hired on rent are used as Hostels.

9. Sports and Cultural Activities

Sports

The institute provides basic sports facilities to the students in the transit campus facilities and a badminton court was constructed in the transit campus. The Institute makes use of the facilities of College of Engineering for conducting sports events. Annual sports were also organized in August, 2010.

Cultural Activities

The cultural club of the institute organized various events throughout the academic year. Independence Day and Republic Day were celebrated with the Director hoisting the national flag and the students from various years singing patriotic songs.

Onam was celebrated on 28th Aug 2010. Various cultural programs like the re-enactment of the story of Vamana and King Mahabali, traditional "pulikali" and "thirvathira" dances were conducted by the students. The Onam celbrations also included a delicious Sadya, a traditional feast organized by the IISER mess while the students sang various traditional Onam songs. Holi was celebrated on 19 March 2011. The cultural club organized a trip to Vithura and the students celebrated Holi in the future site of the campus with full vigour.

Institute's cultural festival, Ishya was held on the 25th, 26th and 27th of March 2011. Various events like creative writing, debate and antakshari were conducted with full participation from the student body. Ishya culminated on the 27th evening with stage performances by students - dances, dramas, songs etc

The Film club organizes screening of movies at regular intervals.

The student's in-house magazine SOPANAM was also published.

10. Permanent & Transit Campus

Permanent Campus

The institute's fully residential permanent campus is under development in 200 acres of land made available by Government of Kerala at Vithura Panchayat in Nedumangad Taluk about 40 km from Thiruvananthapuram. The campus is located in the lower terrain of Ponmudi Hill region and is dotted with smaller and larger hills, and borders reserve forest and private plantations.

The master plan has been prepared taking maximum advantages of the terrain features and provisioning for future expansion. The campus is being developed taking into account green building concepts to achieve four star rating as per GRIHA (Green Rating for Integrated Habitat Assessment) incorporating energy conservation, rain water harvesting, waste water recycling, solar power systems etc. The development of campus is being done with minimum foot print and retaining maximum green cover.

The total built-up area of the campus master plan is 117000 sq m. The major facilities provided in the master plan include:

Academic Complex: Biological Sciences Block, Physical Sciences Block, Chemical Sciences Block, Mathematical Science Block, Humanities Block, Administrative Block, Lecture Theatre Complex, Computer Centre, Common Instrumentation & Workshop, Animal House and Solvent Store

Hostels & Residences: Planned for about 1500 students, 150 faculty and 200 staff. Men's Hostel Cluster, Women Hostel Cluster, PhD Men's Hostel cluster, Central Dining Hall, Director's Residence, Type A,B,C,D,E Residential Quarters for Faculty & Staff, Guest House and Health Centre

Recreation & Utilities: Indoor Stadium & Sports ground, Tennis Courts, Students and Faculty Clubs, Campus School, Shopping Centre and Health Centre

Engineering Services: Main Electricity receiving station & 3 other substations, Pump house and Underground Reservoir, Sewage & Effluent Treatment Plants

The construction of campus is being undertaken in two phases, with the first phase having 57000 sq m built-up area has commenced with the award of work contract in March, 2011. The construction work of the remaining built-up area is also to be commenced in 2012.

Progress of Campus Project

(a) **Land acquired for approach and access:** In 2010-11, the State Government acquired 1.12acres of land and handed over for the main approach road to the campus. Another 0.42 acres of land was purchased for widening the road leading to residential area.

(b) **Statutory Clearances:** Statutory clearances and consents under Environment (Protection) Act, 1986 and water and air pollution control acts have been obtained from Ministry of Environment & Forests, Govt. of India and Kerala State Pollution Control Board. Clearance under town planning regulations has also been obtained from Chief Town Planner and the Vithura Grama Panchayat.

(c) **Project Consultancy Contracts:** Master Plan, Architectural and Engineering Design Consultancy for the entire campus at Vithura by M/s. Consulting Engineering Services (India) Ltd, New Delhi at an estimated cost of Rs 743 lakh is under progress with 25% of the consultancy work done in 2010-11. Project Management Consultancy (PMC) Services for Phase I of setting up of the institute campus at Vithura has been awarded to M/s. Gherzi Eastern Ltd, Chennai at an estimated cost of Rs. 189 Lakhs and the work has commenced.

(d) **GRIHA Registration:** With GRIHA (Green Rating for Integrated Habitat Assessment) registration on 25.02.2010, the involvement and monitoring of GRIHA Secretariat started from design phase for ensuring the stringent green building norms. The team from GRIHA Secretariat and the TERI visited the site for conducting their preliminary inspection.

(e) **Power Allocation for campus:** 6 MVA Electricity power supply for the campus has been arranged from Kerala State Electricity Board (KSEB). KSEB commenced the works for commissioning 33 KV sub-station in the campus by underground cable from their 110 KV substation, Nedumangad to the campus at Vithura with necessary take off and terminal arrangements at a cost of Rs. 970.61 lakh.

