ANNUAL REPORT 2017 -18

Indian Institute of Science Education and Research

Thiruvananthapuram

Vithura, Thiruvananthapuram - 695 551

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CONTENT

Preface

Preface

I am delighted to report that Indian Institute of Science Education and Research Thiruvananthapuram (IISER TVM) has been making strenuous efforts to establish itself as a premier national academic institution with steady progress in the operationalization of the permanent campus, academic and research achievements during the last year. Here I submit the report on the overall activities of the financial year 2017-18.

During the last year, at IISER TVM we continued our mission of providing high quality education and outstanding research at the undergraduate level. Since its establishment in 2008, IISER TVM was mostly operating from its transit campus from College of Engineering Thiruvananthapuram, with severe constrains on the infrastructural development and expansion in terms of student uptake and faculty recruitment. I am glad to report that, as promised in my last annual report, now permanent campus is fully operational bubbling with energy and round the clock teaching and research activities. Most of the activities from all the four schools and administration are running from the permanent campus. The campus at Vithura now consists of three academic blocks, several halls of residence for students that can accommodate more than 1500 students, two dining halls, an indoor stadium, three residence blocks for faculty and staff, volleyball court, badminton courts and many other facilties. The upcoming facilities include School of Biology and School of Mathematics buildings, Guest house, academic complex, Medical Centre etc. The campus has around 4 Km of roads, five Bridges, a Spillway, water and sewage treatment plants, electrical substations etc. We are keeping with our promise to maintain the natural environment by planning of tree saplings, while clearing the space for various buildings.

The institute is moving with clarity of purpose, vibrant faculty and students, continuous financial support, and a strong functional culture. Towards this end, I am happy to report that, IISER TVM is continuously attracting outstanding scientists as faculty members and establishing itself as a premier national academic institution. At present 4 Professors, 19 Associate Professors, 42 Assistant Professors Grade I and Grade II are working in the institute. In addition, many pre-eminent academicians are also associated with IISER TVM (Honorary Professor: 02, Emeritus Professor: 1, Visiting Professor: 2, Adjunct faculty: 07). The Institute is having 52 regular and 2 contractual staff non-teaching administrative and support personnel. Our faculty members are continued to be recognized for their academic and scientific contributions, as reflected by the awards they have won this year also. A faculty member has been selected as an external collaborator of LiteBIRD satellite mission, jointly proposed by JAXA and NASA. Currently he is working for ‘Phase A1’ study of this mission to forecast it’s potential to measure B-mode of Cosmic Microwave Background polarization. Awards and honors won included Kerala Young Scientist Award 2018, Fellow of Royal Society of Chemistry, Alexander von Humboldt return Fellowship, MRSI Medal of Materials Research Society of India, Dr. APJ Abdul Kalam Life Time Achievement National Award, Chemical Society of Japan Distinguished Lectureship Award,

The Gruber Foundation 2018 Cosmology Prize, Early Career Research (ECR) Award. The faculty remain competitive scientifically with 134 publications and 3 book chapters. Several crores of funding for research from extramural agencies under several schemes were procured this year also.

In the presence of academic luminaries, IISER TVM community held the 5th convocation this year on 3 June 2017 in the permanent campus. The function was graced by Prof. Vikram Kumar, FNAS, FNAE, FIETE, DSc., as the Chief Guest. Dr. Kumar is an Emeritus Professor at Indian Institute of Technology Delhi, former Director of the National Physical Laboratory and Solid State Physics Laboratory. The number of students graduated from the institute is gradually increasing with the fifth batch of Five Year BS-MS Dual Degree Programme consisting of 99 students, and 24 Ph.D. students. Many of these students are pursuing higher education in reputed institutions worldwide. The Institute celebrated its 9th foundation day on October 09th, 2017. The Chief Guest Dr. Madhavan Nair Rajeevan, Secretary, Ministry of Earth Sciences, Government of India delivered the foundation day lecture titled “Earth System Science for Socio-Economic Benefits”.

In addition to learning from the regular faculty, students get benefit from time-to-time lectures given by several imminent academicians from institutions within India and from around the world that regularly visit the institute. The total strength of students presently is 1070 with 787 in BS-MS Programme, 94 in Integrated Ph.D. Programme, and 189 in Ph.D Programme. In August 2017, 244 students joined the ninth batch of Five Year BS-MS dual degree programme. These students qualified to the admission through channels, namely KVPY, IIT-JEE merit list and the Aptitude test conducted jointly for all the IISERs. This year 29 students were admitted to Int Ph.D. programme and 36 students joined Ph.D. programme, with 20 students from IPHD being promoted to PhD programme. Students admitted to the doctoral programme are those qualified in one of the National Eligibility Tests such as UGC-CSIR JRF/DBT-JRF/GATE/INSPIRE-Ph.D./NBHM/ICMR /JEST/ JGEEBILS etc.

The institute is extending additional research/academic opportunities in Indian institutions and abroad through the Memorandum of Understanding (MoUs) that were signed between IISER TVM and other national and international institutions. This year also the institute signed MoUs with several institutions to enrich academic environment with exchange of faculty and students, academic visits, organization of conferences and workshops. These included Workshop on Basic aspects of Nonlinear Dynamics and its Applications, Science Talent Enrichment Programme, Mini-Symposium on Photoprocesses in Chemistry and Biology, Faraday Discussions on Photoinduced Processes in Nucleic Acids and Proteins, 2nd Annual Conference Nanobioteck-2017, Mini-Symposium on Spectroscopy, Mini-Symposium on Photochemistry and Supramolecular Chemistry, Symposium on chromosome biology and cell signaling (jointly organized by School of Biology, IISER TVM - IPR, Osaka University), Post Conference EM Workshop at EMSI -2017, Mahabalipuram, International Conference on Electron Microscopy and Allied Techniques and XXXVIII Annual Meeting of the Electron Microscope Society of India (EMSI-2017), Satellite meeting to the international congress of cell biology. Cellular processes in Homeostasis, regeneration and diseases, Nanobioteck 2017,

DBT Task Force meeting, Advanced Instructional School on Erogotic Theory and Dynamical System.

To further our commitment to quality education and research, IISER TVM proactively implemented several programmes for the benefit of community. These included IISER Thiruvananthapuram Summer Visiting Programme (SVP), IISER TVM SVP - Own Fellowship, IISER TVM SVP - Prathibha Scholars etc.

Finally, for the overall development of the students, IISER TVM continues to conduct numerous activities. Anvesha, the Science Club conducts year round activities, Anvesha science festival (3 days in October), National Science Day celebration, Int'nal Girls and Women in Science day celebrations, School Outreach activities by students, Popular science talks by eminent scientists and speakers, Some surprise events such as sky observation, tree plantations etc. In sports activities, IISER TVM students have participated in 3 major sports events, Intra-, Inter-IISER and batch tournaments during the academic year 2017-2018. ITSAV'17, IISER TVM institute annual sports meet, was conducted from 15th – 17th September, 2017, in Jawahar Navodaya Vidyalaya sports ground, Palode (mainly athletic events, cricket and football) and the rest of the games were conducted in our indoor stadium. Edition of the ICL (IISER Cricket league) was successfully completed. IISER Mohali hosted IISM'17 during 18th -21th December 2017. In IISM'17 ten institutes from all over India including 7 IISERs Pune, Mohali, Kolkata, Bhopal, TVM, Tirupati and Berhampur, NISER Bhubaneswar, IISc Bangalore and CBS Mumbai IISER TVM fought with spirit and vigour in complete sportsmanship. The contingent had a total strength of 131 students: including 80 boys and 41 girls. IISER TVM contingent secured 3 gold, 1 silver and 3 bronze in individual events, bagged gold in 4x400m relay boys, silver in 4*400m relay girls, bronze in 4*100m relay both boys and girls. We were runners up in football boys and basketball boys.

Jai Hind

Prof. V. Ramakrishnan
Director

Premable

1. Introduction

The Indian Institutes of Science Education & Research were established by Government of India between 2006, 2008 and 2015 at Kolkata, Pune, Mohali, Bhopal, Thiruvananthapuram and Tirupathi 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 (IISER-TVM) 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 organisation.

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.

The statute for the existence and functioning of the institute has been approved by the parliament and governed by the National Institute of Technology (Amendment) Act 2012.

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.

Board of Governors

The composition of the Board of Governors according to NITSER Act 2012 is as follows:-

Chairperson

Dr. Tessy Thomas, Project Director for Agni-IV missile,
Defence Research & Development Organisation (DRDO), Hyderabad

Members

Secretary, Department of Higher Education, MHRD, Govt. of India (ex-officio)

Director, Indian Institute of Science Education and Research Thiruvananthapuram (ex-officio)

Director, Indian Institute of Science Bangalore (ex-officio)

Secretary, Department of Industrial Policy & Promotion, Govt. of India (ex-officio) – w.e.f. 26 September 2017

Secretary, Department of Science & Technology, Govt. of India (ex-officio) - w.e.f. 26 September 2017

Chief Secretary, Govt. of Kerala (ex-officio)

Prof. Srinivasa Murty Srinivasula, School of Biology, IISER Thiruvananthapuram

Prof. M.S. Ramachandra Rao, Visiting Professor, School of Physics, IISER Thiruvananthapuram

Prof. Vijayalakshmi Ravindranath, Chairperson, Centre for Neuroscience, IISc Bangalore - w.e.f 26 September 2017.

Prof. Bhavana Badhe, Jawaharlal Institute of Postgraduate Medical Education & Research, Puducherry - w.e.f. 26 September 2017

Joint Secretary & Financial Advisor, MHRD, Govt. of India (ex-officio)

Registrar, Indian Institute of Science Education and Research Thiruvananthapuram (ex-officio) – Secretary

The board met on 02/06/2017, 29/08/2017 and 30/01/2018 during the period of report.

Finance Committee

Chairperson

Chairman, Board of Governors, IISER Thiruvananthapuram

Members

Director, Indian Institute of Science Education and Research Thiruvananthapuram (ex-officio)

Joint Secretary (Admin) DHE, MHRD, Govt.of India (ex-officio)

Joint Secretary & Financial Advisor, MHRD, Govt. of India (ex-officio)

Prof. M.P. Rajan, School of Mathematics, IISER Thiruvananthapuram

Shri. Harikumar S., Chief Engineer (Civil) (Retd), BSNL

Registrar, IISER Thiruvananthapuram -Secretary

The finance committee met on 02/06/217, 29/08/2017 and 30/01/2018 during the period of report.

Building and Works Committee

Chairman

Director, Indian Institute of Science Education and Research Thiruvananthapuram

Members

Shri. V. R. Rengasamy, Head, EM&C, NCBS-TIFR, Bangalore

Shri. P. Raveendran, Dy Head, CMD (E), CMG, VSSC

Smt. Poornima U. B., Head Architect, NCBS-TIFR, Bangalore

Prof. Srinivasa Murty Srinivasula, Professor, School of Biology, IISER Thiruvananthapuram

Shri. M. Radhakrishnan, Registrar, IISER Thiruvananthapuram

Shri. Siva Dutt V.K., Superintending Engineer, IISER Thiruvananthapuram - Member Secretary

The committee met on 18.05.2017, 12.09.2017 and 11.01.2018 during the period of report.

2. Human Resource

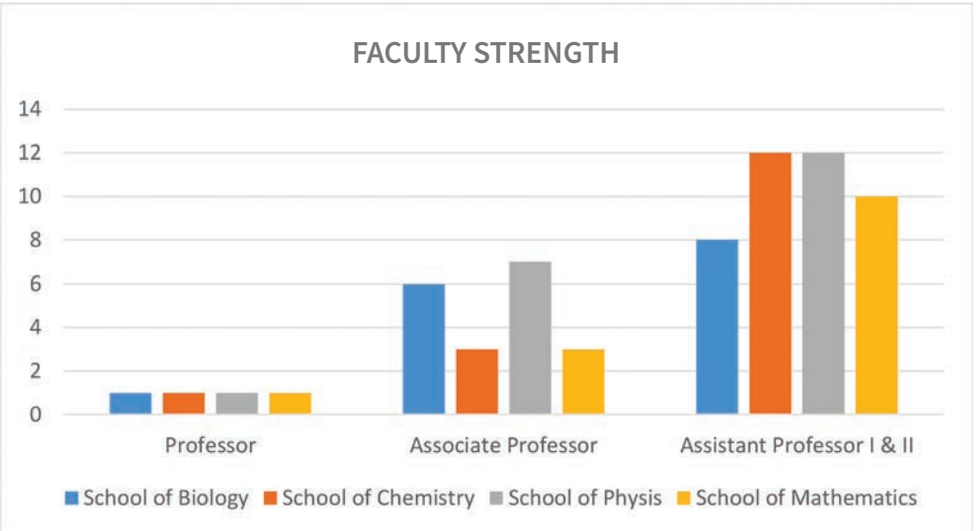
Human resources of the institute in 2017 - 18 comprised the following:-

Faculty	Regular Faculty		69
	Emeritus/ Honorary/Visiting/ Adjunct Faculty		20
Technical and Non-Teaching Personnel	Officers	Regular	15
		Contractual	02
	Subordinate	Regular	37
		Temporary & Contract	33

Faculty

School-wise lists of faculties and their names are given below.

Professor	School of Biology	01
	School of Chemistry	01
	School of Physics	01
	School of Mathematics	01
Associate Professor	School of Biology	06
	School of Chemistry	03
	School of Physics	07
	School of Mathematics	03
Assistant Professor Grade I & II	School of Biology	08
	School of Chemistry	12
	School of Physics	12
	School of Mathematics	10



School of Biology

The School of Biology has been engaged in carrying out cutting-edge research in the areas spanning from single molecules to ecosystems. At present, the School comprises of 15 faculty members, Ph.D. students, Post-Doctoral Fellows, Technical Assistants and Project Assistants. Research programmes in the School are funded by Wellcome Trust/DBT India Alliance, The Royal Society UK, Dupont Inc, CSIR, DST, DAE, DBT and IISER TVM intramural support. Our state-of- the-art research laboratories are well equipped for imaging, molecular biology, animal tissue culture, biochemical and biophysical work. The IISER campus at Vithura located in the Western Ghats is also ideal for field biology. Our teaching curriculum aims to provide students an exposure to a broad range of subjects in biology and gain experience in the frontier research areas of biology.

Sl No	Name	Position	Area of Research
1	Dr. Srinivasa Murty Srinivasula	Professor	Nutrient and energy homeostasis, gene regulation in neuroendocrine centers, neural circuitry of feeding.
2	Dr. Hema Somanathan	Associate Professor	Insect navigation and sensory ecology; insect-plant interactions.
3	Dr. Kalika Prasad	Associate Professor	Plant molecular genetics-patterning, stem cell and regeneration, evolutionary developmental biology.
4	Dr. Nishant K.T	Associate Professor	Meiotic recombination, genome stability, mutation rates.
5	Dr. Sunish Kumar Radhakrishnan	Associate Professor	Prokaryotic development and genetics.
6	Dr. Tapas Kumar Manna	Associate Professor	Microtubule cytoskeleton, mitosis, centrosome and spidle pole regulation,drug development, and ciliogenesis.
7	Dr.Stalinraj V	Associate Professor	Molecular Virology- Zoonotic Viruses, Virus discovery, Virus host Interactions, Development of Vaccine and Monoclonal antibodies
8	Dr. Jishy Varghese	Assistant Professor Grade I	Nutrient and energy homeostasis, gene regulation in neuroendocrine centers, neural circuitry of feeding.

9	Dr. N. Sadananda Singh	Assistant Professor Grade I	Molecular Biology, Biochemistry, Microbiology.
10	Dr. Ramanathan Natesh	Assistant Professor Grade I	Molecular structural biology- protein crystallography, single particle cryoEM.
11	Dr. Ravi Maruthachalam	Assistant Professor Grade I	Plant centromere biology, uniparental genome elimination, genome stability, aneuploidy, haploid genetics, and minichromosome biology.
12	Dr. Sabari Sankar Thirupathy	Assistant Professor Grade I	Molecular Biology, Replication-Transcription Conflicts, Mutagenesis and Evolution of Antibiotic Resistance
13	Dr. Satish Khurana	Assistant Professor Grade I	Hematopoietic stem cells, bone marrow niche, developmental hematopoiesis.
14	Dr. Ullasa Kodandaramaiah	Assistant Professor Grade I	Prey-predator interactions, wolbachia in insects, secondary sexual characters, phylogenetic patterns, diversity of Indian butterflies.
15	Dr. Nisha.N.Kannan	Assistant Professor Grade II	Circadian clock, neuropeptides and sleep, post- transcriptional regulation of circadian rhythm etc.

School of Chemistry

The School of Chemistry established in the year 2008 at IISER Thiruvananthapuram has a vibrant academic and research ambience with 16 faculties, 71 PhD students, 5 research associates, 3 project assistants and 6 technical assistants. The school also hosts a large number of under graduate students for short projects. The research activities of the school cover a wide range of areas in chemistry (inorganic, organic, physical and theoretical chemistry). The department is actively involved in research in the areas of inorganic and organometallic chemistry, physical organic chemistry, supramolecular chemistry, DNA nanotechnology, photophysics and photochemistry of nanomaterials and hybrid materials, Solid State chemistry, NMR spectroscopy, theoretical chemistry, computational chemistry, electrochemistry and non-linear dynamics. On the experimental front, the department has a large number of state-of-the-art research facilities including 500 and 700 MHz NMR (CIF Facility), single crystal X-ray diffractometer (CIF Facility), powder X-ray diffractometer (CIF Facility), scanning electron microscope (CIF Facility), atomic force microscope, UV-Vis and UV-Vis NIR absorption spectrophotometers, emission spectrophotometer, FT-IR spectrophotometer, Raman

spectrometer, circular dichroism spectrometer, vibrational circular dichroism spectrometer, circularly polarized luminescence spectrometer, fluorescence microscope, confocal fluorescence microscope, femtosecond transient absorption, picosecond fluorescence, gas chromatography-mass spectrometry, differential scanning calorimetry, thermogravimetric analyzer, electrochemical system, DNA and peptide synthesizers. The computational facilities include 3 clusters with a total of 120 processors.

Sl No	Name	Position	Area of Research
1	Dr. K.George Thomas	Professor	Photochemistry & photophysics, Hybrid nanomaterials, Light-matter interactions at nanoscale, Raman Spectroscopy using nanomaterials, Organized surfaces
2	Dr. Kana M.Sureshan	Associate Professor	Medicinal Chemistry, Chemical Biology, Organic Synthesis, Carbohydrate Chemistry, Supramolecular Chemistry, Methodology Development
3	Dr. Mahesh Hariharan	Associate Professor	Physical organic chemistry, biophysical chemistry
4	Dr. Sukhendu Mandal	Associate Professor	Cluster-Assembled Materials, Atom-Precise Metal Nanocluster, two dimensional hybrid materials
5	Dr. A. Muthukrishnan	Assistant Professor Grade I	Fuel cell electro-catalysis, platinum-free catalysts for the cathodic reduction of oxygen in polymer electrolyte membrane fuel cells
6	Dr. Ajay Venugopal	Assistant Professor Grade I	Inorganic and Organometallic chemistry
7	Dr. Alagiri Kaliyamoorthy	Assistant Professor Grade I	Developing new methods, Activation and functionalization of relatively unreactive C–H bonds, Asymmetric Catalysis, Synthesis of Natural Products
8	Dr. Gokulnath Sabapathi	Assistant Professor Grade I	Macrocyclic systems, Bioinorganic Chemistry, Planar Aromatic and Antiaromatic systems, Porphyrin based Dye-Sensitized Solar cells (DSSC)

9	Dr. Rajender Goretti	Assistant Professor Grade I	Asymmetric Total Synthesis, Asymmetric Catalysis, and Medicinal Chemistry.
10	Dr. Ramesh Rasappan	Assistant Professor Grade I	Asymmetric Catalysis and Natural Product Synthesis
11	Dr. Reji Varghese	Assistant Professor Grade I	Supramolecular chemistry with DNA, and Functional DNA nanotechnology
12	Dr. Subrata Kundu	Assistant Professor Grade I	Inorganic Reaction Mechanisms, Catalysis, Bioinorganic Chemistry
13	Dr. Thirumurugan Alagarsamy	Assistant Professor Grade I	Materials Chemistry - Metal organic frameworks, metal oxide clusters and nanocomposites for molecular separation, optical and conducting properties.
14	Dr. Vennapusa Sivaranjana Reddy	Assistant Professor Grade I	Theoretical and Computational Chemistry
15	Dr. Vinesh Vijayan	Assistant Professor Grade I	NMR spectroscopy, structure determination of macromolecules
16	Dr. R.S.Swathi	Assistant Professor Grade I	Theoretical Chemistry

School of Mathematics

The establishment of Indian Institutes of Science Education and Research (IISERs) is an innovative concept of the Ministry of Human Resource Development, Government of India, aimed at providing quality education in the basic sciences and fostering research in frontier areas of science.The School of Mathematics, IISER TVM is one of the foundational schools established in the Institute since its inception in the year 2008. At present, there are fourteen full time faculty members, and one visiting faculty member affiliated to the School of Mathematics. The School provides a wonderful environment for students to learn Mathematics. The School of Mathematics at IISER Thiruvananthapuram offers courses in basic and advanced areas of mathematics at the undergraduate and postgraduate levels. The members of the school are actively involved in Theoretical, Applied and Computational Research in Mathematics. The Major Research Areas in Mathematics pursued at the Institute are:

1. Algebra, Linear Algebra, Number Theory and Cryptography
2. Algebraic Geometry
3. Complex Dynamics and Ergodic Theory
4. Differential Geometry

5. Functional Analysis and Numerical Functional Analysis
6. Graph Theory
7. Harmonic Analysis and Signal Processing
8. Partial Differential Equations - Control, Stochastics and Numerics
9. Mathematical Biology
10. Machine Learning and Data Science Research

Algebra, Linear Algebra, Number Theory and Cryptography: Group theory with applications in Algebraic Topology, Commutative algebra and homological Algebra are some of the focus areas of Research in Algebra. This includes representation theory of finite groups and the theory of cellular algebras. Recently focussed on Schur algebras and q-Schur algebras and Schur-Weyl duality over the finite fields. Other interests includes Wreath product algebras, combinatorics of symmetric groups and Hecke algebras, Kazhdan-Lusztig polynomials and cell representations, Coxeter groups.

Research in linear algebra concerns the study of certain positivity classes of matrices arising from optimization problems, their structure, linear preservers and possible applications.

In number theory the main focus of research is on Analytic, Additive Number Theory and Arithmetic Geometry. More specifically on Modular forms, deformation theory of Galois representations and the theory of elliptic curves and zero sum sequences. This group of researcher are also working on applications of these in the area of Cryptography which plays a vital role in information security.

Algebraic Geometry: Studies in this area involve investigating geometric properties of moduli space of vector bundles over surfaces, Brill Noether theory over algebraic surfaces and geometric questions on curves embedded in a surface, mainly embedded in K3 surface. Studies in these areas are related to questions on constancy of gonality sequence.

Complex Dynamics and Ergodic Theory: The research focuses on complex dynamical systems of nonlinear maps: polynomials, rational functions etc., both open and closed; systems of holomorphic correspondences, correspondences generated by a finite rational semigroup etc. Holomorphic, non-invertible dynamical systems of the Riemann sphere are surprisingly intricate and beautiful.