(f) Work for Phase-I: Construction of Buildings, (Academic Complex & Residential Complex) related infrastructure and site development works (phase-I) was awarded to M/s Consolidated Construction Consortium Ltd, New Delhi for an estimated amount of Rs. 25316.61 lakh with commencement date of work being 24th March, 2011 and completion period of 18 months.

(g) Other Works: A small project office has been constructed at cost of Rs 39 lakh to undertake campus development works. Construction of internal roads in the campus has been undertaken at an estimated cost of Rs 293.83 lakh and 80% work was completed in 2010-11.

Transit Campus

To keep up the pace of academic and research activities of the institute, the transit campus in the College of Engineering Trivandrum (CET) and several hired premises for hostels and project office are being utilized with the necessary expansion and augmentation of utility and service installations for class-rooms, research and teaching labs and the offices. Two classrooms and office space for faculty with total built up area of 375 sq m at cost of Rs 25 lakh have been added in the CET premises with the consent of the college authorities for the growing student strength with admissions in 2010 and 2011 and the new faculty members. A housing facility for NMR instrumentation has also been constructed.

STATEMENT OF ACCOUNTS

The Annual Statement of Accounts of IISER, Thiruvananthapuram for the year 2010-11 consists of:

Balance Sheet with schedules forming part of Balance Sheet;
Income and Expenditure Account with supporting Schedules; and
Receipt and Payment Account

A Grant-in-Aid of Rs.90.00 Crore was sanctioned by the Ministry of Human Resource Development, Government of India vide Sanction F.No.38-08/2010-TS.V dated 30.04.2010, 03.08.2010, 24.12.2010 & 07.03.2011 during the year 2010-11.

Income from other sources as Scholarship & Fellowship under KVPY, CSIR and INSPIRE Programme of DST, Examination Fees, Interests etc., aggregated to Rs.0.85 Crore.

Total Expenditure of the institute during the year 2010-11 is Rs.29.60 Crore as under:

Expenditure on Salary	-	Rs.4.87 Crore
Non Salary expenditure	-	Rs.7.87 Crore
Capital expenditure	-	Rs.16.86 Crore

Separate Audit Report of the Comptroller & Auditor General of India on The accounts of the Indian Institute of Science Education and Research Thiruvananthapuram for the year ended 31 March 2011

(Communicated vide Letter No.OA/AB/7-21/SAR/IISER/2011-11/151 dated 4/7.10.2011)

We have audited the attached Balance Sheet of Indian Institute of Science Education and Research, Thiruvananthapuram as at 31 March 2011 and the Income & Expenditure Account / Receipts & Payment Account for the year ended on that date under Section 20(1) of the Comptroller & Auditor General's (duties, Powers & Conditions of Service) Act, 1971 read with Regulation 16(2) forming part of Memorandum of Association of the Institute. The audit has been entrusted for the period upto 2012-2013. These financial statements are the responsibility of the Institute's management. Our responsibility is to express an opinion on these financial statements based on our audit.

2. This Separate Audit Report contains the comments of the Comptroller & Auditor General of India (CAG) on the accounting treatment only with regard to classification, conformity with the best accounting practices, accounting standards and disclosure norms, etc. Audit observations on financial transactions with regard to compliance with the Law, Rules & Regulations (Propriety and Regularity) and efficiency-cum-performance aspects etc., if any, are reported through Inspection Reports / CAG's Audit Reports separately.

3. We have conducted our audit in accordance with auditing standards generally accepted in India. These standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements. An audit includes examining, on a test basis, evidences supporting the amounts and disclosure in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of financial statements. We believe that our audit provides a reasonable basis for our opinion.

4. Based on our audit, we report that:

   i. We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purpose of our audit:

   ii. The Balance Sheet and Income & Expenditure Account / Receipt & Payment Account dealt with by this report have been drawn up in the format approved by the Ministry of Finance,

Government of India under Regulation 16.1 forming part of Memorandum of Association of the Institute.

   iii. In our opinion, proper books of accounts and other relevant records have been maintained by the Indian Institute of Science Education and Research, Thiruvananthapuram as required under Regulation 16.1 forming part of Memorandum of Association of the Institute in so far as it appears from our examination of such books.

   iv. We further report that:

A Grants in Aid

Out of the grants in aid of Rs.91.59 crore received during the year (including the opening balance of Rs. 1.59 crore), the organisation could utilise a sum of Rs. 28.70 crore leaving a balance of Rs. 62.89 crore as unutilised grant as on 31 March 2011.

B Management letter

Deficiencies which have not been included in the Audit Report have been brought to the notice of the Director, Indian Institute of Science Education and Research, Thiruvananthapuram through a management letter issued separately for remedial / corrective action.

v. Subject to our observations in the preceding paragraphs, we report that the Balance Sheet and Income & Expenditure Account / Receipt & Payment Account dealt with by this report are in agreement with the books of accounts.

vi. In our opinion and to the best of our information and according to the explanations given to us, the said financial statements read together with the Accounting Policies and Notes on Accounts, and subject to the significant matters stated above and other matters mentioned in Annexure I to this Audit Report give true and fair view in conformity with accounting principles generally accepted in India.

a. In so far as it relates to the Balance Sheet, of the state of affairs of the Indian Institute of Science Education and Research, Thiruvananthapuram as at 31 March 2011; and

b. In so far as it relates to Income & Expenditure Account of the deficit for the year ended on that date.

For and on behalf of the C & AG of India
Sd/-
Principal Accountant General (C&CA), Kerala

Place: Thiruvananthapuram
Date : 7 October 2011

Annexure I

1. **Adequacy of Internal Audit System**

   No internal audit system is in force.

2. **Adequacy of Internal Control System**

   The institute has not so far prepared an Accounting Manual.

3. **System of Physical Verification of Assets**

   The institute has not maintained updated Fixed Assets Register indicating location wise details of assets held. So, effective physical verification of assets was not carried out.

4. **System of Physical Verification of Inventory**

   Not applicable

5. **Regularity in payment of Statutory Dues**

   The institute is regular in payment of statutory dues.

Sd/-
Dy.Accountant General (Central Expenditure)

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH , THIRUVANANTHAPURAM
BALANCE SHEET AS AT 31ST MARCH 2011

CORPUS/ CAPITAL FUND AND LIABILITIES	Schedule	Amount in Rs.	
		Current Year 2010-11	Previous Year 2009-10
CORPUS/CAPITAL FUND	1	34,41,06,025	23,46,77,281
RESERVES AND SURPLUS			
EARMARKED/ ENDOWMENT FUNDS			
SECURED LOANS AND BORROWINGS			
UNSECURED LOANS AND BORROWINGS			
DEFERRED CREDIT LIABILITIES			
CURRENT LIABILITIES AND PROVISIONS	7	2,39,27,078	72,86,812
UNSPENT BALANCE OF GRANT	26	63,14,99,915	1,89,67,433
UNSPENT BALANCE OF EXTERNAL PROJECTS	27	68,45,742	16,70,345
TOTAL		**1,00,63,78,760**	**26,26,01,871**
ASSETS			
FIXED ASSETS	8	33,11,57,022	15,25,91,904
INVESTMENTS-FROM EARMARKED/ ENDOWMENT FUNDS			
INVESTMENTS-OTHERS			
CURRENT ASSETS, LOANS, ADVANCES ETC.	11	67,52,21,738	11,00,09,967
MISCELLANEOUS EXPENDITURE			
(to the extent not written off or adjusted)			
TOTAL		**1,00,63,78,760**	**26,26,01,871**
SIGNIFICANT ACCOUNTING POLICIES	24		
CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS	25		

Sd/-
B.V.RAMESH
ASST. REGISTRAR (F&A)

Sd/-
P.N.MOHANAN
CONSULTANT (F&A)

Sd/-
BHARAT JYOTI
REGISTRAR

Sd/-
PROF E.D.JEMMIS
DIRECTOR

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM
INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/YEAR ENDED 31.03.2011

	Schedule	Current Year	Previous Year
			(Amount in Rs.)
INCOME			
Income from Sales / Services			
Grants/Subsidies	13	12,73,66,136	4,44,85,387
Fees/Subscriptions	14	22,55,600	12,19,200
Income form Investments (Income on Invest. from earmarked/endowment funds transferred to Funds)			
Income from Royalty, Publication etc.	16	72,867	18,861
Interest Earned	17	83,15,567	33,36,762
Other Income	18	40,64,410	19,57,738
Depreciation Written Back			3,26,49,290
Prior Period income		8,100	
Increase/(decrease) in stock of Finished goods an works-in-progress			
TOTAL (A)		**14,20,82,680**	**8,36,67,238**
EXPENDITURE			
Establishment Expenses	20	4,86,75,057	2,36,02,048
Other Administrative Expenses etc.	21	8,50,92,056	2,32,77,809
Expenditure on Grants, Subsidies etc.			
Interest			
Project Expenses	28		8,01,329
Depreciation (Net Total at the year-end-corresponding to Schedule8)		6,67,50,525	3,26,49,290
TOTAL (B)		**20,05,17,638**	**8,03,30,476**
Balance being excess of Income over Expenditure (A-B)		**-5,84,34,958**	**33,36,762**
Transfer to Special Reserve (Specify each)			
Transfer to/ from General Reserve			
BALANCE BEING SURPLUS/(DEFICIT) CARRIED TO CORPUS / CAPITAL FUND		**-5,84,34,958**	**33,36,762**
SIGNIFICANT ACCOUNTING POLICIES	24		

Sd/-
B.V.RAMESH
ASST. REGISTRAR (F&A)

Sd/-
P.N.MOHANAN
CONSULTANT (F&A)