Differential Geometry: Higher category theories and more specifically in connections on categorical bundles, non abelian gerbes and Grothendieck topology are the main focus of research.

Functional Analysis and Numerical Functional Analysis: One of the main research focus is on solving inverse and ill-posed problems. Constructing stable approximate solution for problems that are ill-posed in nature. Certain class of parameter identification problems in PDEs that are non-linear in nature; Singular perturbations problems in PDEs.

Another major area of research in Functional Analysis in the school of Mathematics is to understand quantum dynamical semigroups, it's structure theories, dilation theory. Main objective is to study the structure of completely positive and completely bounded maps and homomorphisms.

Graph Theory: Graph theory is a branch of Mathematics which studies structures called graphs. The research focused is interdisciplinary in nature as it involves Spectral Graph Theory, Isoperimetric inequalities and Partial differential equations. In particular looking into certain eigenvalue problems on graphs which can be viewed as isoperimetric inequalities related to combinatorial PDE and how it is similar and different from the existing classical results.

Harmonic Analysis and Signal Processing: The research deals with the analysis of certain convolution operators on locally compact groups. One of the cutting edge research in Applied Harmonic Analysis is the Mathematics of digital Signal processing. The research on this area focuses upon reconstruction of the analog signals from their local weighted average samples over various signal classes like shift invariant spaces, spline spaces, wavelet spaces.

Partial Differential Equations - Control, Stochastics and Numerics: The members of the group are actively involved in research in the areas of hyperbolic systems of conservation laws; asymptotic preserving schemes; genuinely multidimensional numerical schemes; nonlinear waves and shock waves; deterministic and stochastic fluid flow models (e.g. Navier-Stokes equations, Viscoelastic fluid flow equations, Cahn-Hilliard Navier-Stokes system, Nematic liquid crystal model, Landau-Lifshitz- Gilbert equations in ferromagnetism etc.); optimal control, maximum principle, stabilization and controllability problems related to these models; statistical behaviour (e.g. Invariant measures, ergodic property, large deviations) of solutions of stochastic partial differential equations; stochastic control; viscosity solutions, game theory; image processing using PDEs (image restoration and inpainting); signal detection and reconstruction using adaptive wavelet methods.

Mathematical Biology: The research group focus upon studying the tumour modelling and treatment of Cancer through a mathematical approach.

Machine Learning and Data Science Research: Data science research is an interdisciplinary field that make use of Mathematics, Statistics and Computer Science applicable to various domain such as Banking, Financial Services and Insurance (BFSI), Health Care, Genetics and many scientific areas. Data plays a big role in the modern digital world. Machine Learning and Artificial Intelligence are modern techniques used to discover hidden truth behind the data. The research focus upon developing new algorithms in this direction.

Sl No	Name	Position	Area of Research
1	Dr. M. P.Rajan	Professor	Numerical Functional Analysis/ Functional Analysis; Financial Engineering/Mathematical Finance; Mathematical Biology. Machine Learing and Data Science Research
2	Dr. Devaraj P	Associate Professor	Harmonic Analysis
3	Dr. Shrihari Sridharan	Associate Professor	Complex Dynamics and Ergodic Theory
4	Dr. Utpal Manna	Associate Professor	Stochastic Partial Differential Equations, Stochastic Processes, Fluid Dynamics
5	Dr. Geetha T	Assistant Professor Grade I	Representation Theory
6	Dr. K Srilakshmi	Assistant Professor Grade I	Number Theory
7	Dr. K. R. Arun	Assistant Professor Grade I	Hyperbolic Systems of Conservation Laws, Finite Volume Schemes, Asymptotic Preserving Schemes, Nonlinear Waves.
8	Dr. Mithun Mukherjee	Assistant Professor Grade I	Operator theory, operator algebra, non-cumulative dynamics.
9	Dr. P. Chiranjeevi RESIGNED ON 30.05.2017	Assistant Professor Grade I	Dynamical Systems.
10	Dr. Sachindranath Jayaraman	Assistant Professor Grade I	Linear Algebra and Matrix Analysis
11	Dr. Saikat Chatterjee	Assistant Professor Grade I	Differential geometry, Higher Category theories, Gerbes.
12	Dr. Sarbeswar Pal	Assistant Professor Grade I	Algebraic Geometry
13	Dr. Sheetal Dharmatti	Assistant Professor Grade I	Differential equations, control and game theory, Navier Stokes' equations and image processing, fluid flow equations
14	Dr. Sumit Mohanty	Assistant Professor Grade I	Spectral Graph Theory, Analysis on Graphs
15	Dr. Viji Z. Thomas	Assistant Professor Grade I	Group theory, Commutative Algebra and Homological Algebra.

School of Physics

School of Physics has completely moved to its permanent campus and stations itself at the cross point of emerging and established research areas in Physics. Two new faculty have been recruited totalling the faculty strength to 20, including the director. Additionally, the school benefits from 2 Honorary/Visiting professors. The faculty are involved in cutting-edge research on major thrust areas in condensed matter theory and experiment, light-matter interaction, optics, high-energy physics, gravitational physics and dynamics of complex systems. To a large extent, the research undertaken is multidisciplinary in nature and also braces the technologically relevant areas. Several faculty members have won national and international research fellowships and awards. As a matter of fact, in the European Space Agency's Planck mission, IISER-TVM faculty contributed in the high precision measurement of Cosmic Microwave Background to observe the oldest light in the universe. The school attracts many national and international extramural grants and got benefited in founding world class laboratories to do frontline research in fundamental and applied physics. International collaborations have been established either through various funding agencies or by entering into a memorandum of understanding.

Highly qualified 120 BS-MS students and 28 Integrated-Ph. D. and 58 Ph. D. scholars constitutes the student community of the school. The curriculum is developed in such a way that the gap between the research and teaching is made narrow and a student learns and specializes on a subject domain of his choice by doing independent research. The school also emphasis on courses and training programmes for creation of skilled human resources for the scientific and technological needs of the country. The school also established a common instrumentation laboratory where advanced research instruments are housed for routine measurements. In future, the school is looking forward to expand in frontier research areas like soft condensed matter, quantum optics, high-energy physics, Biophysics and atomic/nano physics.

Sl No	NAME	Position	Research interest
1	Dr. V. Ramakrishnan	Professor and Director	Optical spectroscopy, nanomaterials, semiconductor hetereostructures.
2	Dr. Soumen Basak	Associate Professor	Observation of the Cosmic Microwave Background (CMB) radiation, the afterglow of the Big Bang, and the analysis of cosmological and astrophysical data sets.
3	Dr. Joy Mitra	Associate Professor	Scanning probe microscopy, tunnelling induced luminescence, metal-semiconductor junctions.

4	Dr. Manoj A G Namboothiry	Associate Professor	Organic and hybrid optoelectronics, Spintronics, Metamaterials, Thermoelectrics, Application of Physics to biology and device applications, Solar Cell.
5	Dr. Ramesh Chandra Nath	Associate Professor	Magnetism and Superconductivity.
6	Dr. M.M. Shaijumon	Associate Professor	Multifunctional nanostructured materials-Graphene, 2-dimensional layered nanostructures; Energy storage - Lithium ion batteries, Supercapacitors; Gas storage.
7	Dr. Anil Shaji	Associate Professor	Quantum Information theory and open quantum systems.
8	Dr. Kumaragurubaran Somu	Associate Professor	Wide bandgap materials and related devices, high-temperature electronics, Power and energy conversion devices, High-throughput techniques.
9	Dr. Bikas C.Das	Assistant Professor Grade I	Novel charge transfer composite nanomaterials based thin film device applications.
10	Dr.Sreedhar B Dutta	Assistant Professor Grade I	Non-equilibrium Physics, Statistical and Quantum Field-theories.
11	Dr. Rajeev N Kini	Assistant Professor Grade I	Ultrafast optical studies of semiconductor nanostructures Terahertz spectroscopy and imaging.
12	Dr. Amal Medhi	Assistant Professor Grade I	Topological insulators, Fractional quantum Hall state, Strongly correlated electron systems.
13	Dr. Deepshika Jaiswal Nagar	Assistant Professor Grade I	Quantum Phase transitions in low dimensional and low spin organic insulators as well as Heavy Fermions , Phase diagram of weakly pinned Type-II superconductors, Multiferroics.
14	Dr. Ravi Pant	Assistant Professor Grade I	Nanophononics, Stimulated Brillouin/ Raman scattering, Opto-mechanical interactions, Slow-light, Nonlinear optical phenomenon and devices, Soliton self-frequency shift.
15	Dr. Bindusar Sahoo	Assistant Professor Grade I	Black hole entropy in supergravity and string theory, Supergravity, AdS-CFT correspondence, Higher-Spin holography.

16	Dr. D. V. Senthil Kumar	Assistant Professor Grade I	Nonlinear Dynamics: Non-integrable systems, Chaotic Dynamics Bifurcation and Stability Analysis Synchronization Network Theory Complex Systems Time-delay Systems Delay-induce etc.
17	Dr. Mayanglambam Suheshkumar Singh	Assistant Professor Grade I	Photoacoustic imaging (microscopy and tomography), speckle contrast imaging, spectroscopy for Biomedical applications.
18	Dr. Madhu Thalakulam	Assistant Professor Grade I	Low temperature electron transport on nanoscale devices: Quantum dots, Quantum point contacts, Nanowires & Superconducting tunnel junction systems and Topological insulators: etc.
19	Dr. K. Shadak Alee	Assistant Professor Grade II	Random Lasing, Photonic crystals, PT symmetric Optics.
20	Dr. Vinayak B. Kamble	Assistant Professor Grade II	Nanostructures and thin films, Surfaces and Interfaces, Defect induced properties of materials, Dilute Magnetic Semiconductors, Thermoelectric materials, Semiconducting Met .etc..

Honorary /Visiting/Adjunct Professor

Sl No	Name	Position	Research Interest	School
1	Prof. N. Mukunda	Honorary Professor	Mechanics, Optics, Mathematical Physics	Physics
2	Prof. M. S. Ramachandra Rao	Visiting Professor	Magnetism, Zinc Oxide, Diamonds Films, Solar Cells, SOFC	Physics
3	Prof. M. S. Gopinathan	Emeritus Professor	Quantum Chemistry, Nonlinear dynamics in Chemistry and Biology	Chemistry
4	Prof. Kankan Bhattacharyya	Adjunct Faculty	Confocal microscope, FCS and fluorescence life time imaging, Femtosecond Up-conversion, Surface Second harmonic generation, Solvation dynamics, FRET, Electron/ Proton transfer, .etc.	Chemistry

5	Prof. S. Natarajan	Adjunct Faculty	Synthesis, structure and mechanistic studies Magnetic interactions in low dimensional solids Heterogeneous catalysis, photo catalysis, ion and electron conduction studies Li-i .etc.	Chemistry
6	Prof. S. Sampath	Visting Professor	Interfacial and Surface Chemistry	Chemistry
7	Dr . Guram Donadze	Adjunct Faculty	Homological Algebra, Commutative Algebra	Mathematics
8	Prof. G. Santhanam	Adjunct Faculty	Differential Geometry	Mathematics
9	Prof. Jugal K. Verma	Adjunct Faculty	Algebra	Mathematics
10	Prof . K. Dharmalingam	Honorary Professor	DNA restriction and repair in E coli, regulation of antibiotic biosynthesis in Streptomyces, Proteomics of eye diseases	Biology
11	Prof . S. Mahalingam	Adjunct Faculty	Molecular Virology and Cell Biology	Biology
12	Prof . Gangadevi	Adjunct Faculty		Biology

Administrative & Support Personnel :-

The Institute is having 52 regular and 2 contractual staff non-teaching administrative and support personnel. The details are as follows:-

Administration

Sl No	Name of Officials	Designation
1	Shri. M. Radhakrishnan	Registrar
2	Shri. B. V. Ramesh	Deputy Registrar (Finance & Accounts)
3	Shri. Siva Dutt V K	Superintending Engineer w.e.f 22.03.2018
4	Dr. Sainul Abideen P	Assistant Librarian
5	Shri. Hariharakrishnan	Deputy Registrar (Academics)
6	Shri. P. Y. Sreekumar	Scientific Officer (IT)
7	Shri. Priji. E. Moses	Assistant Executive Engineer (Civil)
8	Dr. Goldwin Hemalatha. M	Medical Officer
9	Dr. Thiraviam. P	Medical Officer
10	Shri. Sreehari. S	Assistant Executive Engineer (Electrical)
11	Shri Sudin B Babu	Deputy Registrar (Purchase & Stores) w.e.f 22.03.2018
12	Shri. Satya Srinivas Naraharisetti	Assistant Registrar (Administration) w.e.f 08.06.2017

13	Shri. Manoj Kumar. S	Assistant Registrar (Estb & HR)
14	Smt. Divya V. J.	Technical Officer w.e.f 09.06.2017
15	Smt. Nimi Joseph Chaly	Assistant Registrar (Accounts) w.e.f 09.06.2017
16	Smt. Darli K. G	Private Secretary
17	Smt. Navya Paul	Senior Technical Assistant w.e.f 09.06.2017
18	Shri. Vijesh. K	Senior Technical Assistant w.e.f 08.06.2017
19	Shri. Krishna Kumar	Senior Technical Assistant w.e.f 09.06.2017
20	Shri. Sangeeth. M	Senior Technical Assistant w.e.f 09.06.2017
21	Shri. Alex Andrews. P	Technical Assistant
22	Smt. Nafeesa C. K	Library Information Assistant
23	Shri. Jayaraj J. R	Library Information Assistant
24	Shri. Praveen Peter	Junior Engineer (Civil)
25	Shri Arun Reghunath	Superintendent
26	Smt. Mini Philip	Personal Assistant
27	Shri. Adarsh. B	Technical Assistant
28	Shri. Anilkumar. P .R	Technical Assistant
29	Shri Naveen Sathyan	Technical Assistant
30	Shri. Ajith Prabha	Superintendent w.e.f 09.06.2017
31	Shri. Manoj M. T	Accountant w.e.f 09.06.2017
32	Shri. Satheesh. R	Superintendent w.e.f 09.06.2017
33	Smt. Veena P. P	Personal Assistant w.e.f 09.06.2017
34	Smt. Suja V. R	Office Assistant (Multi Skill)
35	Smt. Vidya Senan. I	Office Assistant (Multi Skill)
36	Smt. Archana P. R	Office Assistant (Multi Skill)
37	Smt. Beena N. K	Office Assistant (Multi Skill)
38	Shri. Muruganandam. A	Office Assistant (Multi Skill)
39	Shri. Rajesh A. P	Office Assistant (Multi Skill)
40	Shri Rakesh M V	Office Assistant (Multi Skill)
41	Shri. Jins Joseph	Nurse
42	Smt. Divya A. T	Nurse
43	Shri Arun Kumar M	Attendant –Electrical
44	Shri Ratheesh C	Attendant –Plumber
45	Ms. Sarika Mohan	Junior Technical Assistant
46	Shri Vivek V G	Junior Technical Assistant
47	Shri. Pradeep Kumar G T	Junior Technical Assistant
48	Shri Nibith Kumar K P	Junior Technical Assistant
49	Ms. Lakshmi C	Junior Technical Assistant
50	Ms.Sandhya P S	Junior Technical Assistant
51	Shri. Packiya Rajan	Junior Technical Assistant
52	Shri Muthukumaran A	Junior Technical Assistant

Consultants and Contractual Officers

1	Shri. Gopakumar. G	Asst.Security Officer
2	Shri Jayan V	Asst.Security Officer

3. Academic Programmes & Students

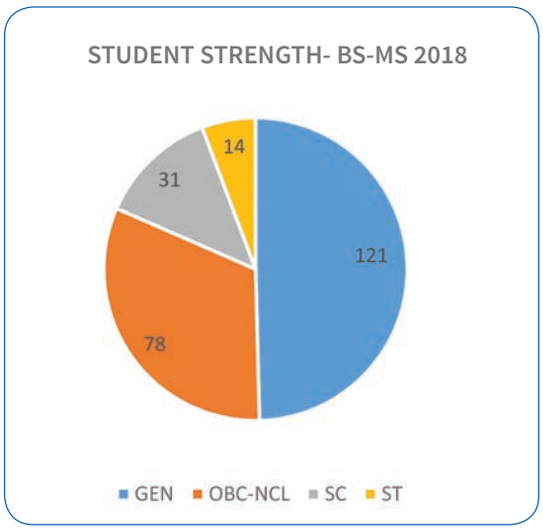
Students BS-MS Dual Degree Programme

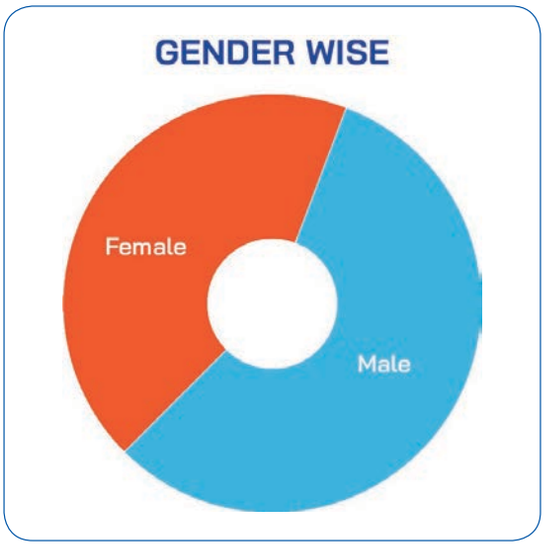
The Fifth Convocation of IISER-Thiruvananthapuram was held on 3rd June 2017, in the permanent Vithura Campus. The function was presided by Prof. Vikram Kumar, FNAS, FNAE, FIETE, DSc, IIT Delhi, Former Director- National Physical Laboratory and Solid State Physics Laboratory. The fifth batch of Five Year BS-MS Dual Degree Programme consisting of 99 students and 24 Ph.D. students were graduated on the occasion.

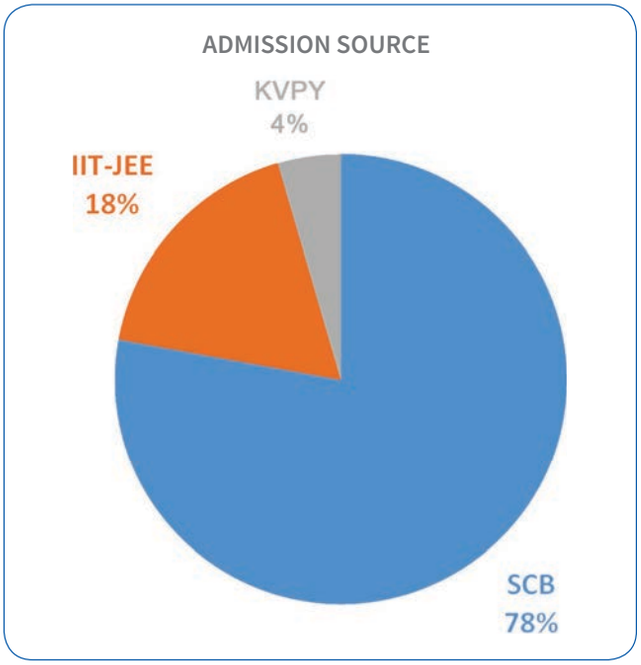
244 students joined the ninth batch of Five Year BS-MS Dual Degree Programme in August 2017 at the Permanent Campus, who were selected through three channels respectively KVPY, IIT-JEE merit list and the Aptitude Test for the top 1% students of class XII exams of all the State Boards, CBSE and ICSE.

The category distribution is as follows

Category	SCB		IIT-JEE		KVPY		Total
	M	F	M	F	M	F	
GEN	63	48	1	0	7	2	**121**
OBC_NCL	18	31	23	5	1	0	**78**
SC	10	8	4	8	1	0	**31**
ST	6	6	1	1	0	0	**14**
Total	**97**	**93**	**29**	**14**	**9**	**2**	**244**







Ph.D. Programme

36 students were admitted to Ph.D. Programme during the academic year 2017-18. Students admitted to the doctoral program are those qualified in one of the National Eligibility Tests such as UGC-CSIR JRF/ DBT-JRF/GATE/INSPIRE-Ph.D./NBHM/ICMR/JEST/JGEEBILS etc. 20 students from IPHD were promoted to PhD programme.

Int. Ph.D. Programme

29 students were admitted to the programme during the academic year 2017-18 through written exam/ JEST and interview.

Total student strength in 2017-18 is given below.

Programme	2010-11 admissions	2011-12 admissions	2012-13 admissions	2013-14 admissions	2014-15 admissions	2015-16 admissions	2016-17 admissions	2017-18 admissions	Total
5Yr Integrated BS-MS	-	-	3	119	133	126	162	244	787
Ph. D.	3	9	19	25	26	28	43	36	189
Int. Ph.D.	-	-	3	11	6	21	24	29	94
Total	3	9	25	155	165	175	229	309	1070

4. Research and Development Activities

The institute has been active in several frontier areas of research in basic and applied sciences spanning Biology, Chemistry, Mathematics and Physics. Several flourishing research groups are now well established and are actively training students as well as publishing their research in reputed peer-reviewed journals. IISER TVM faculty are engaged in collaborative research projects with researchers in premier institutions in India and abroad. Faculty and students have attended international and national meetings to present their research. The faculty have been successful in attracting research funding from national and international funding bodies.

New Sponsored Projects

Sl No	Name of Project	Principal Investigator	Co-Investigator	Sponsoring Agency	Amount Sanctioned (in Lakhs)	Duration
1	Localization and Flow of Information in Quantum Computing and Open Quantum Dynamics	Dr. Anil Shaji	None	SERB-DST	21.03	2017-20
2	Development of Charge-Transfer Nanohybrids of 2D Transition Metal Dichalcogenides to Fabricate Flexible Thin Film Devices	Dr. Bikas C. Das	None	ECRA, SERB	23.10	2017-20
3	Brain-like computing – Designing the basic building blocks for artificial neurons and synapses	Dr. Bikas C. Das	Dr. Leszek Majewski (PI, UoM, UK)	UKIERI-UGC	16.46	2018-20
4	Organic Field-effect Transistors as the building blocks of artificial neurons and synapses	Dr. Bikas C. Das	None	MeitY	Facility support at CeNSE, IISc Bangalore	2017-19
5	Development of solid-state hybrid hydrogen storage using Palladium and Magnesium nanoclusters	Dr. Deepshikha Jaiswal-Nagar	None	RESPOND, ISRO	34.06	2018-21
6	The effect of interannual variation in flowering intensity, periodicity and synchrony on pollination and fruit set in a highly seasonal tropical forest in the Western Ghats	Deepak Barua	Dr. Hema Somanathan	DST	49.00	2017-20

7	Ecology and Conservation of fresh water swamps in the Western Ghats (Extension phase)	Dr. Hema Somanathan	Rajendra Prasad	DBT	7.80	2018-20 Extension phase
8	Community pollination at the landscape level (Extension phase)	Dr. Hema Somanathan	Deepak Barua	DBT	13.60	2018-20 Extension phase
9	Ecology of pollination in fragmented landscapes	Dr. Hema Somanathan, Almut Kelber	Henrik Smith	Swedish International Development Agency (SIDA)	60.00	2017-20)
10	Functional Analysis for Genetic and Molecular Mechanisms that Maintain Nutrient and Energy Homeostasis	Dr. Jishy Varghese	None	SERB-DST	42.90	2017-20
11	Nanoscale writing of bespoke Graphene devices for electronic and plasmonic scalable technologies.	Dr. Joy Mitra	Prof. Ravi Silva, Dr P. Dawson	UKIERI-UGC	28.80	2017-20
12	Smartening smart materials by nano-carbon incorporation: An Industry Academia collaboration in surface engineering and characterisation.	Dr. Joy Mitra	Prof Ravi Silva, Dr Chintan Bhatt, Dr Syed Asif	Royal Academy of Engineering, UK	40.00	2017-19
13	Design of a Surface-Enhanced Spectroscopy based Device for the Rapid Detection of Organophosphate Pesticides and Pyrethroid Insecticides in Fruits and Vegetables	Prof. K. George Thomas	(i) Anil Shaji (ii) K. R. Arun (iii) Sheetal Dharmatti (iv) R. S Swathi (in collaboration with Kerala Agriculture University)	IMPRINT INDIA Project (Nanotechnology Hardware Domain) supported by MHRD and DST	296.55	2017-20
14	Engineered 2-dimensional transition metal dichalcogenide (TMD) nanostructures for efficient hydrogen generation	Dr. M. M. Shaijumon	--	SERB	37.38	2017-20
15	Charge and Energy Transfer in Molecular Multifunctional Materials	Dr. Mahesh Hariharan	Prof. K. George Thomas and Dr. R. S. Swathi	Indo-Italian Executive Programme of Cooperation in Scientific and Technological Cooperation	10.20	2017-19
16	Genome-scale screening for response to drug treatment	Dr. N Sadananda Singh	None	Department of Science and technology, Govt. of India	40.00	2018-20
17	Metal decorated graphynes for molecular adsorption	Dr. R S Swathi	None	Kerala State Council for Science, Technology and Environment	22.40	2018-21

18	Investigation of the interaction of acoustic phonons with electrons in semiconductor nanostructures	Dr. Rajeev N Kini	NIL	KSCSTE, Kerala	38.32	2017-20
19	Structural studies on transcription regulators	Dr. Ramanathan Natesh	None	DBT-ESRF Grenoble	In the form of 1 day of peer reviewed beam time on ID29 beamline	3 shifts in Dec 2017 – between 9:30 am on 2 Dec 2017 and 9:30 am of 3 Dec 2017
20	Identification and Characterization of Molecular Pathways involved in Immune-related Autophagy:	Prof. S. Murty Srinivasula	Dr. Tapas K Manna March 15, 2018 to March 31st, 2021	DBT	67.82	2018-21
21	Insights into the Interplay of H_2S and NO at Redox Active Metal sites	Dr. Subrata Kundu	None	SERB	37.40	2018-21
22	Tailoring the Catalytic Properties of Atom-Precise Metal Nanoclusters	Dr. Sukhendu Mandal	None	SERB	87.00	2018-21
23	Elucidating the role of GTP-induced transition of EB1 dimer to monomer in the regulation of microtubule plus ends	Dr. Tapas K. Manna	None	CSIR	15.00	2018-21
24	Engineered 1D Heterostructures for Chemical Sensor Device Applications	Dr. Vinayak Kamble	None	MeitY	Facility support at CeNSE, IISc Bangalore	2017-20
25	Junction Barrier modulation study in engineered core-shell Oxide hetero-structure Gas sensor device	Dr. Vinayak Kamble	None	DST Nano mission	27.50	2017-20

Ongoing Sponsored Projects

Sl No	Name of Project	Principal Investigator	Co-Investigator	Sponsoring Agency	Amount Sanctioned (in Lakhs)	Duration
1	Vanadium Based Hybrid Materials for Electrochemical Energy Storage	Dr. A. Thirumurugan	None	SERB	45.70	2017-20
2	Molecular Magnesium Hydrides: Hydrogen Storage	Dr. Ajay Venugopal	None	DST INSPIRE	35.00	2013-18
3	Empowerment and Equity oppurtunities for Excellence in Science (EEQ)	Dr. Alagiri Kaliyamoorthy	None	SERB (EMEQ)	46.36	2017-21
4	Early Career Research Award (ECR)	Dr. Alagiri Kaliyamoorthy	None	SERB (ECR)	40.92	2016-19
5	Centre for Computation, Modelling and Simulation (CCMS).	Dr. Amal Medhi	Nishant K.T, Anil Shaji, Archana Pai, K. R . Arun, R . S . Swathi, S. Sankaran aranarayanan	MHRD	400.00	2014-18
6	A Detail Study of Electrolyte-Gated Organic Field-effect Transistors	Dr. Bikas C. Das	None	SERB	49.48	2016-20
7	Collective Dynamics of Complex Nonlniear Systems	Dr. D. V. Senthilkumar	NA	CSIR	25.52	2017-20
8	Development of hydrogen sensors for extended range of temperatures from 100K to 300K using 2D nano cluster assembled films of Palladium	Dr. Deepshikha Jaiswal Nagar		RESPOND, ISRO	23.80	2016-19
9	Effect of size on the superconducting properties of films assembled in nanocluster form in elemental superconductors Al, Pb and Nb	Dr. Deepshikha Jaiswal Nagar		SERB-DST	23.07	2016-19
10	INSPIRE	Dr.Mithun Mukherjee	None	DST	35.00	2013-18
11	On certain class of diagram algebras arising from Schur-Weyl Duality	Dr. Geetha T.	None	SERB	6.60	2018-21
12	Ecology and Conservation of fresh water swamps in the Western Ghats	Dr. Hema Somanathan	Rajendra Prasad	DBT	32.00	2015-18
13	Community pollination at the landscape level	Dr. Hema Somanathan	Deepak Barua	DBT	17.00	2015-18
14	microRNA functions in regulation of metabolism and energy homeostasis	Dr. Jishy Varghese	None	DST-Ramanujan Fellowship	73.00	2013-18

15	Design of a Surface-Enhanced Spectroscopy based Device for the Rapid Detection of Organophosphate Pesticides and Pyrethroid Insecticides in Fruits and Vegetables	Prof. K George Thomas	Thomas Biju Mathew, Anil Shaji, K R Arun, Y Adithya Lakshmanna, Sheetal Dharmatti, R S Swathi	IMPRINT	292.00	2017-20
16	Probing adenophostin mediated IP3R activation using click chemistry approach.	Dr. K M Sureshan	None	DST	23.00	2008-11
17	Synthesis of IP3 analog libraries using click chemistry and their biological evaluation	Dr. K M Sureshan	None	CSIR	17.00	2009-12
18	Chemical Biological Intervention in Cellular Signaling	Dr. K M Sureshan	None	DST	75.00	2010-15
19	Chemical Biological Intervention in Cell Signaling	Dr. K M Sureshan	None	DST	245.00	2015-20
20	Dipolar and Multipolar Interactions in Assembled Molecules and Nanostructures: Developing a General Description and its Applications	Prof. K. George Thomas Dr. Mahesh Hariharan (co- Principal Investigator)	Dr. R. S. Swathi and Dr. Adithya Lakshmana	DST	561.21	2016-19
21	Quantum Plasmonics of Hybrid Nano-Assemblies	Professor Jaydeep Basu, Indian Institute of Science and Dr. Stephen K. Gray, Argonne National Laboratory (USA)	**Indian Partners** (i) Prof. K. George Thomas (IISER-TVM), (ii) Dr. G. V Pavan Kumar and (iii) Dr. Aveek Bid **US Partners** (i) Profs. George C. Schatz and Teri W. Odom from Northwestern University, (ii) Profs. Peter Nordlander and Naomi Halas from Rice University (iii) Dr. Gary P. Wiederrecht from Argonne National Laboratory and (iv) Prof. Alexander O. Govorov from Ohio University	Indo-US Science and Technology Forum	46.45 (for international travel and living expense in US for students and faculty from IISc, Bangalore, IISER-TVM, IISER Pune)	2015-18
22	INSPIRE	Dr. K. Srilakshmi	None	DST	35.00	2014-19

23	Cost-effective hand-held medical device for real-time intra-operative scanning applications at operation bedside	Dr. M Suheshkumar Singh	None	SERB, DST	31.75	2016-19
24	Hybrid Energy Storage Devices Based on Multifunctional Nanocomposite Materials	Dr. M. M. Shaijumon	Dr. A. Thirumurugan	DST	104.07	2017-20
25	Double quantum dot coupled to a RF QPC for quantum measurement and back action	Dr. Madhu Thalakulam		DST SERB	50.00	2014-17
26	Design, synthesis and photocatalytic water splitting properties of functional cobalt based inorganic-organic hybrids	Dr. Mahesh Hariharan	None	Kerala State Council for Science Technology and Environment	45.20	2015-18
27	Approaches to improve open circuit voltage and fill factor – Enhancing the power conversion efficiency in organic and organic-inorganic hybrid systems.	Dr. Manoj A G Namboothiry	Dr. Ajay Venugopal	DST-SERI	88.00	2016-19
28	CRISPR/Cas9 based whole genome screening for response to drug treatment	Dr. N Sadananda Singh	None	SERB ECR/2016/000979 Department of Bio-technology, Govt. of India	83.50	2017-21
29	Wellcome Trust DBT Early Career Fellowship 2016	Dr. Nisha N Kannan	None	Wellcome Trust DBT India Alliance	170.00	2017-21
30	Tunable azacrown-based graphene nanomeshes for gas separation	Dr. R S Swathi	None	SERB, Government of India	18.00	2016-19
31	Ramanujan Research Award	Dr. Rajendar Goreti	None	DST-SERB	35.00	2016-21
32	Early Career Research Award (ECRA)	Dr. Rajendar Goreti	None	DST-SERB	35.42	2017-20
33	Synthesis and characterization of frustrated spin-1/2 chain compounds.	Dr. Ramesh Chandra Nath	Dr. Sukhendu Mandal.	Board of Research in Nuclear Science (BRNS) – Department of Atomic Energy (DAE)	30.00	2017-20
34	Asymmetric Catalysis: Exploring Organosilanes in Stereospecific and Convergent Reactions	Dr. Ramesh Rasappan	None	SERB	55.00	2016-19

35	Generation and characterization of minichromosomes and neocentromere formation in plants	Dr. Ravi Maruthachalam	None	Ramalingaswami fellowship Department of Biotechnology-(DBT)	82.50	2013-18
36	Mid Infrared (Mid-IR) sources using stimulated Brillouin scattering and soliton self-frequency shift	Dr. Ravi Pant	NA	DST-SERB	63.70	2015-18
37	Solid State Structural Analysis of Photoactive Molecular Assemblies on DNA Scaffold through Single Crystal X-ray Diffraction	Dr. Reji Varghese	None	KSCSTE, Kerala State	28.00	2017-20
38	DST-Fast Track	Dr. S. Gokulnath	None	SERB, India	26.00	2016-19
39	DST-Inspire Faculty Grant	Dr. S. Gokulnath	None	DST, India	35.00	2013-18
40	Gerbes and Categorical geometry	Dr. Saikat Chatterjee	None	SERB DST	13.35	2017-20
41	Understanding the role of Periostin-Itgav interactions in adult and fetal hematopoiesis	Dr. Satish Khurana	None	Wellcome trust-DBT India Alliance	359.00	2016-21
42	Some Extremum Eigenvalue Problems Related to Combinatorial PDE	Dr. Sumit Mohanty	None	SERB, DST	6.60	2018-21
43	Molecular dissection of the role of intracellular redox in bacterial cell cycle progression and pathogenesis	Dr. Sunish Kumar Radhakrishnan	None	DST	257.00	2016-21
44	To determine the role of ubiquitin ligase SCF-FBXW7 in regulation of centriole biogenesis and duplication in human cells	Dr. Tapas K. Manna	None	DST	63.00	2016-19
45	Determining the role of microtubule plus tip protein EB1 in regulation of spindle- kinetochore associated protein complex Ska: the mechanism underlying the stabilization of spindle- kinetochore attachment	Dr. Tapas K. Manna	None	DBT, Govt. of India	59.00	2016-19
46	INSPIRE Faculty Award	Dr. Ullasa Kodandaramaiah	None	DST	35.00	2013-18
47	Morphometry and phylogeography of Honey Bees and Stingless Bees in India Phase-II	Dr. Ullasa Kodandaramaiah	Network-Project with many institutions across India	DBT	33.73	2015-19
48	Comparative biogeography of plants of the Western Ghats	Dr. Ullasa Kodandaramaiah, N. Mohanan (JNTBGRI)	P Padmesh, G. Rajkumar, K.B. Rameshkumar, T. Shaju	DBT	36.77	2015-19

49	Theoretical Investigation on Relaxation Dynamics of Ultrafast Generated Molecular Triplet States	Dr. V. Sivaranjana Reddy	None	SERB	23.26	2016-19
50	Development of Novel metal oxide-graphene based nanocomposite materials for Microsensors and Nanoelectronics device applications.	Dr. Vinayak Kamble	None	Inspire faculty award	35.00	2016-21
51	Comparative NMR study of structure and dynamics of VDACs, human VDAC1 and rice VDAC4, using segmental isotope labeling technique	Dr. Vinesh Vijayan	None	SERB	35.88	2015-18

Completed Sponsored Projects

During the period 2017-18, 13 projetcs have completed. The details are given below;

Sl No	Name of Project	Principal Investigator	Co-Investigator	Sponsoring Agency	Amount Sanctioned (in Lakhs)	Duration
1	Lewis Acidic Molecular Bismuth Alkyls and Hydrides	Dr. Ajay Venugopal	None	SERB	25.80	2013-16
2	Cationic Bismuth Complexes in Hydroamination	Dr. Ajay Venugopal	None	CSIR	14.00	2014-17
3	Synchronization of complex networks with delay	Dr. D. V. Senthilkumar	None	SERB-DST	19.80	2014-17
4	Parallel Adaptive Simulation of Multiscale and Multiphysics Phenomena, CCMS, IISER-TVM	Dr. K R Arun	None	MHRD, FAST	400.00	2014-18
5	Incorporation of Plasmonic structures to improve Organic Photovoltaics.	Dr. Manoj A G Namboothiry	Dr. M M Shaijumon	DST-SERI	183.74	2012-17
6	Genetic analysis of crossover assurance mechanisms facilitating meiotic chromosome segregation	Dr. Nishant K.T	None	Wellcome Trust-DBT India Alliance	330.30	2012-17

7	Nucleic acid-pi amphiphiles: Luminescent and addressable nano-biomaterials.	Dr. Reji Varghese	Prof. S. Murty Srinivasula	DBT	120.00	2014-17
8	DNA Based Addressable Functional Nanomaterials: Design, Synthesis and Self-assembly of Novel DNA-Rigid Rod Block Copolymers	Dr. Reji Varghese	None	SERB	75.00	2012-17
9	Synthesis, Structural Evolution and Physical Properties Tuning of Cluster-Assembled Materials	Dr. Sukhendu Mandal	None	SERB	50.00	2014-17
10	Metathesis of Alkanes Using Transition Metal Catalysts	Dr. Sukhendu Mandal	None	CSIR	11.00	2014-17
11	A multilayered approach to decipher unchartered mechanisms of asymmetric cell division	Dr. Sunish Kumar Radhakrishnan	None	Wellcome Trust/DBT India Alliance	267.62	2011-16
12	Stochastic Landau-Lifshitz-Gilbert equation with Lévy noise and ferro- magnetism	Dr. Utpal Manna & Dr. Zdzislaw Brzezniak	None	Royal Society, United Kingdom	12000 GBP (approx. INR 12 lakhs)	2014-17

1. Lewis Acidic Molecular Bismuth Alkyls and Hydrides

We have been successful in preparing three stable bismuth complexes $[Tp^{Me2}{}_2Bi][Tp^{Me2}BiCl_3]$, $[Tp^{Me2}{}_2Bi_5Cl_{13}]$ and $[Tp^{Me2}BiCl(\mu\text{-}Cl)]_2$ supported by the *scorpionate* Tp^{Me2} ligand in a facile manner without decomposition. $[Tp^{Me2}BiCl(\mu\text{-}Cl)]_2$ can serve as a starting point to explore the reactivity of trispyrazolylborate bismuth compounds as Lewis acids. Reactivity of $[Tp^{Me2}BiCl(\mu\text{-}Cl)]_2$ with group 13 metal chlorides infers that it is Lewis acidic enough to abstract chloride from $AlCl_3$ and $GaCl_3$. $[Tp^{Me2}BiCl(\mu\text{-}Cl)]_2$ aggregates with BiCl3 in the presence of $AlCl_3$ to form the one-dimensional polymer $[Tp^{Me2}{}_2Bi_5Cl_{13}]$. Our investigations indicate $[Tp^{Me2}BiCl(\mu\text{-}Cl)]_2$ can be a potential precursor in further investigating the coordination chemistry and reactivity of tris(pyrazolyl)borate bismuth complexes. We have quantitatively investigated the Lewis acidity in the two organobismuth cations. Significantly smaller bite angles are observed in cationic bismuth complexes bearing 2-[(dimethylamino)]phenyl ($Me_2NC_6H_4$) ligand as compared to 2-[(dimethylamino)methyl] phenyl ($Me_2NCH_2C_6H_4$) ligand. Decrease in the chelate ring size in the cationic bismuth complexes leads to a notable increase in Lewis acidity at bismuth demonstrating that the bite angle is as important a ligand-parameter in main group chemistry as in transition metals. Preliminary investigations on the reactivity studies of $[(Me_2NC_6H_4)(Mesityl)Bi]^+$ point out that the cation can initiate ring opening polymerisation in THF and ε-caprolactone under mild conditions.

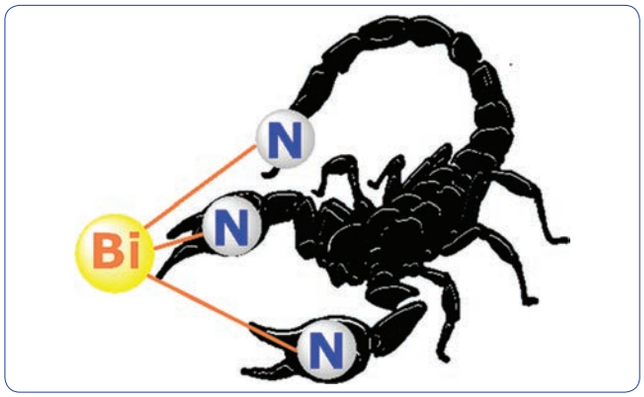


Figure 1. Pictorial representation of *scorpionate* Tp^{Me2} ligand chelating to bismuth.

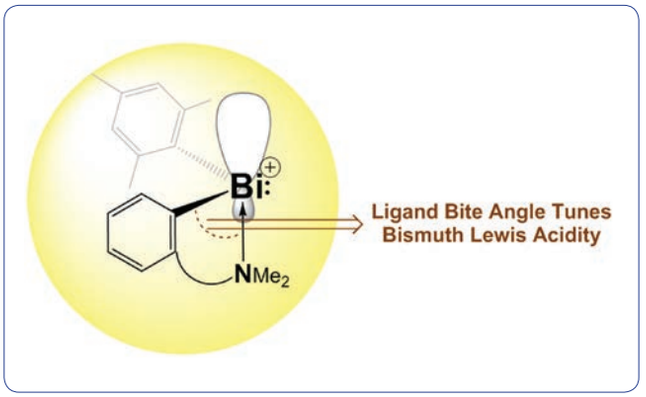


Figure 2. Consequence of ligand bite angle on bismuth lewis acidity

2. Cationic Bismuth Complexes in Hydroamination

The project aimed to systematically develop the chemistry of cationic Bi(III) amide complexes and investigate their role in hydroamination of olefins. As per the proposal, nitrogen donor ligands have been synthesized and well characterized. To develop the salt metathesis route for preparing new bismuth compounds, potassium complexes of the bidendate β-ketoeniminate ligand have been prepared for the first time and characterized by various analytical techniques. The obtained potassium complexes have been employed to obtain new bismuth complexes supported electronegative anionic bidendate β-ketoeniminate ligand have been synthesized. The structural aspects of the obtained compounds have been studied both in the solid state and in solution.

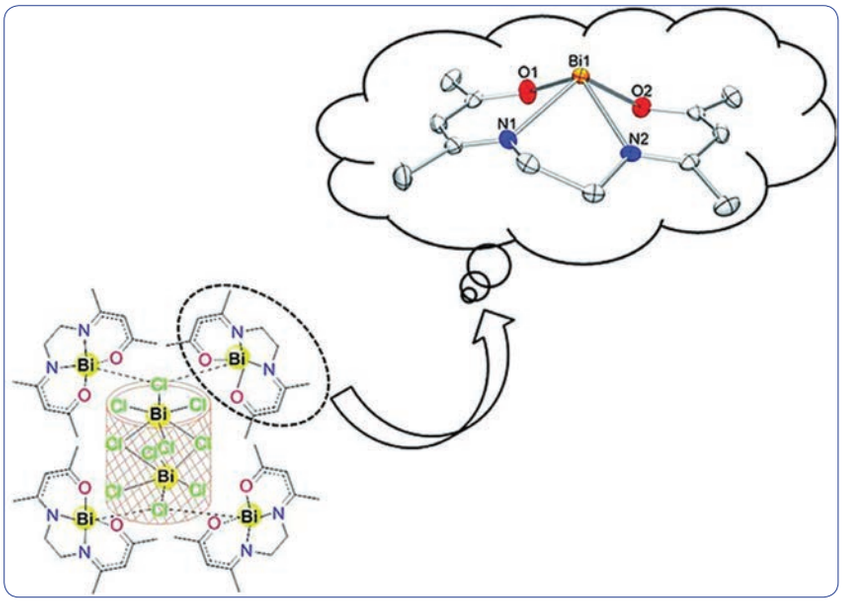


Figure 3: Cationic β-ketoeniminate bismuth complex

3. Synchronization of complex networks with delay"

It is to be noted that we have carried out most of our analysis by employing the paradigmatic Stuart-Landau oscillator, which represents a normal form describing dynamics near a supercritical Hopf bifurcation. Thus, our findings are expected to essentially characterize generic features of coupled systems near Hopf bifurcation. We also firmly believe that our study serves as a genesis and a benchmark for future investigations of AD and OD in more complex systems, in particular, in electronic circuits, lasers, and neuronal networks.

We have established the asymmetry parameter in the nonlocal rotational matrix coupling, which induces the asymmetry in the ensemble of identical nonlinear systems, plays a crucial role in determining the desired dynamical behavior. Hence for appropriate choice of the asymmetry parameter, it is possible to obtain the desired collective states in dynamical systems including neuronal systems, hydrodynamical systems with appropriate nonlocal coupling.

The non-trivial influence of the new diffusive coupling scheme, that we have proposed, on the qualitative properties of dynamical systems indicates a new path for future studies of other collective behaviours in diffusively coupled non-linear oscillators such as chimera states, explosive synchronization and glass states. The framework of our study sheds significantly new insights on the diffusive coupling in manipulating oscillatory dynamics of coupled complex non-linear systems, which will have a strong impact and invoke wide interests in the field of complex systems science as well as in various applications from biology via engineering to social sciences.

We have illustrated that the common force facilitates a global saddle-node bifurcation of the ensemble by breaking the symmetry of the individual oscillators exhibiting pitchfork bifurcation in the absence of the external forcing. As driving/influencing others is a natural behavioural tendency in ecology as well as in epidemics, in neuroscience, in social networks, etc., there lies every possibility that such an emergent behavior may exist in several natural systems. Our results may open up potential activities in the identification of states mimicking chimeras in appropriate natural systems. More significantly, our results will serve as a basic framework to ensure the existence of chimera in laboratory systems before performing experiments using ensembles of such systems.