Sd/-
BHARAT JYOTI
REGISTRAR

Sd/-
PROF E.D.JEMMIS
DIRECTOR

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

RECEIPTS AND PAYMENTS FOR THE PERIOD/YEAR ENDED 31.03.2011

Amount in Rupees

RECEIPTS	CURRENT YEAR	PREVIOUS YEAR	PAYMENTS	CURRENT YEAR	PREVIOUS YEAR
I. Opening Balance			I. Expenses		
a) Cash in hand	1,44,345	62,549	a) Establishment Expenses		
b) Bank Balances			Corresponding to Sch.20	3,80,12,139	1,76,11,514
i) In current accounts			b) Administrative Expenses		
Canara Bank	1,23,33,398	-65,61,831	Corresponding to Sch.20	13,42,00,025	2,19,13,851
Flexi Accounts	8,85,00,000	4,83,53,374			
ii) In deposit accounts	3,55,000				
iii) Savings accounts					
a) SB Travancore	35,84,901				
b) Canara Bank Project A/c	17,14,259				
II. Grants Received			II.Payments made against		
Funds for various projects	44,80,030				
a) From Govt. of India	90,00,00,000	25,00,00,000			15,94,714
b) From State Government					
c) From other sources (details)					
DST	50,00,000	49,04,000			
CSIR	15,42,176	6,21,663			
KVPY	11,95,000	9,25,700			
UGC	8,03,110				
External Projects incldg.Int.	1,01,60,942	32,65,059			
III. Income on Investments from			III. Investments and deposits made		
a) Earmarked/Endow. Funds			a) Out of Earmarked/Endowment funds		
b) Own Funds ()th. Investment)			b) Out of Own Funds (Investments-Others)		
IV. Interest Received			IV. Expenditure on Fixed Assets & Capital		
a) On Bank deposits	62,71,133	29,96,269	Work-in-Progress		
b) Loans. Advances etc.			a) Purchase of Fixed Assets	21,79,65,834	15,07,03,520
			b) Expenditure on Capital		
V. Other Income (Specify)	43,19,211	23,76,836	Work-in-Progress	2,42,78,474	
			V. Refund of surplus money/Loans		
VI. Amount Borrowed			a) To the Government of India		
			b) To the State Government		
VII. Any other receipts	10,77,742	10,36,954	c) To other providers of funds		
			VI. Finance Charges (Interest)		
			VII. Other Payments	90,02,057	95,25,071
			VIII. Closing Balances		
			a) Cash in hand	66,212	1,44,345
			b) Bank Balances		
			i) In current accounts		
			Canara Bank Account	19,87,259	1,23,33,398
			Flexi/ Fixed Deposit	0	8,85,00,000
			ii) In Deposit Accounts		
			a) Fixed Deposit with SBT	9,87,408	3,55,000
			b) Fixed Deposit with Canara Bank	15,07,03,549	
			iii) Savings Accounts		
			a)Canara Bank SB Account	44,07,78,853	
			b)SBT SB Account	71,44,206	35,84,901
			c)Canara Bank Project A/c	73,95,171	17,14,259
	1,03,70,01,217	**30,79,80,573**		**1,03,70,01,217**	**30,79,80,573**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31.03.2011

SCHEDULE 1- CORPUS/CAPITAL FUND:

(Amount-Rs.)

	Current Year		Previous Year	
Balance as at the beginning of the year		234677281		28814923
(+) Add: Contributions towards Corpus /Capital Fund				
Amount utilised for acquiring capital asset	246154184		157662370	
Amount Committed for Lab Equipment and Library Books	246154184	77512516	235174886	
(-) Less: Depreciation provided for the				
above mentioned item written back	32649290			
(-) Less: WDV of Fixed Assets acquired out of Project Grants in the previous year	733881			
(-) Less: Interest acquired from Project grant in the previous year	44085			
(-) Amount Committed for Lab Equipment & Library Books in the Previous Year	77512516	78290482		
Add/(Deduct): Balance of Net income/ (expenditure)	-58434958		3336762	
Transferred from the Income and Expenditure Account				
BALANCE AT THE YEAR-END		**344106025**		**234677281**

SCHEDULE 7- CURRENT LIABILITIES AND PROVISIONS

	Current Year	Previous Year
A. CURRENT LIABILITIES		
1. Acceptances		
2. Sundry Creditors:		
a) For Goods		
b) Others	21624596	5302359
3. Advances Received		
4. Interest accrued but not due on:		
a) Secured Loans/borrowings		
b) Unsecured Loans/borrowings		
5. Statutory Liabilities:		
a) Overdue		
b) Others	477200	470908
6. Other current Liabilities	1825282	1513545
Total (A)	**23927078**	**7286812**
B. PROVISIONS		
1. For Taxation		
2. Gratuity		
3. Superannuation/Pension		
4. Accumulated Leave Encashment		
5. Trade Warranties/Claims		
6. Others (Specify)		
Total (B)		
Total (A+B)	**2,39,27,078**	**72,86,812**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH, THIRUVANANTHAPURAM
SCHE DULES FORMING PART OF BALANCE SHEET AS AT 31.03.2011
SCHEDULE 8- FIXED ASSETS of MAIN ACCOUNT

DESCRIPTION	Gross Block					Depreciation				Net Block		
	Cost/valuation As at beginning of the Year	Additions during the year		Total Additions	Deductions during the year	Cost/ valuation at the Year-end	Rate of Depre-ciation	As at the beginning of the year	On Additions During The year	On Deduc-tions During the year	Total up to the year-end	As at the current year-end	As at the previous year-end
		Before 1.10.2010	After 30.09.2010										
FIXED ASSETS:													
LAND:													
a) Freehold													
Land obtained from Govt.	1					1						1	1
Vithura			930,506	930,506		930,506						930,506	
b) Leasehold													
BUILDINGS:													
a) On Freehold Land											0	0	
Vithura	16,726,858	4,511,267	72,671	4,583,938		21,310,796	10%	1,495,701	1,977,876		3,473,577	17,837,219	15,231,157
CET Campus (Transit)	10,687,355	251,974	3,666,748	3,918,722		14,606,077	10%	977,769	1,179,493		2,157,262	12,448,815	9,709,586
b) On Leasehold Land													
c) Ownership Flats/Premises													
d) Superstructures on Land not belonging to the entity													
GENERATOR SET	1,218,323			0		1,218,323	15%	249,296	145,354		394,650	823,673	969,027
ELECTRIC INSTALLATIONS	4,726,078	258,247	2,722,104	2,980,351		7,706,429	10%	428,649	591,673		1,020,322	6,686,107	4,297,429
INTERIOR FURNISHING	486,032	67,950	106,325	174,275		660,307	10%	51,708	55,544		107,252	553,055	434,324
FURNITURE, FIXTURES,	8,915,219	1,803,239	4,341,413	6,144,652		15,059,871	10%	1,029,156	1,186,001		2,215,157	12,844,714	7,886,063
LAB FIXTURES	1,608,572					1,608,572	10%	234,617	137,396		372,013	1,236,559	1,373,955
LAB EQUIPMENT	60,446,443	17,568,765	134,087,970	151,656,735	104,660	211,998,518	15%	5,554,626	20,909,986		26,464,612	185,533,906	54,891,817
TUTORIAL EQUIPMENTS	82,016	56,586	47,949	104,535		186,551	15%	17,531	21,757		39,288	147,263	64,485
OTHER EQUIPMENTS	3,223,673	739,506	2,894,658	3,634,164		6,857,837	15%	543,752	730,013		1,273,765	5,584,072	2,679,921
HOSTEL KITCHEN EQUIPMENTS	325,694			0		325,694	15%	74,319	37,706		112,025	213,669	251,375
LIBRARY EQUIPMENT	28,611					28,611	15%	6,116	3,374		9,490	19,121	22,495
LIBRARY BOOKS	9,088,955			0		9,088,955	60%	3,752,882	3,201,644		6,954,526	2,134,429	5,336,073
BOOKS & PERIODICALS	2,965	2,144,920	1,483,347	3,628,267		3,631,232	60%	2,184	1,732,425		1,734,609	1,896,623	781
LIBRARY JOURNALS	42,032,022	1,715,936	24,722,177	26,438,113		68,470,135	60%	13,329,939	25,667,465		38,997,404	29,472,731	28,702,083
COMPUTER/PERIPHERALS	10,914,268	3,676,988	4,927,673	8,604,661		19,518,929	60%	6,157,606	6,538,492		12,696,098	6,822,831	4,756,662
SOFTWARE	6,496,924	99,692	369,617	469,309		6,966,233	60%	2,528,680	2,551,647		5,080,327	1,885,906	3,968,244
VEHICLES - MOTOR CAR	701,044					701,044	15%	149,848	82,679		232,527	468,517	551,196
TOTAL OF CURRENT YEAR CAPITAL WORK-IN P	**177,711,053**	**32,895,070**	**180,373,158**	**213,268,228**	**104,660**	**390,874,621**		**36,584,379.00**	**66,750,525.00**		**103,334,904.00**	**287,539,717.00**	**141,126,674.00**
ROGRESS												**43,617,305**	**10,731,349**
TOTAL													

Date to be given as to cost of assets on hire purchase basis included above

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH, THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31.03.2011

SCHEDULE 11- CURRENT ASSETS, LOANS, ADVANCES ETC

(Amount-Rs.)