We have also demonstrated experimentally using electronic circuits that the presence of even a small processing delay in the coupling results in retaining the natural rhythms of real world systems. The processing delay is particularly predominant in networks with large hubs and may be responsible for their dynamic robustness despite the presence of the couplings that can facilitate the onset of quenching of oscillations. We firmly believe that our results will open up the possibility of designing more robust technological networks, human-machine interfaces, etc., by the introduction of the processing delay in their circuit architecture.

The following are the publications resulted from the project.

1. R. Gopal, et al., *Communications in Nonlinear Science and Numerical Simulation* 59, 30-49 (2018).
2. K. Sathiyadevi, et al *Physical Review E*, 95, 042301(1-11) 2017.
3. V.K. Chandrasekar, et al., *Phys. Rev. E,* 94 012208(1-10) (2016).
4. K. Suresh et al., ,*Chaos, Solitons and Fractals*, 93, 235(1-11) 2016.
5. D. V. Senthilkumar, et al., *Chaos,* 94 043112(1-6) (2016).
6. V. K. Chandrasekar et al., *EuroPhysics Letters* ,111 60008 (2015).
7. Wei Zou et al., *Nature Communication,s* 7709 (2015).
8. R. Gopal, et al., *Phys. Rev. E*, 91 062916(1-9) (2015).
9. Wei Zou, et al *Phys. Rev. E*, 90 (2014) 032906(1-5).
10. R. Suresh, et al., *Int. J. Bifurcation Chaos*, 24 1450067 (1-16) (2014).

4. Parallel Adaptive Simulation of Multiscale and Multiphysics Phenomena, CCMS, IISER-TVM

The ultimate aim of this initiative is to build a computing centre at IISER-TVM. The focus of our project is on the design and analysis of adaptive numerical algorithms to simulate fluid flows exhibiting multiple space scales, e.g. low speed flows, and also governed by multiphysics, e.g. multicomponent flows. The goal was to develop a parallel code for simulating three-dimensional fluid dynamics equations. Several time stepping routines, such as Runge-Kutta and multistep methods etc. are implemented in finite volume framework. The codes are to be tested on a cluster to be installed.

5. Incorporation of Plasmonic structures to improve organic Photovoltaics

Objectives	Achievements
Make plastic solar cell with power conversion efficiency (PCE) more than 5 %	Power conversion efficiency (PCE) of more than 5 % was achieved for plastic solar cell.
Study the effects of incorporation of plasmonic structure into organic photovoltaics	Studied the effect of different size and shape of Au nanoparticles in organic photovoltaics
Using polymers of band gap lower than P3HT, and compatible HOMO LUMO energy levels, like PCDTBT and other commercially available polymers try to target a PCE of 10 %.	Used bulk heterojunction devices with PTB7 and $PC_{71}BM$ and an PCE of above 10% is observed.
Make devices of area 1 cm^2 and study the effect of shunt resistance and series resistance on the PCE of such large area devices	Large area devices were made. But the efficiency was very low due to shunt and series resistance. Further optimization is in progress

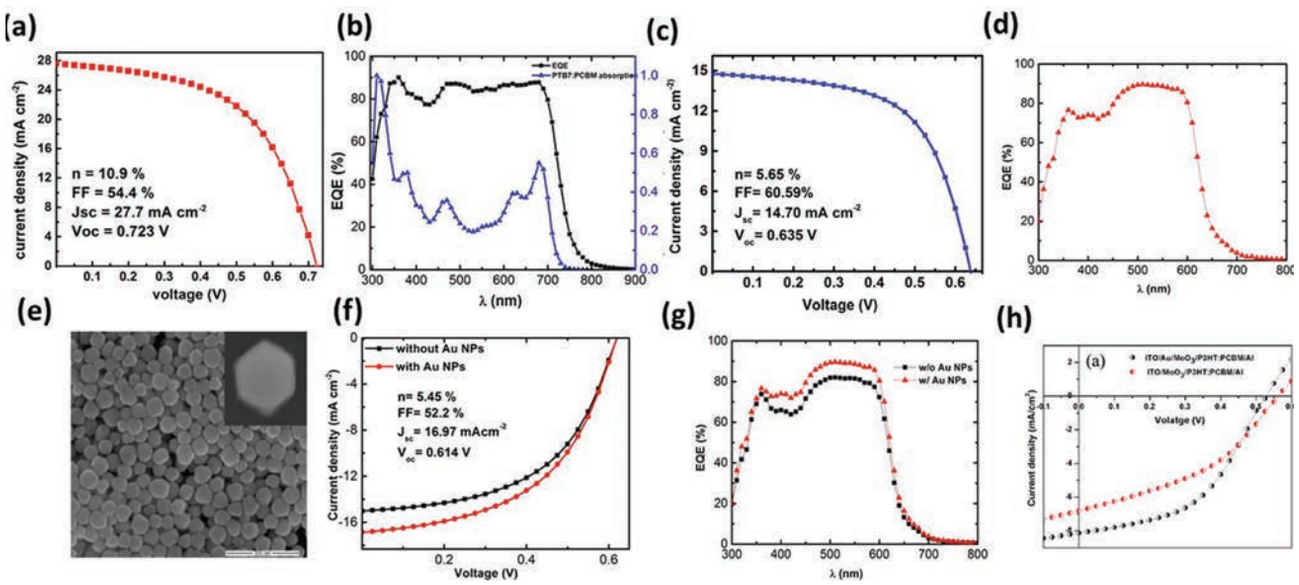


Figure 1 (a), (b) J-V characteristics and EQE of PTB7:PCBM device, **(c), (d)** J-V characteristics and EQE of P3HT:PCBM device **(e)** SEM image of truncated octahedral Au nanoparticles **(f), (g)** J-V characteristics and EQE of plasmonic device **(h)** J-V of plasmonic device.

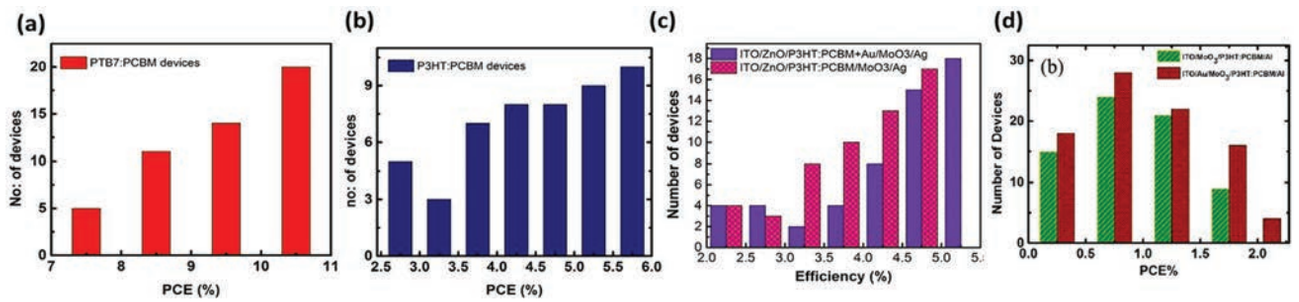


Figure 2: Histogram showing the reproducibility of various devices.

6. Genetic analysis of crossover assurance mechanisms facilitating meiotic chromosome segregation

The Wellcome Trust-DBT India Alliance project was on Genetic analysis of crossover assurance mechanisms facilitating meiotic chromosome segregation. In humans, homologous chromosomes that do not receive a crossover frequently undergo non-disjunction at the first meiotic division, yielding aneuploid gametes that cause congenital birth defects (e,g Down syndrome). In the baker's yeast and mammals, crossovers are generated primarily through a pathway involving the highly conserved mismatch repair related Msh4-Msh5 and Mlh1-Mlh3 complexes. We used high through-put genomic methods to generate genome wide meiotic recombination maps in msh4/5 and mlh3 mutants in the bakers yeast. This information provided novel insights into the functions of these genes. These maps were also useful to understand how cells tolerate fluctuations in crossover frequency. Using ChIP-Seq and cytology, we also determined the genome wide binding sites of the Msh4-Msh5 complex during meiosis. This work has provided new insights into how Msh4-Msh5 and Mlh1-Mlh3 complexes may work together to generate crossovers. Work from this project has been published in leading life science journals like Genetics, PloS Genetics etc

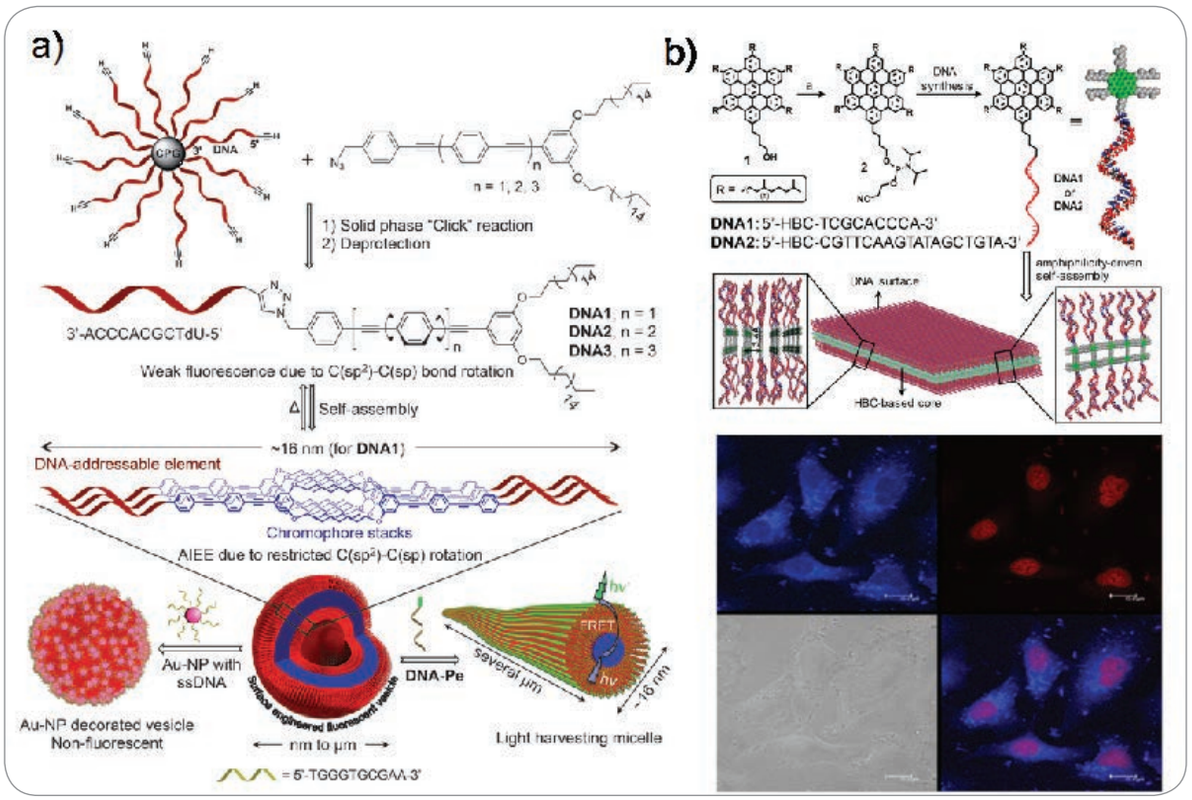
7. Nucleic Acid Pi amphiphiles: Luminescent and addressable nanobiomaterials

The main goal of this proposal is the design of DNA based nanostructures for drug delivery applications. As part of the project novel class of nucleic acid-chromophoric hybrid amphiphiles that are able to self-assemble into luminescent and addressable nanostructures were designed and synthesized. The unique features of these nanostructures include: i) DNA directed surface addressability, ii) biocompatibility and iii) remarkable optical properties due to the presence of chromophoric segment. Nanostructures (vesicle or 2D sheets) derived from the self-assembly of DNA amphiphiles consist of a hydrophobic membrane and a hydrophilicDNA shell, and undoubtedly, these nanostructures could be a potential candidate as nanocarriers for drug delivery applications. This is because hydrophobic membrane of the vesicle allows efficient encapsulation of hydrophobic drugs during the self-assembly while the DNA shell provides excellent bio-compatibility for the system. More importantly, DNA shell of these nanostructures offers the unique opportunity for targeted drug delivery by incorporating specific cell targeting ligands onto the surface of the vesicle through DNA hybridization or by replacing the random DNA sequence with DNA or RNA aptamer for a specific target. The synthesized material was tested for their ability to enter live human cells and their ability to kill cancer cells was also tested.

8. Nucleic acid-π amphiphiles: Luminescent and addressable nanobiomaterials

Reference Number: BT/PR7030/NNT/28/636/2012

Project summary: This research proposal aims at the design and crafting of DNA-based soft and luminescent nanostructures using the bottom-up amphiphilicity-driven self-assembly approach. Since the nanostructures derived from the self-assembly of DNA amphiphiles consists of hydrophobic core and hydrophilic DNA shell, undoubtedly, these nanostructure could be a potential candidate as nanocarriers for drug delivery applications. This is because hydrophobic core of the nanostructure allows efficient encapsulation of hydrophobic drugs during the self-assembly while the DNA shell provides excellent biocompatibility for the system. More importantly, DNA shell of these nanostructures offer the unique opportunity for targeted drug delivery by incorporating specific cell targeting ligands onto the surface of the nanocarrier through DNA hybridization or by replacing the random DNA sequence with DNA or RNA aptamer for a specific target. As a proof-of-concept for the design of DNA based amphiphile and their self-assembly into surface addressable nanostructures, we have shown the synthesis and self-assembly of DNA-



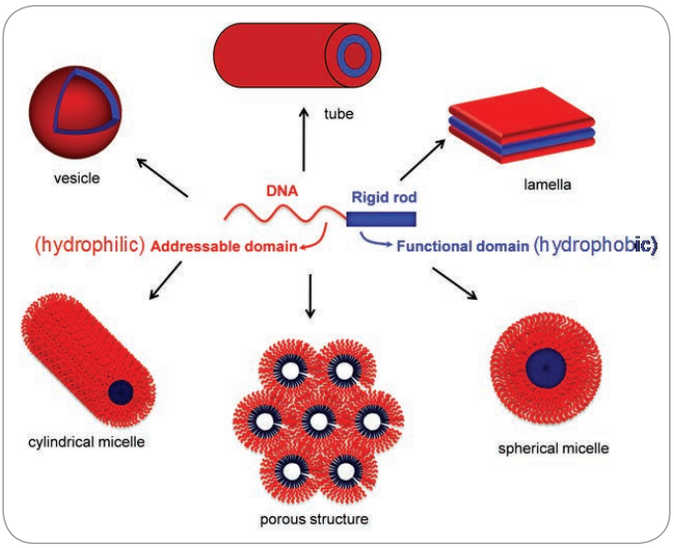
Scheme1. a) Amphiphilicity-driven self-assembly of DNA-OPE into surface addressable vesicles, and **b)** self-assembly of DNA-HBC into nanosheets and their A549 cellular uptake.

oligo(phenylenethynylene) (DNA-OPE) based hybrid amphiphiles, and demonstrated their amphiphilicity-driven self-assembly into vesicular nanostructures. The most remarkable feature of this kind nanostructure is the DNA based surface addressability, which was demonstrated through the surface decoration of the

nanostructures with Au-NPs. This was achieved by the surface modification of the Au-NPs with a DNA sequence, which is complementary to the DNA on the surface of the vesicle (Scheme 1a). Motivated form these results, we envisioned that the replacement of alkyl chains tethered OPE segment of the amphiphile with a strongly π-stacking hydrophobic core such as alkyl chains tethered hexa-peri-benzocoronene (HBC) could lead the self-assembly of the amphiphile into DNA decorated nanosheets due to the strong π-stacking of HBC core in one dimension and the van der Waals interaction of the alkyl chains in other dimension. Keeping this in mind, we have designed a series of DNA-HBC hybrid amphiphiles. Microscopic analyses have shown that DNA-HBC amphiphiles self-assemble into high-aspect-ratio nanosheets with remarkable thermal stability. Nanosheets consist of graphite-like core made of π-stacked HBC with interdigitated alkyl chains, which is decorated with ultra-dense array of hydrophilic DNA on either faces of the sheet. The most attractive feature of the nanosheet is the DNA-directed surface addressability that allows the reversible decoration of the sheet surface with other functional molecules through sequence specific DNA hybridization. We have also exploited the surface addressability of the nanosheets for the integration of cancer cell (A549) targeting ligands (biotin) on their surface, and demonstrated their efficient cellular uptake through the receptor-mediated endocytosis mechanism (Scheme 1b). As expected, no cell permeability was observed for a biotin-receptor negative cell line (WI38). These results clearly suggest that the dense display of biotin on the surface of the sheet efficiently guide the nanostructure to A549 cell line, and these results suggest that nanostructures of this kind would be an ideal candidate for the targeted cancer therapy. Our results clearly suggest that DNA nanostructures would be an ideal candidate for targeted cancer therapy, which is currently progressing in our laboratory.

9. DNA Based Addressable Functional Nanomaterials: Design, Synthesis and Self-assembly of Novel DNA-Rigid Rod Block Copolymers

Crafting of surface engineered nanostructures of π-conjugated molecules with promising optical properties is extremely important for molecular and supramolecular electronics. This is primarily because such nanostructures allow their exact positioning at desired location, a great challenge of nanoelectronics. Furthermore, surface engineered nanostructures offer a unique template for the assembly of other functional molecules. DNA has proven to be an ideal candidate in the creation of surface addressable nanostructures by making use



Scheme 1. Schematic representation depicting the self-assembly of DNA-chromophore hybrid amphiphile into various

of the principles of DNA nanotechnology. One common strategy to obtain π-conjugated chromophoric assemblies using DNA is through the covalent incorporation of multiple chromophores into DNA. Another approach involves DNA templated non-covalent assembly of chromophores along the structural scaffold of DNA. Despite these approaches providing an ideal platform for the helical organization of chromophores, creation of surface engineered nanostructures of diverse morphology is challenging. Very recently, DNA based amphiphiles have emerged as a promising candidate in the creation of responsive nanostructures of distinct morphology. The most remarkable structural features of this class of nanomaterials are surface addressability, biocompatibility, and morphology tunability due to the presence of dense array of DNAs on their surface. More importantly, such nanostructures have shown potential applications in many fields ranging from biomedicine to material sciences. Hydrophobic moieties derived from different classes of non-chromophores including polymers, dendrimers, and long hydrocarbon chains have been used for the design of DNA amphipliles, but chromophoric systems are least exploited. Motivated from these reports, we envisioned that the covalent conjugation of a short DNA (10-mer) into a hydrophobic π-conjugated chromophore would generate a new class of DNA-π-conjugated chromophore amphiphile, and their self-assembly would offer a unique class of DNA-directed surface engineered chromophoric assemblies. Unlike non-chromophoric DNA amphiphiles, the large π-surface of chromophore-based DNA amphiphiles can greatly enhance the self-assembly propensity through strong π-π stacking interaction, and thereby allows modulation of optical properties of the resulting nanostructures (Scheme 1).

Very recently, we have reported a general "click chemistry" based approach for the synthesis of DNA–OPE hybrid amphiphiles (DNA1-3, Figure 2) and studied their reversible self-assembly into surface-engineered vesicles. Various spectroscopic and microscopic analyses revealed that the DNA-OPE amphiphiles self-assembled into supramolecular nano to-micro sized vesicular assemblies. Interestingly, strong aggregation induced enhanced emission (AIEE) is observed for the vesicles due to the restricted rotation of C(sp^2)-C(sp) bonds of the OPE segment of the amphiphiles, which has been proven through the very detailed steady state and time resolved fluorescence analysis. One of the unique features of this class of nanostructures is the DNA directed surface addressability, which was exploited for the reversible organization of Au- NPs and fluorophores on the surface of the vesicle. Significant electronic interaction was observed between chromophore stacks and both Au-NPs

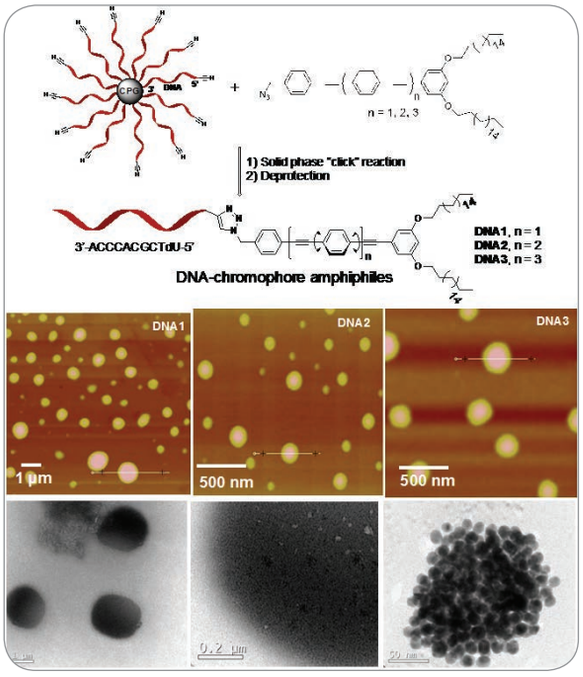


Figure 2. Schematic representation showing the solid phase "click" chemistry approach for the synthesis of DNA-OPE hybrid amphiphiles. AFM images of the self-assembled vesicles (middle row)

and fluorophores in the hybrid nanostructures (Figure 2). Since the length of the DNA duplex can be tuned by altering the number of DNA bases, this assembly offers a unique supramolecular template to study distance-dependent electronic interaction of chromophore stacks with other functional molecules.

The generality of this synthetic strategy is subsequently demonstrated by synthesizing a series of DNA-chromophore amphiphiles including DNA-hexabenzocoronene (DNA4), DNA-porphyrin (DNA5), and DNA-merocyanine (DNA6) amphiphiles. These hybrid amphiphiles also self-assembles into supramolecular vesicular nanostructures due to the amphiphilic nature of the systems as revealed from DLS, AFM, TEM, SEM, and fluorescence microscopic analysis. DNA based surface addressability of the nanostructures is demonstrated through the reversible surface decoration of the vesicular surface with gold nanoparticles. Thus, we have demonstrated a highly efficient modular approach for the synthesis of DNA-chromophore amphiphiles, which, in principle, can be applied into any class of DNA or hydrophobic molecule of interest (Figure 3). Very interestingly, these vesicular systems show excellent cell permeability (HeLa cell), and these experiments are in progress (manuscript under submission).