	Current Year	Previous Year
A. CURRENT ASSETS:		
1. Inventories:		
a) Stores and Spares		
b) Loose Tools		
c) Stock-in-trade		
Finished Goods		
Work-in-progress		
Raw Materials		
2. Sundry Debtors:		
a) Debts Outstanding for a period exceeding six months		
b) Others		
3. Cash balances in hand (including cheques/drafts and imprest)	66,212	1,44,345
4. Bank Balances:		
Main A/c		
a) With Scheduled Banks:		
-On Current Accounts	19,87,259	10,08,33,398
-On Deposit Accounts (includes margin money)	15,16,93,968	14,66,349
-On Savings Accounts	44,79,23,059	35,84,901
b) With non-Scheduled Banks:		
-On Current Accounts		
-On Deposit Accounts		
-On Savings Accounts		
Project A/c		
a) With Scheduled Banks:		
-On Current Accounts		
-On Deposit Accounts (includes margin money)		
-On Savings Accounts	73,95,171	17,14,259
b) With non-Scheduled Banks:		
-On Current Accounts		
-On Deposit Accounts		
-On Savings Accounts		
5. Post Office- Savings Accounts	60,90,65,669	10,77,43,252
B. LOANS, ADVANCES AND OTHER ASSETS		
1. Loans:		
a) Staff (Motor Car Advance)	1,80,000	
b) Other Entities engaged in activities/objectives similar to that of the Entity		
c) Other (specify)		
2. Advances and other amounts recoverable in cash or in kind or for value to be received		
a) On Capital Account		
b) Prepayments	6,04,30,519	10,06,990
c) Others 3,35,050	17,000	
3. Income Accrued:		
a) On Investments from Earmarked/Endowment Funds		
b) On Investments-Others		
c) On Loans and Advances		
d) Others	27,81,934	7,37,500
(includes income due unrealized-Rs.....)		
4. Claims Receivable	24,28,566	5,05,225
TOTAL (B)	**6,61,56,069**	**22,66,715**
TOTAL (A+B)	**67,52,21,738**	**11,00,09,967**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH, THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT
FOR THE PERIOD/YEAR ENDED 31.03.2011

SCHEDULE 13- GRANTS/SUBSIDIES
(Irrevocable Grants & Subsidies Received)

	Current Year		Previous Year	
1) Central Government				
Revenue Grant				
Main A/c				
Opening Unspent Grant	1,89,67,433		4,05,41,629	
Add: Grant Received during the year				
MHRD	90,00,00,000		25,00,00,000	
DST	50,00,000		49,04,000	
CSIR	15,42,176		6,21,663	
KVPY	11,95,000		9,65,700	
UGC	8,03,110		0	
	92,75,07,719		**29,70,32,992**	
Less: Capital Expenses Incurred during the year-				
MHRD	24,61,54,184		15,68,68,985	
	68,13,53,535		**14,01,64,007**	
Less: Amount Committed for Lab Equipment and				
Library Books			7,75,12,516	
	68,13,53,535		**6,26,51,491**	
Less: Closing Unspent balance of grant	63,14,99,915		1,89,67,433	
		4,98,53,620		4,36,84,058
Add: Amount committed for Lab Eqpt. & Lib. Books in				
previous year	7,75,12,516	12,73,66,136	0	4,36,84,058
PROJECT ACCOUNT				
Grant Received during the year			32,65,059	
Less: Capital Expenses Incurred during the year			7,93,385	
Less: Closing Unspent balance of grant		0	16,70,345	8,01,329
2) State Government(s)				
3) Government Agencies				
4) Institutions/Welfare Bodies				
5) International Organisations				
6) Others (Specify)				
TOTAL		**12,73,66,136**		**4,44,85,387**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT
FOR THE PERIOD/YEAR ENDED 31.03.2011

SCHEDULE 14- FEES/SUBSCRIPTIONS

(Amount-Rs.)

	Current Year	Previous Year
1) Onetime Fees	57,200	46,900
2) Annual Fees/Subscriptions	21,98,400	11,72,300
3) Seminar/Program Fees		
4) Consultancy Fees		
5) Others (Specify)		
TOTAL	**22,55,600**	**12,19,200**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT
FOR THE PERIOD/YEAR ENDED 31.03.2011

SCHEDULE 16- INCOME FROM ROYALTY, PUBLICATION ETC.

Amount in Rupees

	Current Year	Previous Year
1) Income from Royalty- Royalty for River Sand	72,867	18,861
2) Income from Publications		
3) Others (specify)		
TOTAL	**72,867**	**18,861**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT
FOR THE PERIOD/YEAR ENDED 31.03.2011

SCHEDULE - 17 INTEREST EARNED

	Current Year	Previous Year
Main A/c		
1) On Term Deposits:		
a) With Scheduled Banks	82,37,417	32,63,485
b) With Non-Scheduled Banks		
c) With Institutions		
d) Others		
2) On Savings Accounts:		
a) With Scheduled Banks	78,150	29,192
b) With Non-Scheduled Banks		
c) With Institutions		
d) Others		
3) On Loans:		
a) Employees/Staff		
b) Others		
4) Interest on Debtors and Other Receivables		
Project A/c		
1) On Term Deposits:		
a) With Scheduled Banks	0	44,085
b) With Non-Scheduled Banks		
c) With Institutions		
d) Others		
2) On Savings Accounts:		
a) With Scheduled Banks		
b) With Non-Scheduled Banks		
c) With Institutions		
d) Others		
3) On Loans:		
a) Employees/Staff		
b) Others		
4) Interest on Debtors and Other Receivables		
TOTAL	**83,15,567**	**33,36,762**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/YEAR ENDED 31.03.2011

SCHEDULE 18- OTHER INCOME

(Amount-Rs.)