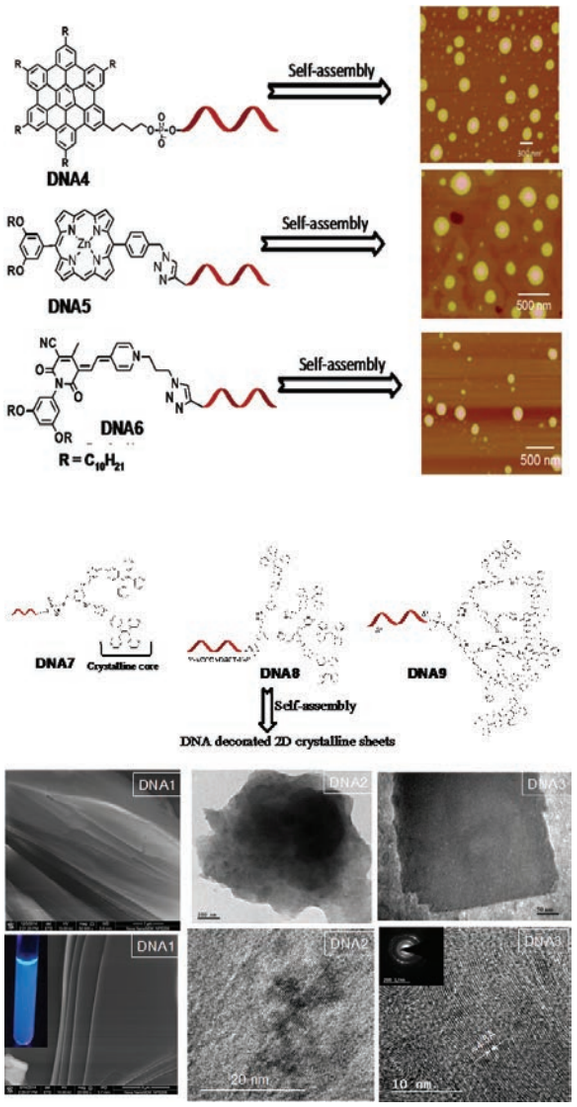


Figure 4. Structure of DNA-TPE dendritic amphiphiles and their self-assembly into crystalline sheets. SEM (middle and bottom left) and TEM images (middle and bottom right) of the sheets

We have also synthesized a series of DNA-tetraphenylethylene (TPE) based dendritic amphiphiles (DNA7-9, Figure 4). In this case, the covalent conjugation of the hydrophobic crystalline TPE unit was achieved through the conventional phosphoramidite chemistry, which gave good yield of conjugation. The spectroscopic analyses of the aggregates show AIEE for the aggregated specie. This is due to the restricted rotation of the TPE molecules in the aggregated state. AFM and SEM, and TEM analysis of the aggregated solution shows the formation of multi layered two- dimensional sheets, which has length of several micrometers. More interestingly, the high resolution TEM shows very high crystallinity for the sheets, and the observed lattice distances are in good agreement with molecular packing of the amphiphiles (Figure 4). Motivated from the crystalline nature of the sheets, our efforts are currently directed to the formation of single crystal of the DNA amphiphiles. We are also investigating these nanostructures using SAXS in

order to understand molecular level packing of the DNA amphiphiles in the sheet structure. From these preliminary investigations, we conclude that the crystalline TPE core induces crystallinity into packing of the amphiphiles.

In summary, we have demonstrated a modular solid phase "click" chemistry approach for the synthesis of DNA-amphiphiles. This synthetic strategy can be applied to the conjugation of DNA into any class of hydrophobic chromophores for the design of new DNA–chromophore amphiphiles. The DNA-directed surface addressability of this class of chromophoric nanostructures was exploited for the reversible organization of Au- NPs and fluorophores on the surface of the vesicle. Significant electronic interaction was observed between chromophore stacks and both Au-NPs and fluorophores in the hybrid nanostructures. Since the length of the DNA duplex can be tuned by altering the number of DNA bases, this assembly offers a unique supramolecular template to study distance dependent electronic interaction of chromophore stacks with other functional molecules. We have also demonstrated that the incorporation of crystalline hydrophobic moieties induces crystallinity into the self-assembly of the amphiphiles, thus offer a unique opportunity to design and synthesis of crystalline nanostructures.

10. Synthesis, Structural Evolution and Physical Properties Tuning of Cluster-Assembled Materials.

In this project, we have synthesized several cluster-based materials. These are well characterized through several state-of-art techniques like single-crystal X-ray diffraction, powder X-ray diffraction, Scanning Electron Microscopy, Transition Electron Microscopy, Mass spectrometry, etc. Several physical properties like optical band gap energy, fluorescence sensing, magnetism, etc. were explored. Among these metathesis on single crystal of alkaline earth metal leads to single crystal of rare earth metals leads to selective sensing of phosphate anions in aqueous medium. This was published in Angew Chem Int. Ed. journal and highlighted in the media. Another work related with platinum nanocluster exhibits interesting Aggregation Induced Emission (AIE). This AIE behaviour was probed for nanothermeter, dry water sensing in organic solvents, etc.

11. Metathesis of Alkanes Using Transition Metal Catalysts.

In this project, we have synthesized several transition metal catalysts and characterised through several techniques. Here we have synthesized copper-based achiral copper based one-dimensional chain structure. This achiral structure converted to chiral three-dimensional compounds that exhibits interesting solvent free catalysis reactions. We have also developed hydrogen bond activation catalysts for Friedel-Craft reaction.

12. A multilayered approach to decipher unchartered mechanisms of asymmetric cell division.

Through the work done using the fellowship grant we have made three important discoveries that will further our understanding of the mechanisms controlling cell cycle and development in bacteria:

i. With the discovery of NstA we have answered the long-standing question of how the DNA decatenation activity of topoisomerase IV (a type II topoisomerase in bacteria), a potent antibiotic target, is modulated during the early stages of cell cycle.

ii. We have demonstrated for the first time a cell cycle-dependent oscillation of the cytoplasmic redox in bacteria. Furthermore, we have defined the importance of this oscillating cytoplasmic redox in bacterial cell cycle progression and development. This discovery not only has long-term implications but also has opened up a unique niche, and tools, in the study of bacterial pathogenesis, cell cycle and development that we plan to pursue.

iii. Finally, our discovery of SpmY that plays a crucial role in regulating the development of the dimporhic bacterial model organism, Caulobacter crescentus, by modulating the activity of a highly conserved σ^{54}-activator, has allowed us to make in-roads in our quest to understand the signaling mechanisms during asymmetric developmental and cell-fate determination.

Publications:

Narayanan, S., Janakiraman, B., Kumar, L., and Radhakrishnan, S.K. (2015) A cell cycle-controlled redox switch regulates the topoisomerase IV activity. *Genes & Development* 29: 1175 -1187. (Highlighted in *Nature India*)

Janakiraman, B., Mignolet, J., Narayanan, S., Viollier, P.H. and Radhakrishnan, S.K. (2016) In-phase oscillation of global regulons is orchestrated by a pole-specific organizer. *Proceedings of the National Academy of Sciences, USA* 113(44): 12550 -12555. (Highlighted in *Science Signaling*).

Narayanan, S., Kumar, L., and Radhakrishnan, S.K. (2018) Sensory domain of the cell cycle kinase CckA regulates the differential DNA binding activity of the master regulator CtrA in *Caulobacter crescentus. BBA Gene Regulatory Mechanisms.* (In Press)

13. Stochastic Landau-Lifshitz-Gilbert equation with Lévy noise and ferromagnetism

The primary aim of this project was to develop a new mathematical theory in the area of random processes, describing how magnetization changes under the influence of jump noise.

The research objectives of this project were to

1. Study the existence of weak solutions to the Stochastic Landau-Lifshitz-Gilbert Equations (SLLGEs) driven by a Levy type noise;
2. Study the regularity of the solutions to SLLES. We expect that the solutions are regular for all times for dimension d=1 and for a short time for d=2;
3. Study of magnetisation reversal via the large deviation principle.
4. Investigate approximation of the SLLGEs by time correlated noise. In particular, understanding the SLLGEs from the point of view of the rough paths.
5. study the Wong-Zakai approximation of the SLLGEs driven by Levy type noise.

5. Research Publications

Journal Articles

1. Consequence of ligand bite angle on bismuth Lewis acidity R. Kannan, S. Kumar, A. P. Andrews, E. D. Jemmis, **A. Venugopal**, Inorg. Chem, 56, 9391, 2017.
2. Disguised hydride in a butylmagnesium cation S. Banerjee, Ankur, A. P. Andrews, **A. Venugopal**, Chem. Commun,54, 5788-5791, 2018
3. Noufal Jaseem and **Anil Shaji**, Two-mode Gaussian product states in a Lossy Interferometer, Quantum Information Processing, 16, 217, 2017.
4. Linta Joseph and **Anil Shaji**, Reference System and Not Completely Positive Open Quantum Dynamics, Physical Review A, 97, 032127, 2018.
5. Noufal Jaseem, S Omkar and **Anil Shaji**, Quantum Critical Environment Assisted Quantum Magnetometer, Journal of Physics A: Mathematical and Theoretical, 51, 175309, 2018.
6. S. Hegde, I. Lodato and **B. Sahoo**, 24+24 Real Scalar Multiplet in Four Dimensional N=2 Conformal Supergravity, Phys. Rev. D 97, no. 6, 066026, 2018.
7. D. Butter, S. Hegde, I. Lodato and **B. Sahoo**, N=2 Dilaton Weyl Multiplet in 4D Supergravity, JHEP 1803, 154, 2018.
8. K. Sathiyadevi, V. K. Chandrasekar, **D. V. Senthilkumar**, and M. Lakshmanan, Distinct collective states due to trade-off between attractive and repulsive couplings, Physical Review E, 97, 032207(1-10), 2018.
9. R. Gopal, V. K. Chandrasekar, **D. V. Senthilkumar**, A. Venkatesan and M. Lakshmanan, Chimera at the phase-flip transition of an ensemble of identical nonlinear oscillators, Communications in Nonlinear Science and Numerical Simulation 59, 30-49, 2018.
10. K. Sathiyadevi, S. Karthiga, V. K. Chandrasekar, **D. V. Senthilkumar**, and M. Lakshmanan, Spontaneous Symmetry Breaking due to the trade-off between attractive and repulsive couplings, Physical Review E, 95, 042301(1-11), 2017.
11. Neeraj K. Rajak, Trupti S. Gaikwad, Amrutha Mukundan, P. Manju, Arya Mohan, Dharmendra K. Singh, A. Thamizhavel and **D. Jaiswal-Nagar**, Growth and physical properties of Bi2Sr2CaCu2O8+x crystals grown by a simple pressure technique and comparison with regrowth self-flux technique J. Crys. Growth 498, 277, 2018.
12. **P. Devaraj**, On reconstruction from discrete local moving averages on locally compact abelain groups, Journal of Mathematical Analysis and Applications, 464, 1119, 2018.
13. A. Sathish Kumar, **P. Devaraj**, Approximation by generalized bivariate Kantorovich sampling type series, The Journal of Analysis, 2018
14. **P. Devaraj**, Certain remarks on functional equations of convolution types, The Journal of Analysis, 2018.
15. S. Yugesh and **P. Devaraj**, Reconstruction of Bivariate Cardinal Splines of Polynomial Growth From Their Local Average Samples, Applied Mathematics E-Notes, 17, 47, 2017.

16. **P. Devaraj** and C. Kavitha, Crypt Analysis of an image compression-encryption and a modified scheme using compressive sensing, Optik-International Journal for Light and Electron Optics, 147, 263, 2017.
17. Krishna S, **Somanathan H**. Intersexual mimicry and flowering phenology facilitate pollination in a dioecious habitat specialist species, Myristica fatua (Myristicaceae). Plant Ecology. doi: 10.1007/s11258-018-0875-6**,** 2018
18. Parthasarathy B, and **Somanathan H**. A method for accurately estimating social spider numbers without colony damage. The Journal of Arachnology, 46(2): 373-375. doi:10.1636/JoA-S-17-075.1, 2018
19. Parthasarathy B, **Somanathan H**. Body condition and food shapes group dispersal but not solitary dispersal in a social spider. Behavioral Ecology. 29:619–627. doi:10.1093/beheco/ary013, 2018
20. Balamurali GS, Nicholls E, **Somanathan H**, Hempel de Ibarra N. A comparative analysis of colour preferences in temperate and tropical social bees. The Science of Nature. 105. doi:10.1007/s00114-017-1531-z, 2018
21. K Bandopadhyay, K N Prajapati and **J Mitra**, Resistive switching in individual ZnO nanorods: delineating the ionic current by photo-stimulation, Nanotechnology, 29, 105701, 2018.
22. P. Dawson, D. Frey , V. Kalathingal , **R. Mehfuz and J. Mitra**, Novel Routes to Electromagnetic Enhancement and its Characterisation in Surface- and Tip-enhanced Raman Scattering, Faraday Discussions, 205, 121, 2017.
23. Vijith Kalathingal, P. Dawson and **J. Mitra**, Scanning tunnelling microscope light emission: Finite temperature current noise and over cut-off emission. Scientific Reports 7, 3530, 2017.
24. **S. Krishnamoorthy**, N.Dummigan, Lifting congruences to weight 3/2, J. Ramanujan Mathematical Society, 431–440, Dec 2017.
25. R. Thomas, J. Kumar, J. George, M. Shanthil, G. N. Naidu, R. S. Swathi and **K. George Thomas** Coupling of Elementary Electronic Excitations: Drawing Parallels Between Excitons and Plasmons J. Phys. Chem. Lett., 9, 919-932, 2018.
26. R. Thomas, A. Thomas, S. Pullanchery, L. Joseph, S. M. Somasundaran, R. S. Swathi, S. K. Gray and **K. George Thomas**, Plexcitons: The Role of Oscillator Strengths and Spectral Widths in Determining Strong Coupling, ACS Nano, 12, 402-415, 2018.
27. P. Zalake, S. Ghosh, S. Narasimhan, and **K. George Thomas**, Descriptor-Based Rational Design of Two-Dimensional Self-Assembled Nanoarchitectures Stabilized by Hydrogen Bonds (with invited cover), Chem. Mater., 29, 7170-7182, 2017.
28. M. Shanthil, H. Fathima and **K. George Thomas**, Cost-Effective Plasmonic Platforms: Glass Capillaries Decorated with Ag@SiO2 Nanoparticles on Inner Walls as SERS Substrates, ACS Appl. Mater. Interfaces, 9, 19470-19477, 2017.
29. K. B. Subila, K Sandeep, E. M. Thomas, J. Ghatak, S. M. Shivaprasad, and **K. George Thomas**, CdSe-CdTe Heterojunction Nanorods: Role of CdTe Segment in Modulating the Charge Transfer Processes, ACS Omega, 2, 5150-5158 2017.

30. R. Sethy, J. Kumar, R. Métivier, M. Louis, K. Nakatani, N. M. T. Mecheri, A. Subhakumari, **K. George Thomas**, T. Kawai, T. Nakashima, Enantioselective Light Harvesting with Perylenediimide Guests on Self-Assembled Chiral Naphthalenediimide Nanofibers, Angew. Chem. Int. Ed.129,15249 –15253, 2017
31. An Implicit–Explicit Scheme Accurate at Low Mach Numbers for the Wave Equation System **K R Arun**
32. C. Klingenberg, M. Westdickenberg (eds), Theory, Numerics and Applications of Hyperbolic Problems II. HYP 2016, Springer Proceedings in Mathematics and Statistics, Vol. 237, pp 97-109, 2018. **K R Arun**
33. Randhir Kumar, M. Balasubrahmaniyam, **K. Shadak Alee**, S. Mujumdar, Temporal complexity in emission from Anderson localized lasers, Phy. Rev. A., 96, 063816, 2017.
34. Landge AN, Radhakrishnan D, Kareeem, A, **Prasad K** Intermediate developmental phases during regeneration. Plant Cell Physiology doi: 10.1093/pcp/pcy011, 2018 (* Corresponding author)
35. Radhakrishnan, D., Kareem, A., Durgaprasad, K., Sreeraj, E., Sugimoto, K., & **Prasad K**. Shoot regeneration: a journey from acquisition of competence to completion. Current Opinion in Plant Biology, 41:23–31. doi.org/10.1016/j.pbi.2017.08.001, 2018 (* Corresponding author)
36. Liu J, Hu X, Qin P, **Prasad K**, Hu Y, Xu L. The WOX11-LBD16 pathway promotes pluripotency acquisition in callus cells during de novo shoot regeneration in Arabidopsis tissue culture. Plant Cell Physiology, https://doi.org/10.1093/pcp/pcy010, 2018.
37. Fonseca, S., Radhakrishnan, D., **Prasad K**. & Chini, A. Fungal production and manipulation of plant hormones. Current Medicinal Chemistry, doi:10.2174/0929867324666170314150827, 2018.
38. Synthesis and Revesrible Hydration of a Pseudoprotein: A fully Organic Polymeric Desiccant via Multiple Single-Crystal-to-Single-Crystal Transformations R. Mohanrao, **K. M. Sureshan*** Angew. Chem. Int. Ed., 57, 12435, 2018.
39. Tunable Mechanical Response from a Crystal Undergoing Topochemical Dimerization: Instant Explosion at Faster Rate and Chemical Storage of 'Harvestable Explosion' at Slower Rate A. Ravi, **K. M. Sureshan*** Angew. Chem. Int. Ed, 57, 9362, 2018.
40. Organogel-derived covalent-noncovalent hybrid polymers as alkali metal ion scavengers for partial deionization of water A. Prathap, C. Raju, **K. M. Sureshan*** ACS Appl. Mater. Interfaces, 10, 15183, 2018.
41. Model molecules to classify CH…O hydrogen bonds. A. M. Vibhte, U. D. Priyakumar, A. Ravi, **K. M. Sureshan*** Chem. Commun, 54, 4629, 2018.
42. Chirality-controlled spontaneous twisting of crystals due to thermal topochemical reaction R. Rai, B. P. Krishnan, **K. M. Sureshan*** Proc. Natl. Acad. Sci. U. S. A. , 115, 2896-2901, 2018
43. Three-way competition in topochemical reaction: Permutative azide-alkyne cycloaddition reactions leading to a vast library of products in the crystal K. Hema, **K. M. Sureshan*** CrystEngComm, 20, 1478-1482, 2018.
44. A library of multi-purpose supramolecular supergelators: Fabrication of structured silica, porous platics and fluorescent gel B. P. Krishnan, **K. M. Sureshan*** Chem. Asian. J, 13, 187-193, 2018
45. Organogelator-cellulose composite for practical and eco-friendly marine oil-spill recovery A. Pratap, **K. M. Sureshan*** Angew. Chem. Int. Ed., 56, 9405-9409, 2017.

46. Regioselective SN2 reactions for rapid syntheses of azido-inositols by one-pot sequence-specific nucleophilyses A, Ravi, Syed Zahid Hassan, A. N. Vanikrishna, **K. M. Sureshan*** Chem. Commun., 53, 3971-3973., 2017.
47. Topochemical azide-alkyne cycloaddition reaction in gels: Size-tunable synthesis of triazole-linked polypeptides B. P Krishnan, **K. M Sureshan*** J. Am. Chem. Soc., 139, 1584-1589., 2017.
48. **M.P. Rajan**, G.D. Reddy, A regularized iterative scheme for solving singularly perturbed elliptic PDE, Mathematics and Computers in Simulation 144, 21–34, 2018.
49. **M. P. Rajan**, G.D. Reddy, An Iterative Tikhonov Regularization for Solving Singularly Perturbed Elliptic PDE. Mediterranean Journal of Mathematics, 14 (4), 2017
50. Jaise Jose and **M.P. Rajan**, A Simplified Landweber Iteration for Solving Nonlinear Ill-Posed Problems, Int. J. Appl. Comput. Math, 3 (Suppl 1):S1001–S1018, 2017.
51. Athulya Ram S, **M.P. Rajan**, Network diffusion model for neurodegenerative diseases with internal and external diffusion, International Journal of Advances in Science Engineering and Technology, 5(3), 76-79, 2017.
52. Neha P.R.S, **M.P. Rajan**, 3 – compartment model for chemotherapy of heterogenous tumors incorporating pharmacokinetics of the drug, International Journal of Advances in Science Engineering and Technology, 5(3), 80-83, 2017.
53. Prasad VS, C.S. Tiwari, S. Radhakrishnan, P. M. Ajayan and **M. M. Shaijumon**, Oxygen incorporated WS2 Nanoclusters with Superior Electrocatalytic Properties for Hydrogen Evolution Reaction, Nanoscale 10, 9516-9524, 2018.
54. K. P. Lakshmi, K. J. Janas and **M. M. Shaijumon**, Antimony Oxychloride/Graphene Aerogel Composite as Anode Material for Sodium and Lithium Ion Batteries, Carbon 131, 86 – 93, 2018.
55. B.Binson, S. Ullattil, R. Prasannachandran, J. Kavil, P. Periyat and **M. M. Shaijumon**, Ti3+ induced Brown TiO2 Nanotubes for High Performance Sodium Ion Hybrid Capacitors, ACS Sustainable Chemistry & Engineering 6, 5401-5412, 2018.
56. S.M.Bhat, B. Babu, M. Feygenson, Joerg C. Neuefeind, and **M. M. Shaijumon**, Nanostructured Na2Ti9O19 for Hybrid Sodium-Ion Capacitors with Excellent Rate Capability, ACS Applied Mater. Interfaces, 10, 437−447, 2018.
57. H. Banda, D. Damien, K. Nagarajan, Ashish Raj, M. Hariharan and **M. M.Shaijumon**, Twisted Perylene Diimides with tunable redox properties for Organic Sodium-Ion Batteries, Adv. Energy Mater., 1701316, 2017.
58. C. H. Sharma, A. P. Surendran, A. Varghese, and **M. Thalakulam**, Sci Rep 8, 3055, 2018.
59. H. Banda, D. Damien, K. Nagarajan, A. R. Mallia **M. Hariharan** M. M. Shaijumon, Twisted Perylene Diimides with Tunable Redox Properties for Organic Sodium-Ion Batteries, Adv. Energy Mater. 7,1701316.
60. K. Nagarajan, G. Gopan, R. T. Cheriya and **M. Hariharan**, Long alkyl side-chains impede exciton interaction in organic light harvesting crystals, Chem. Commun., 53, 7409-7411, 2017 (Emerging Investigators Issue 2017).

61. A. M. Philip, F. Kuriakose, and **M. Hariharan**, Unsolicited Photoexcited-State Pathways Relegate the Long-Lived Charge Separation in Self-Assembled Nucleobase–Arene Conjugate, J. Phys. Chem. C, 121, 42, 23259-23267, 2017.

62. S. K. Rajagopal, A. R. Mallia and **M. Hariharan**, Enhanced intersystem crossing in carbonylpyrenes, Phys. Chem. Chem. Phys., 19, 28225-28231, 2017.

63. Y. Zhang, K. de La Harpe, **M. Hariharan** and B. Kohler, Excited-state dynamics of mononucleotides and DNA strands in a deep eutectic solvent, Faraday Discuss., 207, 267-282, 2018.

64. M. Mohan, S. Ramkumar, and **M. A. G. Namboothiry**, Plasmon enhanced power conversion efficiency in inverted bulk heterojunction organic solar cell, Proc. SPIE 10363(10363 - 10363 – 10367, 2017.

65. Rajarama Bhat, B. V.; Lindsay, J. Martin; **Mukherjee Mithun** , Additive units of product systems. Trans. Amer. Math. Soc. 370, no. 4, 2605–2637., 2018.

66. **Mukherjee Mithun**, Structure theorem of the generator of a norm continuous completely positive semigroup: an alternative proof using Bures distance. Positivity 22, no. 1, 27–37., 2018

67. Abdel-Razek O, **Sadananda S N**, Li X, Cermakova L, Frohlich J and Brunham LR. (2018) Increased prevalence of clinical and subclinical atherosclerosis in patients with damaging mutations in ABCA1 or APOA1.J Clin Lipidol. 12(1):116-121., 2018.