	Current Year	Previous Year
1) Profit on Sale/disposal of Assets:		
a) Owned assets		
b) Assets acquired out of grants, or received free of cost		
2) Export Incentives realized		
3) Fees for Miscellaneous Services		
4) Miscellaneous Income	4064410	1957738
TOTAL	**4064410**	**1957738**

SCHEDULE 20 ESTABLISHMENT EXPENSES

	Current Year	Previous Year
a) Salaries and Wages	48675057	23602048
b) Allowances and Bonus		
c) Contribution to Provident Fund		
d) Contribution to Other Fund (specify)		
e) Staff Welfare Expenses		
f) Expenses on Employees Retirement and Terminal Benefits		
g) Others (specify)		
TOTAL	**48675057**	**23602048**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/YEAR ENDED 31.03.2011

SCHEDULE 21- OTHER ADMINISTRATIVE EXPENSES ETC.

(Amount-Rs.)

	Current Year	Previous Year
a) Purchases	-	-
b) Labour and processing expenses	-	-
c) Cartage and Carriage Inwards	-	-
d) Electricity and power	5,44,317	3,27,112
e) Water charges	1,17,357	74,006
f) Insurance		
g) Repairs and maintenance	9,19,959	3,04,090
h) Excise Duty		
i) Rent, Rates and Taxes	56,90,696	18,19,451
j) Vehicles Running and Maintenance	1,12,071	1,08,635
k) Postage, Telephone and Communication Charges	11,49,859	4,92,510
l) Printing and Stationary	12,03,985	3,15,196
m) Travelling and Conveyance Expenses	14,70,067	29,85,442
n) Expenses on Seminar/Workshops	30,13,513	10,71,631
o) Subscription Expenses	25,000	5,000
p) Expenses on Fees- Library Journals		
q) Auditors Remuneration	51,490	51,490
r) Hospitality Expenses		
s) Professional Charges	54,000	
t) Provision for Bad and Doubtful Debts/Advances		
u) Irrecoverable Balances Written-off		
v) Packing Charges		
w) Freight and Forwarding Expenses		
x) Distribution Expenses		
y) Advertisement and Publicity	41,87,140	20,59,007
z) Others (specify)	6,65,52,602	1,36,64,239
TOTAL	**8,50,92,056**	**2,32,77,809**

SCHEDULE 24 - SIGNIFICANT ACCOUNTING POLICIES

1. Accounting convention:

The accompanying financial statements are prepared on Historical Cost Convention.

2. Fixed Assets:

Cost of Assets acquired out of Grant from Government of India is credited to General Fund.

3. Closing Stock:

Items issued to labs are treated as consumed and hence Closing Stock of Lab Consumables/Chemicals is taken as NIL.

4. Depreciation:

Depreciation on Fixed Assets has been charged under Written Down Value Method at rates specified as per the Income Tax rates. Assets put to use for more than 180 days has been depreciated at full rate and assets put to use for less than 180 days has been depreciated @ 50% of said rates.

5. Grant in aid:

- Grant-in-aid received from Government of India, amounting Rs.90,00,00,000/- during the year 2010-11 has been credited to the General Fund to the extent of amount spent for Capital expenditure and credited to the Income & Expenditure Account to the extent of amount utilised for Revenue expenditure.
- Grant-in-aid received from DST amounting to Rs. 50,00,000/- has been credited to Income & Expenditure account to the extent of amount utilised for Revenue expenditure.
- Grant-in-aid received from CSIR amounting to Rs. 15,42,176/- has been credited to Income & Expenditure account to the extent of amount utilised for Revenue expenditure.
- Grant-in-aid received from KVPY amounting to Rs. 11,95,000/- has been credited to Income & Expenditure account to the extent of amount utilised for Revenue expenditure.
- Grant-in-aid received from UGC amounting to Rs. 8,03,110/- has been credited to Income & Expenditure account to the extent of amount utilised for Revenue expenditure.

6. Interest on Flexi / Fixed Deposits & Term deposits:

Interest on flexi / fixed deposits has been credited in the accounts on Accrual basis.

SCHEDULE 25 - NOTES ON ACCOUNTS

1. The land (approx 200 acres in Jersey Farm, Vithura, Karipur Village, Nedumangad Taluk, Thiruvananthapuram District) has been given by Government of Kerala at free of cost and hence recorded at nominal value in the accounts as per Accounting Standard: 12 - Accounting for Government Grants.

2. The construction works done at CET Campus which were completed are capitalized. Permanent infrastructure assets created in the temporary premises located in CET Campus will be handed over to CET on shifting of the location of the Institute permanently to Vithura.

3. During the year Income & Expenditure Account shows excess of expenditure over income of Rs.5, 84,34,958/ -

4. The Commitment for Purchases for the period 2009-2010 which has been deducted from the grant in the previous year has been added back in the current financial year. The Commitment for Purchases outstanding as on 31.03.2011 amounts to Rs. 9,56,15,881/- out of which provision has been created for an amount of Rs. 76,24,601/- pertaining to purchase of consumable against which payments have been made after 01.04.2011. The balance commitment is Rs. 8,79,91,280/-

5. Library Journals are reference material and used like Library books hence it is capitalized

6. Prior period income: An amount of Rs. 8100/- has been received as fee for the year 2009-10 in the current financial year, accounted under prior period income.