68. Chakraborty, P., Ajith, V.P., Dutta, A. and **Nishant K T**. Genome wide analysis of meiotic recombination in yeast: for a few SNPs more. IUBMB Life 70: 743-752. 2018

69. Dutta, A., Lin, G., Pankajam, A.V., Chakraborty, P., Bhat, N., Steinmetz, L.M. and **Nishant K T**. Genome dynamics of hybrid Saccharomyces cerevisiae during vegetative and meiotic divisions. G3 (Bethesda) 7: 3669-3679. 2017

70. Al-Sweel, N., Raghavan, V., Dutta, A., Ajith, V.P., Di Vietro, L., Khondakar, N., Manhart, C.M., Surtees, J.A., **Nishant K T**. and Alani, E. Mlh3 mutations in baker's yeast alter meiotic recombination outcomes by increasing noncrossover events genome-wide. PLoS Genet. 13: e1006974. 2017

71. Hadiya M A, Reshmi Thomas and **R S Swathi**, Overwhelming Analogies between Plasmon Hybridization Theory and Molecular Orbital Theory Revealed: The Story of Plasmonic Heterodimers, J. Phys. Chem. C, 122, 7382, 2018.

72. Reshmi Thomas, Jatish Kumar, Jino George, M Shanthil, G Narmada Naidu, **R S Swathi** and K George Thomas, Coupling of Elementary Electronic Excitations: Drawing Parallels Between Excitons and Plasmons, J. Phys. Chem. Lett., 9, 919, 2018 [Highlighted as cover].

73. Reshmi Thomas, Anoop Thomas, Saranya P, Linta J, Sanoop M S, **R S Swathi**, Stephen Gray and K George Thomas, Plexcitons: The Role of Oscillator Strengths and Spectral Widths in Determining Strong Coupling, ACS Nano, 12, 402, 2018.

74. S Chandra Shekar and **R S Swathi**, Molecular Switching on Graphyne and Graphdiyne: Realizing Functional Carbon Networks in Synergy with Graphene, Carbon, 126, 489, 2018.

75. C P Vaisakh, Mithun Kumar Bhowal, Sunanda Dhar and **Rajeev N Kini**, Enhanced terahertz emission from Bi incorporated GaSb, J. Phys D, 51 065112, 2018.
76. C P Vaisakh, C T Foxon, S V Novikov and **R N Kini**, Terahertz conductivity of the highly mismatched amorphous alloy, GaNBi, Semicond. Sci. Technol. 32, 125009, 2017.
77. Rajender Vemula, Nathan C. Wilde, **Rajendar Goreti**, and E. J. Corey; A New, Short, and Stereocontrolled Synthesis of C2 Symmetric 1,2- Diamines, Org. Lett, 19, 3883-3886, 2017.
78. K. S. Asha, Niyaz Ahmed, **R. Nath**, Denis Kuznetsov and Sukhendu Mandal, Impact of Postsynthetic Modification on the Electrical and Magnetic Properties of Materials, Inorg. Chem., 56, 7316, 2017.
79. Purna Chandra Rao, Sonu Pratap Chaudhary, U. Arjun, Denis Kuznetsov, **R. Nath**, Sukhendu Mandal, Magnetic Diversity in Three-dimensional 2-Fold Interpenetrated Structure: Story of Two Compounds, Dalton. Trans., 46, 12804, 2017.
80. N. Ahmed, P. Khuntia, K. M. Ranjith, H. Rosner, M. Baenitz, A. A. Tsirlin, and **R. Nath**, Alternating spin chain compound AgVOAsO4 probed by 75As NMR, Phys. Rev. B, 96, 224423, 2017.
81. P. Bag and **R. Nath**, First order magneto-structural transition and magnetocaloric effect in MnNiGe0.9Ga0.1, Solid State Commun. 270, 54, 2018.
82. S. N. Panja, L. Harnagea, J. Kumar, P. K. Mukharjee, **R. Nath**, A. K. Nigam, and S. Nair, Coupled magnetic and ferroelectric states in the distorted honeycomb system Fe4Ta2O9, Phys. Rev. B 98, 024410, 2018.
83. P. Mani, P. Mukharjee, N. G. Hegde, **R. Nath**, and S. Mandal, Triangular and Linear Co3 Cluster based Metal-Organic Frameworks: Structures and Magnetic Properties, J. Solid. State. Chem., 265, 123, 2018.
84. S.S. Islam, K. M. Ranjith, M. Baenitz, Y. Skourski, A. A. Tsirlin, and **R. Nath**, Frustration of square cupola in Sr(TiO)Cu4(PO4)4, Phys. Rev. B 97, 174432, 2018.
85. Sarma S, Pandey AK, **Ravi M**, Sreelakshmi,Y and Sharma R. MutS-Homolog2 Silencing Generates Tetraploid Meiocytes In Tomato (Solanum lycopersicum) . Plant Direct. 2:1–15. https://doi.org/10.1002/pld3.17. 2018
86. S. K. Albert, I. Sivakumar, M. Golla, H. V. P. Thelu, N. Krishnan, J. Libin K. L., Ashish, **R. Varghese**, J. Am. Chem. Soc., 39, 17799, 2017
87. S. K. Albert, M. Golla, H. V. P. Thelu, N. Krishnan, **R. Varghese**, Chem. Eur. J., 23, 8348, 2017
88. S. K. Albert, H. V. P. Thelu, M. Golla, N. Krishnan, **R. Varghese**, Nanoscale, 9, 5425, 2017
89. H. V. P. Thelu, S. K. Albert, M. Golla, N. Krishnan, D. Ram, S. M. Srinivasula and **R. Varghese**, Nanoscale, 10, 222, 2018
90. Chandrashekaran Arumugasamy, **Sachindranath Jayaraman**, Full column rank preservers that preserve semipositivity of matrices, Special Matrices, 6, 37-45, 2018.
91. Chandrashekaran Arumugasamy, **Sachindranath Jayaraman**, Linear maps on M_n(R) preserving Schur stable matrices, Bulletin of Kerala Mathematics Association (Special Issue of International Conference on Linear Algebra and its Applications, ICLAA 2017), 16(1), 127-137, 2018.
92. Chandrashekaran Arumugasamy, **Sachindranath Jayaraman**, Vatsalkumar N. Mer, Semipositivity

of linear maps relative to proper cones in finite dimensional real Hilbert spaces, Electronic Journal of Linear Algebra, 34, 304-319, 2018.

93. **Chatterjee Saikat**; Lahiri, Amitabha; Sengupta Ambar N. Connections on decorated path space bundles. J. Geom. Phys. 112, 147–174, 2017.
94. **Chatterjee Saikat**; Lahiri Amitabha; Sengupta Ambar N. Gauge transformations for categorical bundles. J. Geom. Phys. 133, 219-241, 2017.
95. **Chatterjee Saikat**, Cat-valued sheaves. Indian Journal of pure and applied mathematics 49 , 451-503, 2018
96. Sandeep Kumar Pathak, P Visakhi, Umesh Kacherki, **Sainul Abideen P**, Siladitya,(Ed), Proceedings of National Conference on Role of Libraries for Excellence in Research, IISER Bhopal, Today & Tomorrow's Printers and Publishers, New Delhi, ISBN 81-7019-594-9, 2018
97. Dan, Krishanu; **Pal Sarbeswar** Brill-Noether Loci over very general quintic hypersur-face. (Accepted for publication in Bulletin des sciences mathematiques)
98. R. Sambathkumar, R. Akkerman, S. Dastidar, P. Roelandt, M. Kumar, M. Bajaj, A.M. Rosa, N. Helsen, V. Vanslembrouck, E. Kalo, **S. Khurana**, J. Laureys, C. Gysemans, M.M. Faas, P. de Vos, C.M. Verfaillie. Generation of hepatocyte and endocrine pancreatic-like cells from human induced endodermal progenitor cells. PLoS One 2018 May 11;13(5):e0197046.
99. I.M. Roy, A. Biswas, C.M. Verfaillie, **S. Khurana***. Energy producing metabolic pathways in functional regulation of the hematopoietic stem cells. IUBMB Life 70(7):612-624, 2018. Review * Co-corresponding authors
100. V.D. Roobrouck, E. Wolfs, M. Delforge, D. Broekaert, S. Chakraborty, K. Sels, T. Vanwelden, B. Holvoet, L. Lhoest, **S. Khurana**, S. Pandey, C. Hoornaert, P. Ponsaerts, T. Struys, N. Boeckx, P. Vandenberghe, C.M. Deroose, C.M. Verfaillie. Multipotent Adult Progenitor Cells improve the hematopoietic function in myelodysplasia. Cytotherapy 19(6):744-755, 2017.
101. JK Manesia, M Franch, D Tabas-Madrid, R Nogales-Cadenas, T Vanwelden, E Van Den Bosch, Z Xu, S Aerts, A Pascual-Montano, **S. Khurana***, CM Verfaillie*. Distinct Molecular Signature of Fetal Liver and Adult Hematopoietic stem cells Identifies Novel Regulators of Hematopoietic stem cells. Stem Cells and Development 15;26 (8):573-584, 2017. *Co-corresponding author
102. T. Biswas, **S. Dharmatti**, Control problems and invariant subspaces for Sabra Shell model of turbulence, Evolution Equations and Control Theory, 7, no.3 417-445, 2018
103. G. Bharali and **Sridharan S**. "Holomorphic correspondences related to finitely generated rational semigroups", vol. 28, No. 14. (1750108), 2017
104. H P Thelu, Shine K. Albert, M Golla, N Krishnan, Divya, **S. M. Srinivasula** and R Varghese Size controllable DNA nanogels from the self-assembly of DNA nanostructures through multivalent host–guest interactions, Nanoscale, 10, 222–230, 2018
105. P. Mani, K. M. Ranjith, **S. Mandal**, A. K. Paul, Comparative Studies on Optical and Electronic Behavior

of Lanthanide-based Coordination Polymers: Synthesis, Structure, Absorption-Emission and Magnetic Properties, J. Chem. Sci., 130, 60, 2018

106. P. C. Rao, **S. Mandal**, Friedel–Crafts Alkylation of Indoles with Nitroalkenes through Hydrogen-Bond-Donating Metal–Organic Framework, ChemCatChem, 9, 1172, 2017.
107. P. Mani, A. A. Ojha, V. S. Reddy, **S. Mandal**, "Turn-on" Fluorescence Sensing and Discriminative Detection of Aliphatic Amines Using a 5-Fold-Interpenetrated Coordination Polymer, Inorg. Chem., 56, 6772, 2017.
108. K. S. Asha, N. Ahmed, R. Nath, D. Kuznetsov, **S. Mandal**, Impact of Postsynthetic Modification on the Electrical and Magnetic Properties of Materials, Inorg. Chem., 56, 7316, 2017.
109. P. C. Rao, S. P. Chaudhary, U. Arjun, D. Kuznetsov, R. C. Nath, **S. Mandal**, Magnetic diversity in three-dimensional two-fold-interpenetrated structures: a story of two compounds, Dalton Trans., 46, 12804, 2017.
110. George, D. Selvan, **S. Mandal**, Catalytic Reduction of Toxic Nitroarenes in Aqueous Medium Using Worm-Like Rhodium Nanoparticles. Chemistry Select, 2, 9718, 2017.
111. P. Mani, A. Sheelam, S. Das, G. Wang, V. K. Ramani, K. Ramanujam, S. K. Pati, **S. Mandal**, Cobalt-Based Coordination Polymer for Oxygen Reduction Reaction, ACS Omega, 3, 3830, 2018.
112. P. Mani, P. Mukharjee, N. G. Hegde, R. C. Nath, **S. Mandal**, Triangular and linear Co3 cluster based metal-organic frameworks: Structures and magnetic properties, J. Solid State Chem., 265, 123, 2018.
113. Pankajakshan, M. Sinha, A. A. Ojha, **S. Mandal**, Water-Stable Nanoscale Zirconium-Based Metal–Organic Frameworks for the Effective Removal of Glyphosate from Aqueous Media, ACS Omega, 3, 7832, 2018.
114. Asha P, **S. Mandal**, Series of Mn(II)/Mg(II)/Zn(II) Coordination Polymers with Azo/Alkene Functionalized Ligands, Cryst. Growth Des., 18, 4937, 2018.
115. R. Bhagya Lakshmi, V. M. Nair, **T. K. Manna**, Regulators of spindle microtubules and their mechanisms: living together matters, IUBMB Life, 70, 101, 2017. (review)
116. G. E. Thomas, M. R. Renjith, **T. K. Manna**, Kinetochore-Microtubule Interactions in Chromosome Segregation: lessons from yeast and mammalian cells, Biochemical Journal, 474, 3559, 2017. (review)
117. V. P. Cyriac, **Ullasa Kodandaramaiah**. Digging their own macroevolutionary grave, Fossoriality as an evolutionary dead-end in snakes. J. Evol. Biol. 52, 587-598, 2017.
118. R. K. Sahoo, A. D. Warren, S. C. Collins, **Ullasa Kodandaramaiah**. Hostplant change and paleoclimatic events explain diversification shifts in skipper butterflies (Family, Hesperiidae). BMC Evol. Biol. 17, 174, 2017.
119. K. G. S. Dani, **Kodandaramaiah U**. Plant and animal reproductive strategies, Lessons from offspring size and number tradeoffs. Front. Ecol. Evol. 5, 38, 2017.
120. **Kodandaramaiah U**, Braby MF, Grund R, Müller CJ, Wahlberg N. Phylogenetic relationships, biogeography and diversification of Coenonymphina butterflies (Nymphalidae, Satyrinae), intercontinental dispersal of a southern Gondwanan group? Syst. Entomol. 43, 798–809, 2018
121. R. K. Sahoo, D. J. Lohman, N. Wahlberg, C. J. Müller, O. Brattström, S. C. Collins, D. Peggie, K. Aduse-Poku, **Kodandaramaiah U**. Evolution of Hypolimnas butterflies (Nymphalidae), Out-of-Africa origin and Wolbachia-mediated introgression. Mol. Phylogenet. Evol. 123, 50-58, 2018.

122. V. P. Cyriac, **Kodandaramaiah U**. Digging their own macroevolutionary grave, Fossoriality as an evolutionary dead-end in snakes. J. Evol. Biol. 31, 587-598, 2018.

123. G. Murali, **Kodandaramaiah U**. Body size and evolution of motion dazzle coloration in lizards. Behav. Ecol. 29, 79-86, 2018.

124. P. Agarwal, **U. Manna**, D. Mukherjee, Stochastic Control of Tidal Dynamics Equation with Levy Noise, Appl. Math. Optim., Available Online DOI 10.1007/s00245-017-9440-2, 2017.

125. **U. Manna**, D. Mukherjee, Strong solutions of stochastic models for viscoelastic flows of Oldroyd type, Nonlinear Anal., 165, pp 198 – 242, 2017.

126. Prabu Mani, Anupam Anand Ojha, **Vennapusa Sivaranjana Reddy** and Sukhendu Mandal, Turn-on" Fluorescence Sensing and Discriminative Detection of Aliphatic Amines Using a 5-Fold-Interpenenetrated Coordination Polymer, Inorg. Chem. 56, 6772, 2017.

127. **Vennapusa Sivaranjana Reddy** and Stepahn Irle, Indirect intersystem crossing (S1→T3/T2→T1) promoted by the Jahn-Teller effect in cycloparaphenylenes, J. Chem. Theory Comput., 13, 4944, 2017

128. A. Antony. G.Donadze, V.P Sivaprasad and **V. Z. Thomas**, The second stable homotopy group of the Eilenberg-Maclane space, Math. Z., 287,1327–1342, 2017.

129. URS Kusuma, SV Bhat, **Vinayak Kamble**, On exceeding the solubility limit of Cr+3 dopants in SnO2 nanoparticles based dilute magnetic semiconductors, Journal of Applied Physics, 123 (16), 161518, 2018.

130. S Beheraa, **V Kamble**, S Vitta, A Umarji, C Shivakumaraa, Synthesis, structure and thermoelectric properties of La1-xNaxCoO3 perovskite oxides, Bulletin of Materials Science 40 (7), 1291, 2018.

131. A. C. Jiji, A. Arshad, S. R. Dhanya, P. S. Shabana, C. K. Mehjubin and **V. Vijayan**, Zn2+ Interrupts R4-R3 Association Leading to Accelerated Aggregation of Tau ProteinChemistry–A European Journal, 23, 16976-16979, 2017.

132. S. Thirunavukkuarasu, A. George, A. Thomas, A. Thomas, **V. Vijayan** and K. G. Thomas, InP Quantum Dots: Probing the Active Domain of Tau Peptide Using Energy Transfer,The Journal of Physical Chemistry C, 122, 14168-14176.3, 2018.

133. K. K. Gireesh, A. Shine, R. B. Lakshmi, **V. Vijayan** and T. K. Manna, GTP-binding facilitates EB1 recruitment onto microtubules by relieving its auto-inhibition, Scientific reports, 8, 9792, 2018.

134. Planck Collaboration N. Aghanim et. Al. (153 authors) Planck intermediate results LI, Features in the cosmic microwave background temperature power spectrum and shifts in cosmological parameters, Astronomy & Astrophysics, 607, 95, 2017.

Book Chapter

1. **Anil Shaji**, Non-Classical correlations in information processing , Book Chapter in “Lectures on General Quantum Correlations and their Applications”, Fanchini, Felipe Fernandes, Soares Pinto, Diogo de Oliveira, Adesso, Gerardo (Eds.). Springer 2017.

2. Filiault DL, Seymour DK, **Maruthachalam R**, and Maloof J. The generation of double haploid lines for QTL mapping. Methods Mol Biol. 1610, 39-57. doi: 10.1007/978-1-4939-7003-2_4 2017.

3. Vancsok C, Peñaranda MMD, **V. Stalin Raj**, Leroy B, Jazowiecka-Rakus J, Boutier M, Gao Y, Wilkie GS, Suárez NM, Wattiez R, Gillet L, Davison AJ, Vanderplasschen AFC. Proteomic and Functional Analyses of the Virion Transmembrane Proteome of Cyprinid Herpesvirus 3. J Virol. 91(21). pii: e01209-17, 2017.

Any Other (Special Mention)

Dr. Soumen Basak has been selected as an external collaborator of LiteBIRD satellite mission, jointly proposed by JAXA and NASA. Currently he is working for ‘Phase A1’ study of this mission to forecast it’s potential to measure B-mode of Cosmic Microwave Background polarization.

6. AWARDS AND HONOURS

Sl. No	Faculty	Honors/ Awards
1	Dr. Ajay Venugopal	Kerala Young Scientist Award 2018 Awarded by Kerala State Council for Science, Technology & Environment, Govt. of Kerala
2	Dr. K M Sureshan	Fellow of Royal Society of Chemistry (2018): invited under the Leader of the Field Category
3	Dr. K M Sureshan	Alexander von Humboldt return Fellowship (2018)
4	Dr. K M Sureshan	MRSI Medal of Materials Research Society of India (2017)
5	Prof. M.P. Rajan	Dr. APJ Abdul Kalam Life Time Achievement National Award for distinguished contribution in the development of the nation and achieving outstanding excellence in the field of Teaching, Research and Publications by International Institute for Social and Economic Reforms, Bangalore.
6	Dr. Mahesh Hariharan	Featured in Chem. Commun. Emerging Investigators Issue 2017
7	Dr. Mahesh Hariharan	Chemical Society of Japan Distinguished Lectureship Award, 2017
8	Dr. Ramanathan Natesh	Invited by DBT Secretory as panelist for discussion at "DBT-EMBL conference on areas of bioimaging, structural biology and bioinformatics", to participate as Panellist for SessionI on "Recent Developments in Structural Biology" and provide valuable inputs for possible collaborations with EMBL in research and training. Organised by DBT at New Delhi on 12-13 Oct 2017.
9	Dr. Ramanathan Natesh	18th July 2017 Elected as founding President of Cryo Electron Microscopy and 3 Dimensional Image Processing (CEM3DIP) Society of India. Society Registered on 9th May 2018.
10	Dr. Soumen Basak	The Gruber Foundation 2018 Cosmology Prize
11	Dr. Subrata Kundu	Early Career Research (ECR) Award from Science and Engineering Research Board (SERB) has been received.
12	Dr. Viji Thomas	Offered a Visiting Assistant Professor Position at Penn State Altoona, PA, USA, 2017
13	Dr. Viji Thomas	Offered a Visiting Assistant Professor position at Adelphi University, NY, USA to head their international program

7. Other Academic Activities

The faculties of the institute have participated in various national and international conferences as listed below.