7. An amount of Rs.3,23,690 is received from UGC against the receivable balance in the previous year, hence this amount is not taken as Grant-in-Aid for the current year.

8. An amount of Rs.9,70,61,000/- was paid to Kerala State Electricity Board for extension of electric power (6MVA) at 33KV to IISER, Vithura, since it is not a leased or owned Line the expenditure is of revenue nature. The estimated time of work completion is 18 months starting from 01.09.2010, expenditure for 7 months up to 31.03.2011 charged to Income & Expenditure A/c and the balance is debited to Prepaid expenditure (Current Asset).

9. Change in Accounting Policies:

- Depreciation has not been written back in the current financial year. As a result the Income & Expenditure account of the Institute for the current financial year shows excess of expenditure over income. The depreciation for the year equals to 6,67,50,525 /-

- The treatment of Project Grant & its utilisation has been changed in current financial year. The accounting of Assets acquired out of project grant & revenue expenditures met from such grant are not accounted in the institutes Final Accounts, only the unspent balance of Project Grant & interest is shown under the Current Liabilities of the Institute's Balance Sheet.

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31.03.2011

SCHEDUEL 26- UNSPENT BALANCE OF GRANT

	Current Year		Previous Year
a) Opening balance of the funds		**1,89,67,433**	**4,05,41,629**
b) Additions to the Funds:			
i. Donation/grants			
MHRD	90,00,00,000		25,00,00,000
DST	50,00,000		49,04,000
CSIR	15,42,176		6,21,663
KVPY	11,95,000		9,65,700
UGC	8,03,110	**90,85,40,286**	
ii. Income from investments made on account of funds			
iii. Other additions (specify nature)			
TOTAL (a+b)		**92,75,07,719**	**29,70,32,992**
c) Utilisation/Expenditure towards			
objectives of funds			
i. Capital Expenditure			
-Fixed Assets - MHRD		16,86,41,668	23,43,81,501
-Others			
Total		**16,86,41,668**	**23,43,81,501**
ii. Revenue Expenditure			
-Salaries, Wages and			
allowances etc.		4,86,75,057	2,36,02,048
-Rent		56,90,696	18,19,451
-Other Administrative expenses		7,30,00,383	1,82,62,559
Total		**12,73,66,136**	**4,36,84,058**
TOTAL (c)		**29,60,07,804**	**27,80,65,559**
NET BALANCE AS AT THE YEAR-END (a+b-c)		**63,14,99,915**	**1,89,67,433**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31.03.2011

SCHEDULE 27- UNSPENT BALANCE OF EXTERNAL PROJECTS

Sl. No	Name Of Project	Opening Balance	Grant Received	Interest Received	Net Amount Received	Amount Utilised		Total Expenditure	Closing Balance
						Fixed Assets	Revenue Expenditure		
1	DST FT PROJECT OF DR.K.M.SURESHAN	687,728			687,728	295,920	287,947	583,867	103,861
2	DST SERC FT DR.AYAN DATTA	164,574	325,000		489,574	34,500	252,134	286,634	202,940
3	JC BOSE FELLOWSHIP	818,043	1,600,000		2,418,043		613,496	613,496	1,804,547
4	CSIR PROJECT OF DR.AYAN DATTA		261,000		261,000		43,214	43,214	217,786
5	CSIR PROJECT OF DR.K.M.SURESHAN		451,000		451,000		6,279	6,279	444,721
6	CSIR PROJECT OF DR.TAPAS KUMAR MANNA		763,333		763,333		0	0	763,333
7	DST PROJECT OF DR.ANIL SHAJI		550,000		550,000		69,600	69,600	480,400
8	RAMALINGASWAMY FELLOWSHIP OF DR.RAMANATHAN NATESH		1,400,000		1,400,000		514,496	514,496	885,504
9	RAMANUJAN FELLOWSHIP OF DR.ANIL SHAJI		1,460,000		1,460,000		810,000	810,000	650,000
10	RAMANUJAN FELLOWSHIP OF DR.K.M.SURESHAN		1,460,000		1,460,000		810,000	810,000	650,000
11	RAMANUJAN FELOWSHIP OF DR.SHANKARANARAYANAN		1,460,000		1,460,000		970,270	970,270	489,730
12	SSB AWARD OF PROF. E.D.JEMMIS		180,000		180,000		180,000	180,000	0
13	SSB AWARD OF PROF.K.GEORGE THOMAS		156,774		156,774		141,774	141,774	15,000
	INTEREST ON SB ACCOUNT								
	For the Year 2009-10			44,085	44,085				44,085
	For the Year 2010-11			93,835	93,835				93,835
	TOTAL	**1,670,345**	**10,067,107**	**137,920**	**11,875,372**	**330,420**	**4,699,210**	**5,029,630**	**6,845,742**