Conferences/Workshops/Symposia Attended

Sl No	Name of Faculty	Name of Conference/ Workshop/ Symposia	Venue	Date	International/ National
1	Dr. A. Thirumurugan	13th JNC conference on the Chemistry of Materials	Trivandrum	Oct 01-03, 2017	National
2	Dr. A. Thirumurugan	Ninth National Symposium on Recent Trends in Chemistry – RTC-2018	Madurai	Jan 18, 2018	National
3	Dr. Ajay Venugopal	Indo-US Bilateral Workshop on Organometallic Chemistry: From Fundamentals to Applications	Lonavala, India	Dec 6-10, 2017	International
4	Dr. Ajay Venugopal	Modern Trends in Inorganic Chemistry XVII	Pune, India	Dec 11-14, 2017	National
5	Dr. Ajay Venugopal	Dalton 2018	Warwick, United Kingdom	Apr 3-5, 2018	International
6	Dr. Ajay Venugopal	International Conference on Organometallic Chemistry	Florence, Italy	Jul 15-20, 2018	International
7	Dr. Bikas C. Das	iCOLD 2017	IIT Madras	Nov 20-22, 2017	International
8	Dr. Bikas C. Das	ICN:3i 2017	IIT Roorke	Dec 6-8, 2017	International
9	Dr. Devaraj P	International Conference on Applied Analysis, Mathematical Modeling and Computing Techniques	The Gandhigram Rural Institute	Mar-18	International
10	Dr. Jishy Varghese	European Drosophila Research Conference	Imperial College, London	Sep-17	International
11	Dr. Jishy Varghese	Satellite Meeting to the International Congress of Cell Biology	Estuary Island Resort, Poovar, Kerala	Feb-17	International
12	Dr. Joy Mitra	Surface Enhanced Raman Scattering - SERS: Faraday Discussions	Glasgow, UK	Sep-17	International
13	Dr. Joy Mitra	8th International conference on Surface Plasmon Photonics	Taipei, Taiwan	May-17	International

14	Dr. M. M. Shaijumon	European Materials Research Society (E-MRS) meeting	Strasbourg, France	May 22-26, 2017	International
15	Dr. M. M. Shaijumon	19th International Meeting on Lithium Batteries	Kyoto, Japan	June 17-22, 2018	International
16	Dr. Manoj A G Namboothiry.	Material Research Society of USA Fall Meeting 2017.	Hynes Convention Center, Boston USA.	Nov 26-Dec 2, 2017.	International.
17	Dr. N. Sadananda Singh	Bridging Biomedical Worlds Meeting 2018 (BBW2018),	Matrix building, Biopolis, Singapore	Feb 4-7, 2018	International.
18	Dr. Nisha N Kannan	Insearch, One day Symposium on insects in research	JNCASR, Bangalore	Jan 5, 2018	National
19	Dr. Nishant K T	Indo-US conference on Transcription, Chromatin structure, DNA repair and Genomic Instability, (Invited talk)	IISc Bangalore	Mar 6-10, 2018	International
20	Dr. Nishant K T	10th Conference on Yeast Biology, New Delhi (Invited talk and Session chair)	JNU and Amity, New Delhi	Feb 8 -11, 2018	National
21	Dr. Nishant K T	Indo-French meeting on Recent Advances in Genome Integrity and Plasticity. (Invited talk and Session chair)	Clarks resort, Bangalore	Dec 4-5, 2017	International
22	Dr. Nishant K T	National workshop on NGS data analysis, University of Kerala (Keynote lecture)	Kerala University, Trivandrum	May 8-13, 2017	National
23	Dr. Rajeev N Kini	Ultrafast Phenomena in Cooperative Systems Gordon Research Conference	Texas, USA	May30-June 3, 2018	International
24	Dr. Rajeev N Kini	seventh international conference on Optical Terahertz Science and Technology (OTST 2017)	London, UK	Apr 2-7, 2017	International
25	Dr. Rajeev N Kini	4th International Symposium on Microwave/Terahertz Science and Applications (MTSA 2017) and 8th International Symposium on Terahertz Nanoscience (TeraNano 8)	Okayama, japan	Nov 17-24, 2017	International

26	Dr. Ramanathan Natesh	Lecture workshop on "Recent Advances in Biophysics"	Mar Athanasios College For Advanced Studies Tiruvalla (MACFAST)	Jun 15-16, 2017	National
27	Dr. Ramanathan Natesh	The 17th International p53 Workshop (Poster Title: Studies of Aurora B mediated phosphorylation of p53)	Breakthrough & Discovery Theatrette, Biopolis, Singapore	Jul 8-12, 2017	International
28	Dr. Ramanathan Natesh	International Conference on Electron Microscopy and Allied Techniques and XXXVIII Annual Meeting of the Electron Microscope Society of India (EMSI-2017)	Confluence Banquets & Resort OMR - ECR Junction, Mahabalipuram 603104, Tamil Nadu, India	Jul 17-19, 2017	International
29	Dr. Ramanathan Natesh	Post Conference EMSI -2017 Workshop on Applications of Cryo-Transmission Electron Microscopy techniques in Biology	SRI Guest House Auditorium, Anupuram - 603127	Jul 20-21, 2017	International
30	Dr. Ramanathan Natesh	Workshop on Protein Structure and Drug Discovery	School of Life Sciences, University of Hyderabad	Aug 27–Sep 5, 2017	International
31	Dr. Ramanathan Natesh	DBT-EMBL Conference on Towards India's Associate Membership of EMBL	Pravasi Bharatiya Kendra, New Delhi, India	Oct 12-13, 2017	International
32	Dr. Ramanathan Natesh	Recent Advances in Genome Integrity and Plasticity. Poster Title: Structural studies of DNA Binding Domain (DBD) of Human DNA Ligase IV in complex with SCR7	Indian Institute of Science (IISc), Bangalore	Dec 4-5, 2017	International
33	Dr. Ramanathan Natesh	Opening cryoEM symposium and Inauguration of National CryoEM facility	Dasheri Auditorium InStem-NCBS Campus, Bangalore	Jan 24-25, 2018	International
34	Dr. Ramanathan Natesh	EMBO practical course CEM3DIP 2018	IIT Delhi	Mar 18-29, 2018	International
35	Dr. Ravi Maruthachalam	Cold Spring Harbor Asia meeting on Plant Cell & Development Biology	Dushu Lake, Shanghai, China	May 22-26, 2017	International
36	Dr. Ravi Maruthachalam	International Conference on Plant Developmental Biology and National Arabidopsis Meeting 2017	National Institute of Science Education and Research Bhubaneswar	Dec 12-16, 2017	National

37	Dr. Ravi Maruthachalam	Science Academics Lecture Workshop on "Emerging Trends in Biological Science	Nandha Arts and Science College, Erode, Tamil Nadu	Feb 08-09, 2018	National
38	Dr. Ravi Maruthachalam	8th Ramalingaswami Fellows Conclave	NIPGR, New Delhi	Feb 15-17, 2018	National
39	Dr. Ravi Maruthachalam	National symposium in current trends in plant sciences	Madras Christian College, Chennai	Feb 22-23, 2018	National
40	Dr. Ravi Pant	International Conference on Advances in Optics and Photonics (ICAOP)	Guru Jambeshwar University, Hisar	Nov 23-26, 2017	International
41	Dr. Reji Varghese	Supramolecular Nanomaterials	Bharat Matha College, Ernakulam	Feb 28, 2018	National
42	Dr. Reji Varghese	DNA-Decorated Soft Nanostructures	Kannur University	Mar 16, 2018	National
43	Dr. Reji Varghese	DNA-decorated Soft Nanostructures	IISc Bangalore	Mar 23, 2018	International
44	Dr. Reji Varghese	DNA-Decorated Soft Nanostructures	IIT Guwahati	Jan 04, 2018	International
45	Dr. Reji Varghese	Supramolecular Materials	Bishop Abraham Memorial College, Thiruvalla	Nov 29, 2017	National
46	Dr. Reji Varghese	DNA-decorated Soft Nanostructures	China	Oct 20, 2017	International
47	Dr. Reji Varghese	DNA-decorated Soft Nanostructures	MG University, Kottayam	Nov 11, 2017	National
48	Dr. S. Kumaragurubaran	International workshop on Physics of Semiconductor Devices (IWPSD-2017)	Indian Institute of Technology Delhi	Dec 11-15, 2017	International
49	Dr. S. Kumaragurubaran	GIAN course on "Advanced x-ray diffraction techniques for the characterization of materials"	Anna University, Chennai	Jan 17-25, 2018	National
50	Prof. S. Murty Srinivasula	Advances in degenerative diseases and molecular interventions	Hotel Hycinth international, Thiruvanthapuram	Nov 23-24, 2017	International
51	Prof. S. Murty Srinivasula	Immunocon-2017 on Immune mechanisms of infectious Diseases and beyond	Nirma University, Ahmedabad, Gujarat	Dec 14-16, 2017	International
52	Prof. S. Murty Srinivasula	International Congress of Cell Biology; Cellular Processes in Homeostasis, Regeneration and Diseases	Estuary Island Resort, Thiruvananthapuram, Kerala	Feb 2-3, 2018	International

53	Prof. S. Murty Srinivasula	International Conference on Cell Death in Cancer and Toxicology (CDCT-2018)	CSIR-Indian Institute of Toxicology Research, Lucknow,	Feb20-22, 2018	International
54	Dr. Sabari Sankar Thirupathy	Faculty Development Program	IIT Madras, Chennai	Dec 6-11, 2017	National
55	Dr. Sabari Sankar Thirupathy	Cellular Processess in Homeostasis, Regeneration, and Disease	Thiruvananthapuram	Feb 2-3, 2018	National
56	Dr. Sabari Sankar Thirupathy	Young Investigators' Meeting (YIM 2018)	Thiruvananthapuram	Mar 5-8, 2018	National
57	Dr. Sachindranath Jayaraman	International Conference on Matrix Analysis and Applications - 2017 (IC-MAA-2017)	Duy Tan University, Da Nang, Vietnam	July, 2017	International
58	Dr. Sachindranath Jayaraman	International Conference on Linear Algebra and its Applications – 2017 (ICLAA-2017)	Manipal University, Karnataka	Dec, 2017	International
59	Dr. Sachindranath Jayaraman	GIAN course on "Matrices with positive principal minors: Theory & Applications"	IIT Madras	Dec, 2017	National
60	Dr. Satish Khurana	EMBL conference: hematopoietic stem cells from embryo to aging	Heidelberg, Germany	7th-9th, 2017	International
61	Dr. Sheetal Dharmatti	Recent advances in PDE: Theory, Computations and Applications	IIT Bombay	June 7-9, 2017	International
62	Dr. Sheetal Dharmatti	Conference on recent Developments in PDE	TIFR CAM Bangalore	Aug 18-19, 2017	National
63	Dr. Shrihari Sridharan	Geometric Complexity of Julia Sets	Mathematical Research Center Bedelevo Poland	Mar 18-23 2018	International
64	Dr. Soumen Basak	Assessing the protects for frontier CMB space experiments from India	ISRO HQ, Bangalore	Jan 8-9, 2018	National
65	Dr. Soumen Basak	Assessing the protects for frontier CMB space experiments from India	ISRO HQ, Bangalore	Jan 8-9, 2018	National
66	Dr. Subrata Kundu	India International Science Festival (IISF) 2017	Anna University, Chennai	Oct 13-16, 2017	International
67	Dr. Subrata Kundu	Faculty Development Program	IIT Madras	Dec 6-8, 2017	National

68	Dr. Subrata Kundu	Modern Trends in Inorganic Chemistry (MTIC) 2017	CSIR-NCL and IISER Pune	Dec 11-13 2017	National
69	Dr. Sukhendu Mandal	MTIC XVII	IISER and NCL Pune	Dec 11-15, 2017	National
70	Dr. Sunish Kumar Radhakrishnan	Evolutionary, Developmental and Cell Biology 2018	Banyuls-sur-Mer, France	Jan 10-12, 2018	International
71	Dr. Sunish Kumar Radhakrishnan	Microbiology in the new millennium: From molecules to communities	Kolkata, India	Oct 27-29, 2017	International
72	Dr. Sunish Kumar Radhakrishnan	Joint Annual Meeting, Swiss Society for Microbiology	Basel, Switzerland	Aug 1, 2017	International
73	Dr. Tapas K. Manna	EMBO workshop on Frontiers in cytoskeleton research	IISER Pune	Oct 29-31, 2017	International
74	Dr. Tapas K. Manna	IABS 2018 An interdisciplinary approach to Biological Sciences	IACS, Kolkata	Feb1-3, 2018	International
75	Dr. Tapas K. Manna	Satellite meeting to the international congress for cell biology, Cellular Processes in homeostasis, regeneration and disease	Estuary Island, Poovar	Feb 2-3, 2018	International
76	Dr. V. Stalin Raj	Faculty Developing Program (FDP)	TLC (Central Library), IIT Madras	Dec 6-8, 2017	National
77	Dr. V. Stalin Raj	India|EMBO Symposium, RNA viruses: Immunology, pathogenesis and translational opportunities,	New Delhi, India	Mar 28 – 30, 2018	International
78	Dr. Viji Z Thomas	Zassenhaus Conference	Binghamton University, USA	May 26-28, 2017	International
79	Dr. Viji Z Thomas	The Commutative Algebra and Algebraic Geometry Conference	IISER Pune	Dec 5-8 2017	National
80	Dr. Vinayak B. Kamble	International conference on laser deposition, (iCOLD2017)	Indian Institute Technology, Madras	Nov 20-22, 2017	International
81	Dr. Vinayak B. Kamble	Young Scientists Colloquium (YSC 2017)	Indian Institute of Engineering Science and Technology, Shibpur	Oct 11, 2017	National
82	Dr. Vinesh Vijayan	42nd annual meeting of Indian biophysical society	IISER Pune	Mar09-11, 2018	National

83	Dr. Vinesh Vijayan	24th conference of national magnetic resonance society of India	IISER Mohali	Feb-16-19, 2018	International
84	Arjun. U. (PhD Student), - Pallab Bag (Post-Doc)	International on Magnetism and Magnetic Materials-MMM-2017	David L. Lowrence Convention center, Pittsburg, PA, USA.	Nov 6-10, 2017	International
85	Pallab Bag (Post-Doc)	Young Materials Researchers' Meet – 2017	BARC, Mumbai	Dec 10-11, 2017	National
86	Somesh K (PhD Student)	GIAN Course on Advance Technique in X-ray Diffraction in Characterization of Materials	Anna University, Chennai, Tamil Nadu, India	Jan 17-25, 2018	National
87	Dr. Sainul Abideen P	National Workshop on "Copyright Considerations for Digital Libraries"	IIT Kharagpur	Feb 8-10, 2018	National
88	Dr. Sainul Abideen P	Workshop on Institutional Digital Repository for National Digital Library of India	Govt. Barton Hill Engineering College, Trivandrum	Jun 20-21, 2017	National

Invited Lectures and Seminars Delivered

Sl No.	Name of Faculty	Title of Lecture	Venue
1	Dr. A. Thirumurugan	Materials for Energy Applications	The American College, Madurai
2	Dr. A. Thirumurugan	Soft-templated Synthesis of Hierarchically Porous MOFs	NISER, Bhubaneswar
3	Dr. Ajay Venugopal	Lewis Acidic Bismuth Compounds	Universität Bremen, Germany
4	Dr. Ajay Venugopal	Lewis Acidic Bismuth Compounds	Universität Bielefeld, Germany
5	Dr. Ajay Venugopal	Distinct Reactivity of cationic magnesium and zinc alkyls	RWTH Aachen
6	Dr. Alagiri Kaliyamoorthy	Total Synthesis of Biologically Active Natural Products	St. Joseph's College, Trichy
7	Dr. Anil Shaji	NonClassical Correlations in Open Quantum Dynamics	IIT Bombay
8	Dr. Anil Shaji	NonClassical Correlations in Quantum Computing and Open Quantum Dynamics	IIT Kanpur
9	Dr. Anil Shaji	Quantum Information and Computing	Bishop Moore College, Kerala
10	Dr. Anil Shaji	Introduction to Quantum Optics	Indian Institute of Science, Bangalore
11	Dr. Bikas C. Das	Doping Strategy of CdSe QDs to Tune Electronic Property without Disturbing the Optical Gap	IIT Madras

12	Dr. Bikas C. Das	Mn2+-doped CdSe QDs Based Memristors: Synthesis, Device Fabrication, and Characterizations	IIT Roorke
13	Dr. Bindusar Sahoo	Conformal Supergravity	Chennai Mathematical Institute
14	Dr. Deepshikha Jaiswal-Nagar	Probing quantum criticality in high temperature superconductors YBa2Cu3O6+x and Bi2Sr2CaCu2O8+x	St. John's College, Anchal, Kerala
15	Dr. Jishy Varghese	Post-transcriptional regulation of Ecdysteroidogenesis	Imperial College London
16	Dr. Joy Mitra	Tunnelling induced Luminescence	Institut des Sciences Moleculaires d'Orsay, Universite Paris Sud
17	Dr. Joy Mitra	Luminescence	IRCEP, Queen's University Belfast
18	Dr. Joy Mitra	Tunnel Current Fluctuations	Bose Institute
19	Dr. K M Sureshan	Topochemical reactions in crystals and gels, SMMA 2017	IISER Kolkata
20	Dr. K M Sureshan	Topochemical reactions in crystals and gels, Thematic Conference in Chemical Sciences TC2S 2017	IIT Ropar
21	Dr. K M Sureshan	Sugar-based organogels: Synthesis & Applications, National Science Academies' Lecture workshop on recent advances in chemical sciences	St. Thomas College, Pala
22	Dr. K M Sureshan	Topochemical reactions: Synthesis of biopolymer mimics, National Science Academies' Lecture workshop on recent advances in chemical sciences	St. Thomas College, Pala
23	Dr. K M Sureshan	The Exciting world of chemistry, Science Talent Enrichment program (STEP) for Prathibha Scholars by KSCSTE	IISER Thiruvananthapuram
24	Dr. K M Sureshan	Topochemical reactions in crystals and gels, Bronze Medal lecture	CSIR-IICT Hyderabad
25	Dr. K M Sureshan	Sugar-based organogels: Synthesis & Applications, Faculty Improvement Program for College teachers	Kannur University
26	Dr. K M Sureshan	Topochemical reactions: Synthesis of biopolymer mimics, Faculty K M Sureshan Improvement Program for College teachers	Kannur University
27	Dr. K M Sureshan	Sugar-based organogels: Synthesis & Applications	Farook College Calicut
28	Dr. K M Sureshan	Sugar-based organogels: Synthesis & Applications	IIT Madras

29	Dr. K M Sureshan	Sugar-based organogels: Synthesis & Applications	Govt. Brennen College Thalassery
30	Dr. K M Sureshan	Sugar-based organogels: Synthesis & Applications	Mar Ivanios College, Thiruvananthapuram
31	Dr. K M Sureshan	Chemistry with Sugars and Polyols,	Hindustan University, Chennai
32	Dr. K M Sureshan	Chemistry for clean Environment and healthy life, Orientation lectures for BSMS students	IISER Thiruvananthapuram
33	Dr. K M Sureshan	Should we ignore the unexpected? Department of Chemistry	IIT Madras
34	Dr. K M Sureshan	Chemistry for Life, ROSH Foundation lecture	Leo XIII Higher Secondary School, Alleppey
35	Dr. K M Sureshan	Topochemical reactions in crystals and gels, 24th Congress and General Assembly of the International Union of Crystallography	Hyderabad International Convention Centre, Hyderabad
36	Dr. K M Sureshan	Synthesis of biopolymer mimics via topochemical reactions	Technical University Dortmund, Dortmund, Germany
37	Dr. K M Sureshan	Synthesis of biopolymer mimics via topochemical reactions	Eindhoven University of Technology, Eindhoven, The Netherlands
38	Dr. K M Sureshan	Total Synthesis of Carbasugar Natural Products and Rare Sugars/ Cyclitols, Max Planck Institute for Colloids and Interfaces	Potsdam, Germany
39	Dr. K M Sureshan	Synthesis of biopolymer mimics via topochemical reactions	Humboldt University, Berlin, Germany
40	Dr. K M Sureshan	Topochemical reactions in crystals and gels	University of Potsdam, Potsdam, Germany
41	Dr. K M Sureshan	Topochemical reactions in crystals and gels	University of Duisburg-Essen, Essen, Germany
42	Dr. K M Sureshan	Synthesis of biopolymer mimics via topochemical reactions	University of Heidelberg, Germany
43	Dr. K M Sureshan	Synthesis of biopolymer mimics via topochemical reactions	ETH Zurich, Switzerland
44	Dr. K M Sureshan	Synthesis of biopolymer mimics via topochemical reactions	Johannes Gutenberg-Universität Mainz, Germany
45	Dr. K M Sureshan	Synthesis of biopolymer mimics via topochemical reactions	Technical University Braunschweig, Germany
46	Dr. K M Sureshan	Syntheses of Triazole-linked Biopolymer Mimics via TAAC Reaction, International Conference on Co-ordination Chemistry (ICCC-2018),	Sendai, Japan
47	Dr. K R Arun	Lectures on ODEs	IIST TVM
48	Dr. K R Arun	From N to R	SH College, Thevara
49	Dr. K R Arun	Continuous Functions and Rationals	MA College kothamangalam

50	Dr. K R Arun	Construction of Reals	NSS College Cherthala
51	Prof. K. George Thomas	Institute colloquium on Coupling of elementary Excitation: Drawing Parallels between Plasmons and Excitons	Bangalore
52	Prof. K. George Thomas	Coupling of elementary Excitation: Drawing Parallels between Plasmons and Excitons	Strasbourg, France
53	Prof. K. George Thomas	Plexcitons: How do Oscillator Strengths and Spectral Widths Govern Strong Coupling?	Goa
54	Prof. K. George Thomas	Invited lecture at DST Nanoschool on Emerging Materials and Methods in Nanotechnology on “Excitons and Plasmons”	Bangalore
55	Prof. K. George Thomas	Plexcitons: How do Oscillator Strengths and Spectral Widths Govern Strong Coupling?	Thiruvananthapuram
56	Prof. K. George Thomas	Invited lecture at JNCASR-Cambridge Winter School 2017 on Frontiers in Material Sciences	Bangalore
57	Prof. K. George Thomas	Plexcitons: The Role of Oscillator Strengths and Spectral Widths in Determining Strong Coupling	Bhutan
58	Dr. Kalika Prasad	Development in multicellular organisms	Kanpur IIT
59	Dr. M Suheshkumar Singh	Scientific Research as a Career Option (Parenting & Career Concelling Program, The Trinity High School School, Meipou, Pallel, Chandel District, Manipur)	Trinity High School, Pallel, Manipur
60	Dr. M Suheshkumar Singh	Medical imaging: A journey of a century or more	Angaan Ching Eco Club, Alliance for Development Alternative Manipur (ADAM), Manipur
61	Dr. M. M. Shaijumon	Hybrid Nanomaterials for Efficient Energy Systems	IFE, Norway
62	Dr. M. M. Shaijumon	Hybrid Nanomaterials for Efficient Energy Systems	PSG-IAS, Coimbatore
63	Dr. M. M. Shaijumon	2D layered nanomaterials	Amal Jyothi Engineering, Kerala
64	Dr. M. M. Shaijumon	Clean Energy Materials	TERI University, Delhi
65	Dr. M. M. Shaijumon	Hybrid Nanomaterials for Efficient Energy Systems	Womens college, Thiruvananthapuram
66	Dr. M. M. Shaijumon	Hybrid Nanomaterials for Energy Storage	CUSAT, Kochi
67	Dr. M. M. Shaijumon	Carbon nanomaterials	Brennen College, Thalassery
68	Dr. M. M. Shaijumon	2D materials beyond Graphene	Govt. Arts College, Kozhikode Kerala

69	Dr. M. M. Shaijumon	2D layered materials: Recent Advances	SH College, Ernakulam
70	Dr. M. M. Shaijumon	Hybrid Ion Capacitors: Combining Energy & Power	Pandit Deendayal Petroleum University, Gandhinagar
71	Dr. M. M. Shaijumon	Hybrid Ion Capacitors	SB College Changanacherry
72	Dr. M. M. Shaijumon	Hybrid Ion Capacitors	HPCL Bangalore
73	Dr. M. M. Shaijumon	Hybrid Ion Capacitors: Combining Energy & Power	Punjab Engineering College, Chandigarh
74	Prof. M.P. Rajan	Prof. Kochumman Memorial Lecture	Marthoma College, Thiruvala
75	Dr. Madhu Thalakulam	Charge & spin readout techniques in quantum dot spin qubits	International workshop on physics of semiconductor devices 2017
76	Dr. Madhu Thalakulam	Two-dimensional superconductivity in 1T MoS2	9-th IACS-APCTP Joint Conference on Novel Quantum Phases in Oxide Materials and Low Dimensional Systems
77	Dr. Mahesh Hariharan	Ultrafast Processes in Chemical and Biological Systems	M. G. College, Thiruvananthapuram
78	Dr. Mahesh Hariharan	Introduction to Mass Spectrometry	Mar Athanasius College, Kothamangalam
79	Dr. Mahesh Hariharan	Colourful Science	Maharajas College, Ernakulam
80	Dr. Mahesh Hariharan	Strategies to Reduce the Rate of Charge Recombination	Cochin University of Science and Technology
81	Dr. Mahesh Hariharan	Ultrafast Processes in Chemical and Biological Systems	St. Berchmann's College, Changanassery
82	Dr. Mahesh Hariharan	Ultrafast Processes in Chemical and Biological Systems	Mar Ivanios College, Thiruvananthapuram
83	Dr. Mahesh Hariharan	Femtosecond Spectroscopy	Central University of Kerala, Kasaragod
84	Dr. Mahesh Hariharan	Chemical Kinetics	Kendriya Vidyalaya, Pattom, Thiruvananthapuram
85	Dr. Mahesh Hariharan	Strategies to Reduce the Rate of Charge Recombination	National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram
86	Dr. Mahesh Hariharan	Ultrafast Processes in Chemical and Biological Systems	Assumption College, Changanassery
87	Dr. Mahesh Hariharan	Femtosecond Spectroscopy	Maharajas College, Ernakulam
88	Dr. Mahesh Hariharan	Ultrafast Processes in Chemical and Biological Systems	St. Teresa's College, Ernakulam
89	Dr. Mahesh Hariharan	Ultrafast Processes in Chemical and Biological Systems	Hotel Residency Tower, Trivandrum
90	Dr. Mahesh Hariharan	Atomic Force Microscopy	Bishop Moore College, Mavelikkara
91	Dr. Mahesh Hariharan	Strategies to Reduce the Rate of Charge Recombination	Government College for Women, Thiruvananthapuram

92	Dr. Mahesh Hariharan	Physical Organic Chemistry	National Institute of Technology, Tiruchirappalli
93	Dr. Mahesh Hariharan	Ultrafast Processes in Materials Science	Kannur University Campus, Thavakkara
94	Dr. Mahesh Hariharan	Ionic Equilibrium	Kendriya Vidyalaya, Pattom, Thiruvananthapuram
95	Dr. Mahesh Hariharan	Time Correlated Single Photon Counting Techniques and Applications	JNCASR, Bangalore
96	Dr. Manoj A G Namboothiry	Organic and Hybrid Photovoltaics – Approaches to improve the performance.	St Xaviers College Aluva Kerala.
97	Dr. Manoj A G Namboothiry	Organic semiconductors for flexible electronics.	Department of Physics, Periyar University, Salem, Tamilnadu.
98	Dr. Manoj A G Namboothiry	Organic semiconductors for flexible electronics.	Department of Chemistry, SN College for Women, Kollam, Kerala
99	Dr. Manoj A G Namboothiry	Highly efficient Organic solar cells with high photocurrent extraction.	Department of Physics, Cochin University of Science and Technology, Cochin, Kerala.
100	Dr. Nisha N Kannan	Insearch, One day Symposium on insects in research	JNCASR, Bangalore
101	Dr. R S Swathi	Overwhelming Analogies between Plasmon Hybridization Theory and Molecular Orbital Theory Revealed: The Story of Plasmonic Heterodimers	IIT, Mumbai
102	Dr. R S Swathi	Understanding the Fascinating World of Atoms and Molecules Using Quantum Mechanics	Kendriya Vidyalaya, Pattom
103	Dr. R S Swathi	Overwhelming Analogies between Plasmon Hybridization Theory and Molecular Orbital Theory Revealed: The Story of Plasmonic Heterodimers	Vivanta by Taj, Kovalam
104	Dr. R S Swathi	Overwhelming Analogies between Plasmon Hybridization Theory and Molecular Orbital Theory Revealed: The Story of Plasmonic Heterodimers	Mahatma Gandhi University, Kottayam
105	Dr. R S Swathi	Nanoporous two-dimensional carbon-based materials for ion sensing and energy storage applications	Central University of Tamilnadu, Thiruvarur
106	Dr. Ramanathan Natesh	Introduction to Electron Microscopy (emphasis SP EM in Structural Biology)	MACFAST Auditorium

107	Dr. Ramanathan Natesh	Single Particle Cryo Electron Microscopy: the recent revolution in structural biology	MACFAST Auditorium
108	Dr. Ramanathan Natesh	Amazing world of Biological Nano Machines within your Cell	Seminar Hall, Anby Plaza, IISER-TVM
109	Dr. Ramanathan Natesh	A short story of unfolding the protein folding	Confluence Banquets & Resort OMR-ECR Junction, Mahabalipuram 603104, Tamil Nadu, India
110	Dr. Ramanathan Natesh	TEM and cryoTEM sample preparation	SRI Guest House Auditorium, Anupuram - 603127
111	Dr. Ramanathan Natesh	Hybrid methods: Protein Crystallography, computational methods and Cryo EM	SRI Guest House Auditorium, Anupuram - 603127
112	Dr. Ramanathan Natesh	Introduction to cryo Electron Microscopy in Structural Biology	School of Life Sciences, University of Hyderabad
113	Dr. Ramanathan Natesh	Visualising the non-native protein at the chamber of secrets	School of Life Sciences, University of Hyderabad
114	Dr. Ramanathan Natesh	Cryo-Electron Microscopy for the high-resolution structure determination of biomolecules in solution 2017 Nobel prize in Chemistry (Nobel exposition lecture)	Seminar Hall, School of Physics, IISER Thiruvananthapuram
115	Dr. Ramanathan Natesh	The resolution revolution in imaging of biomolecules the science of the Nobel Prize for Chemistry in 2017 - CryoElectron Microscopy	Seminar Hall , STIC, Cochin University of Science &Technology
116	Dr. Ramanathan Natesh	EM sample, specimen preparation methods (Single Particle and Tomography)	IIT Delhi Lecture-Hall-complex
117	Dr. Ramesh Chandra Nath	Quantum Phase Transitions in Spin-1/2 and Spin-1 Frustrated Triangular Lattices Li2(Cu,Ni)W2O8, probed by 31P NMR	NISER Bhubaneswar
118	Dr. Ramesh Chandra Nath	National Conference on Applied Materials	Central University of Gujarat
119	Dr. Ravi Maruthachalam	Does minichromosomes induce heritable mutations in normal chromosomes? A case study in Arabidopsis thaliana	Cold Spring Harbor Asia, Shanghai, China
120	Dr. Ravi Maruthachalam	Does minichromosomes induce heritable mutations in normal chromosomes? A case study in Arabidopsis thaliana	National Institute of Science Education and Research (NISER), Bhubaneswar, Odisha
121	Dr. Ravi Maruthachalam	Engineering Centromeres to Produce haploids in plants	University of Calicut, Kerala
122	Dr. Ravi Maruthachalam	Engineering Centromeres to Produce in vivo haploids in plants	Nandha Arts and Science College, Erode, Tamil Nadu

123	Dr. Ravi Maruthachalam	A haploid genetic toolbox for expediting plant genetics.	Nandha Arts and Science College, Erode, Tamil Nadu
124	Dr. Ravi Maruthachalam	Generation and characterization of minichromosomes in Arabidopsis thaliana	National Institute of Plant Genome and Research (NIPGR), New Delhi
125	Dr. Ravi Maruthachalam	Engineering centromeres to produce haploids in plants	Madras Christian College, Chennai
126	Dr. Reji Varghese	DNA-decorated Soft Nanostructures	IISER Pune
127	Dr. Reji Varghese	Supramolecular Nanomaterials	Bishop Moore College, Mavelikkara
128	Dr. Reji Varghese	Supramolecular Nanomaterials	Bharat Matha College, Ernakulam
129	Dr. Reji Varghese	DNA-Decorated Soft Nanostructures	Kannur University
130	Dr. Reji Varghese	DNA-decorated Soft Nanostructures	IISc Bangalore
131	Dr. Reji Varghese	DNA-Decorated Soft Nanostructures	IIT Guwahati
132	Dr. Reji Varghese	Supramolecular Materials	Bishop Abraham Memorial College, Thiruvalla
133	Dr. Reji Varghese	DNA-decorated Soft Nanostructures	China
134	Dr. Reji Varghese	DNA-decorated Soft Nanostructures	MG University, Kottayam
135	Dr. S. Gokulnath	Opportunities at IISER TVM	S.N. College, Kannur
136	Dr. S. Gokulnath	How Porphyrins are Known as Pigments of Life?	Central University of Kerala, Transit Campus
137	Prof. S. Murty Srinivasula	Novel players in proteostasis	Hotel Hycinth International, Thiruvanthapuram
138	Prof. S. Murty Srinivasula	Toll-Like Receptor (TLR)-mediated Autophagy: Role in cellular stress regulation	Nirma University, Ahmedabad, Gujarat
139	Prof. S. Murty Srinivasula	Regulation of Immune realted autophagy	Estuary Island Resort, Thiruvananthapuram, Kerala
140	Prof. S. Murty Srinivasula	Novel Regulators of Proteostasis	CSIR-Indian Institute of Toxicology Research, Lucknow,
141	Prof. S. Murty Srinivasula	Novel Regulators of Mitophagy	Department of Biological Sciences and Bioengineering, IIT Kanpur, Kanpur.
142	Dr. Sabari Sankar Thirupathy	The Conflict between DNA Replication and Transcription	Dept. of BSBE, IIT Kanpur
143	Dr. Sachindranath Jayaraman	Semipositivity of matrices over the n-dimensional ice-cream cone and some related questions	ICMAA-2017, Duy Tan University, Da Nang, Vietnam
144	Dr. Sachindranath Jayaraman	Nonsingular subspaces of M_n(F), F a field	ICLAA-2017, Manipal, Karnataka

145	Dr. Satish Khurana	Hematopoietic stem cells niche and aging	SCTIMST, Thiruvananthapuram
146	Dr. Satish Khurana	Developmental stage dependent response to proliferation in HSCs	Imperial college, London, UK
147	Dr. Sheetal Dharmatti	Stabilization of Viscosealstic Fuild Models	IIT Bombay
148	Dr. Sheetal Dharmatti	Flow Invaraince preserving feed-back controllers for Sabra Shell Model of Turbulence	TIFR Campus Bangalore
149	Dr. Shrihari Sridharan	The dynamics of holomorphic cor-respondences	IISER PUNE
150	Dr. Shrihari Sridharan	Orbital Measures in holomorphic correspondence	Pondicherry University
151	Dr. Srilakshmi Krishnamoorthy	The Eisenstein elements of modu-lar symbols for level pq	Paris , France
152	Dr. Srilakshmi Krishnamoorty	Research in Mathematcis	Kottayam
153	Dr. Srilakshmi Krishnamoorty	Ramanujan's Life and Work	Chennai
154	Dr. Subrata Kundu	Chemistry: The Molecular View of Life	Baselius College Kottayam
155	Dr. Subrata Kundu	Chemistry: The Molecular View of Life	BCM College Kottayam
156	Dr. Sukhendu Mandal	Structure-Property correlation in MOFs and Metal Nanocluster	UNIST
157	Dr. Sukhendu Mandal	Ferromagnetic semiconductor two-dimensional materials	Seoul, South Korea
158	Dr. Sukhendu Mandal	Aggregation Induced Behavior of Molecular Platinum Cluster's	South Korea
159	Dr. Sunish Kumar Radhakrishnan	Evolutionary, Developmental and Cell Biology 2018	Banyuls-sur-Mer, France
160	Dr. Sunish Kumar Radhakrishnan	Invited Lecture	Indian Institute of Chemical Biology, Kolkata
161	Dr. Sunish Kumar Radhakrishnan	Invited Lecture at Microbiology in the new millennium: From mole-cules to communities	Bose Institute, Kolkata
162	Dr. Sunish Kumar Radhakrishnan	Invited Lecture at the Joint Annual Meeting	Swiss Society for Microbiology, Basel, Switzerland
163	Dr. Sunish Kumar Radhakrishnan	Invited Lecture	IISc, Bengaluru, India
164	Dr. Sunish Kumar Radhakrishnan	Invited Lecture	The University of Warwick, Coventry, UK
165	Dr. Sunish Kumar Radhakrishnan	Invited Lecture	NCBS, Bengaluru, India
166	Dr. Sunish Kumar Radhakrishnan	Biology Research Seminar day Lec-ture	IISER Mohali

167	Dr. Tapas K. Manna	"Transforming acidic coiled-coil 3 (TACC3): A key regulator of astral microtubules".	Delhi
168	Dr. Tapas K. Manna	"Molecular dynamics at spindle-kinetochore interface".	Delhi
169	Dr. Utpal Manna	Landau-Lifschitz-Gilbert Equation with Pure Jump Noise	University of York, UK
170	Dr. V. Stalin Raj	The discovery and characterization of emerging and re-emerging viral pathogens	AMRF, Madurai
171	Dr. V. Stalin Raj	Pathogen Discovery and characterization	Bharat Biotech,
172	Dr. Viji Z Thomas	Closure Properties and The second stable homotopy group of the Eilenberg Maclane Space	Easton PA USA
173	Dr. Viji Z Thomas	The second stable homotopy group of the Eilenberg-Maclane space is completely determined by the Schur Multiplier	Penn State Altoona, USA
174	Dr. Vinayak Kamble	1D Oxide heterostructure for Chemical and Optical Sensing	IIT Madras
175	Dr. Vinesh Vijayan	NMR spectroscopy	MA college Kothamangalam
176	Dr. Vinesh Vijayan	Basics of NMR spectroscopy	SH college Thevara
177	Dr. Vinesh Vijayan	Inspire internship: Application of Magnetic Resonance in Life Sciences	SH college Thevara

Conferences and Workshops Organized

Sl No.	Name of Faculty	Name of Sem./Wor./ Conf.	Funded By	Date	International/ National
1	Dr. D. V. Senthil Kumar	Workshop on Basic aspects of Nonlinear Dynamics and its Applications	IISER TVM	Apr 3-5,2017	National
2	Prof. M.P. Rajan	Science Talent Enrichment Programme	KSCSTE	June 19-23, 2017	National
3	Dr. Mahesh Hariharan	Mini-Symposium on Photoprocesses in Chemistry and Biology	IISER-TVM	January 14, 2018	National

4	Dr. Mahesh Hariharan	Faraday Discussions on Photoinduced Processes in Nucleic Acids and Proteins	Royal Society of Chemistry, The International Union for Pure and Applied Biophysics (IUPAB) and IISER-TVM	January 11 – 13, 2018	International
5	Dr. Mahesh Hariharan	2nd Annual Conference Nanobioteck-2017	Department of Biotechnology and Department of Science & Technology, Indian Society of Nanomedicine (ISNM) and IISER-TVM	December 6-8, 2017	National
6	Dr. Mahesh Hariharan	Mini-Symposium on Spectroscopy	IISERTVM	October 7, 2017	National
7	Dr. Mahesh Hariharan	Mini-Symposium on Photochemistry and Supramolecular Chemistry	IISERTVM	September 23, 2017	National
8	Dr. Nishant K.T.	Co-organizer, School of Biology, IISER TVM - IPR, Osaka University joint symposium on chromosome biology and cell signalling	IISER TVM and IPR, Osaka University	March 5, 2018	International
9	Dr. Ramanathan Natesh	Post Conference EM Workshop at EMSI -2017, Mahabalipuram	EMSI	July 20-21, 2017	International
10	Dr. Ramanathan Natesh (Conference Steering Committee)	International Conference on Electron Microscopy and Allied Techniques and XXXVIII Annual Meeting of the Electron Microscope Society of India (EMSI-2017)	EMSI	Jul 17-19, 2017	

11	Dr. Ravi Maruthachalam (one of the organisers)	Satellite meeting to the international congress of cell biology. Celular processes in Homeostasis, regeneration and diseases	IISER-TVM and many other corporate sponsors	Feb 2-3, 2018	International
12	Dr. Reji Varghese	Nanobioteck 2017	Several agencies	Dec 6-8, 2017	International
13	Dr. Reji Varghese	DBT Task Force meeting	DBT	Dec 4-5, 2017	Meeting
14	Prof. S. Murty Srinivasula	Satellite meeting to the International Congress of Cell Biology; Cellular Processes in Homeostasis, Regeneration and Diseases	Partly by IISER TVM	Feb 2-3, 2018	International
15	Dr. Satish Khurana	Satellite symposium to the International Congress for Cell Biology	Corporate sponsors	Feb 2-3, 2018	International
16	Dr. Shrihari Sridharan	Advanced Instructional School on Erogotic Theory and Dynamical System	National Board for Higher Mathematics (NBHM)	Dec 4-23, 2017	National
17	Dr. Tapas K. Manna (joint-organizer)	Satellite meeting to the international congress for cell biology, Cellular Processes in homeostasis, regeneration and disease	IISER TVM and external agencies	Feb 2-3, 2018	International

Foundation Day Lecture

The Institute celebrated its 9th foundation day on October 09th, 2017. Prof. V Ramakrishnan, Director, IISER-TVM welcomed the gathering and introudued the chief guest. The chief guest Dr.Madhavan Nair Rajeevan, Secretary, Ministry of Earth Sciences, Govt. of India delivered the foundation day lecture titled “Earth System Science for Socio-Economic Benefits”.

Colloquia

Sl. No.	Speaker	Institute	Title	Date
1	Prof. S. Ramakrishnan	TIFR, India	Discovery of superconductivity in a low carrier density system: Bismuth	02.03.2018
2	Prof. Carlo Baccigalupi	SISSA, Italy	Records of primordial Gravitational Waves in the Cosmic Microwave Background (CMB): Status, Challenges and Prospects for present and future CMB experiments	06.10.2017
3	Prof. Umesh Varshney	Microbiology and Cell Biology Department, Indian Institute of Science, Bangalore	Don't forget your alimentary Escherichia coli	18.08.2017
4	Professor Sriram Subramaniam	National Cancer Institute, NIH	Cryo-EM: A new tool for molecular medicine	25.08.2018
5	Professor Deshdeep Sahdev	IIT Kanpur	Manipulating Atoms and a Lot More in our own Backyards	01.09.2017
6	Professor Rabindra Nath Mukherjee	IIT Kanpur	Metal-Coordinated Ligand Radicals. Molecular and Electronic Structure, and Reactivity	08.09.2017
7	Professor Sumit Bhaduri	IIT-Bombay	The language of science and technology. The relationships between “know why”, “know how” and natural sciences	13.10.2017
8	Prof. P. P. Divakaran		The mathematics of India -- from counting to calculus	27.10.2017
9	Prof. Anna Akhmanova	Utrecht University, the Netherlands	Symmetry and asymmetry of cytoskeletal networks in control of cell and tissue development	10.11.2017
10	Prof. Paul S. Weiss	University of California, Los Angeles	Precise Chemical, Physical, and Electronic Nanoscale Contacts	05.12.2017
11	Prof. Stephen M Cohen	University of Copenhagen, Denmark	Drosophila genetic models for cancer gene discovery	05.01.2017
12	Prof. N. Sathyamurthy	IISER-Mohali	Atoms and Molecules in a Confined Environment	23.02.2018
13	Prof. B. Ravindran	Institute of Life Sciences, Bhubaneswar	Evolution of TLR2 mediated inflammation in Primates	09.03.2018
14	Prof. Vinod K. Singh	IISER-Bhopal	Enantioselective Approach towards Isoindolinone, Lactone, and Cyclohexane ring systems	23.03.2018

Seminars

Sl. No.	Speaker	Institute	Title	Date
1	Prof. R. Suryanarayanan	University of Paris-Sud, Orsay France	Some recent results on Electron Doped Manganites	10.01.2018
2	Prof. S. Natarajan	School of Physics, Madurai Kamaraj University	An Introduction to Crystal growth and its possible application to control Urinary stone disease	10.11.2017
3	Prof. Deshdeep Sahdev	IIT Kanpur	Concrete Ways of Improving the Teaching of Experimental Physics	01.09. 2017
4	Prof. Sriram Subramaniam	National Cancer Institute, NIH	Cryo-EM: A new tool for molecular medicine	25.08.2017
5	Prof. E.V. Sampathkumaran	Tata Institute of Fundamental Research (TIFR), Mumbai, India	Magnetism and magneto-electric coupling behaviour in Haldane chain family, R2BaNiO5 (R= Rare-Earth)	19.02.2018
6	Prof. Stephen Cohen	University of Copenhagen	Drosophila genetic models for cancer gene discovery	Jan-18
7	Prof. S. Dorendrajit Singh	Manipur University	Photoluminescence and Thermoluminescence studies of LiB4O7:RE CaB4O7:RE phosphors	16.02.2018
8	Prof. Pernille Rorth	Former Deputy Director, IMCB, Singapore	Raw Data and cooking the books: about doing science, publishing science, scientific misconduct and the complicated grey areas	Jan-18
9	Prof. Mohan Balasubramanian	University of Warwick, UK	Cytokinesis in vitro and in vivo	Dec-17
10	Prof. J. Kumar	Anna University, Chennai 600025	Ferromagnetic semiconducting materials for Nano-Spintronic Applications	19.04.2018
11	Prof. Bart. L. Haagmans	Erasmus Medical Center, Netherlands	Combatting newly emerging zoonotic viral infections	02.04.2018
12	Dr. Viswanath Balakrishnan	Indian Institute of Technology Mandi	Nanomanufacturing of 1D and 2D materials for electronics and energy applications	20.09.2017
13	Dr. Shamayita Ray	Calcutta University, Kolkata, India	LHC: The Standard Model Higgs and beyond	22.02.2018
14	Dr. Rudra Sekhar Manna	IIT Tirupati	Searching for spin-liquid behaviour in Kitaev iridate	18.06.2018
15	Dr. Jyrki Piilo	University of Turku, Finland	Fully controlled dephasing dynamics and synthetic spectral densities	21.08.2018

16	Dr. Vandna Gohroo	Washington State University, Pullman	Experiments with cold and ultracold atoms	22.9.2017
17	Dr. Shrihari Sridharan	Thiruvalluvar College, Papanasam	An Introduction to Hyperbolic Geometry	23.02.2018
18	Dr. Madhusoodan V Hosur	C-DAC, Mumbai and NIAS, Bangalore	X-ray Crystallographic studies to probe catalytic, drug-resistance and folding mechanisms in proteins	21.06.2018
19	Dr. Krishnanand Mallayya	Pennsylvania State University	Relaxation and thermalization in isolated quantum systems	04.01.2018
20	Dr. Ganguli Babu	Rice University, Houston, USA	Materials Design for EnergyStorage Applications On-Demand	26.04.2018
21	Dr. Emil Joseph	IISc Bangalore	Multielectron Bubbles: electrons on a curved & confined surface	17.04.2018
22	Dr. Deep Jariwal	California Institute of Technology, USA	Heterostructures for Nanoelectronics and Photovoltaics	11.12.2017
23	Dr. Sharath Sriram	RMIT University	Functions from flaws: Devices that harness vacancies and deficiencies in oxide thin films	28.06.2018
24	Dr. Vijay B. Shenoy	Department of Physics, IISc Bangalore	The Tenfold Way To Amorphous Topological Insulators	28.12.2017
25	Dr. Subhmoy Mandol	University of Germany	Extending Biological Imaging to the Fifth Dimension: Real-Time Volumetric Multispectral Optoacoustic Tomography	03.01.2018
26	Dr. Sayantani Ghosh	University of California, USA	Understanding hybrid perovskites: phase transition, stability and performance in thin films and quantum dots	11.01.2018
27	Dr. Joseph Samuel	Raman Research Institute, Bangalore	Gravitation and Decoherence: the double slit experiment revisited	16.01.2018
28	Dr. Ajay Gopinathan	Director, NSF-CREST: Center for Cellular and Bio-molecular Machines	University of California Merced: Graduate Programs and Research Opportunities	11.01.2018

Short-Term Courses Organised

Sl No.	Name of Faculty	Name of the Programme.	Duration	Venue
1	Dr. Ramanathan Natesh (IISER-TVM) Dr. Manidipa Banerjee (IITD) and Dr. Vinothkumar K Raghunath (NCBS)	EMBO Practical Course CEM3DIP 2018 :Programme	18th March 2018 to 29th March 2018. 12 days	IIT Delhi Lecture-Hall-complex
2	Dr. Bindusar Sahoo	Advances in N=4 Conformal Supergravity	TIFR, Mumbai	TIFR, Mumbai

Patent Filed

1. K. M. Sureshan, A. Prathap, Organogelator-Cellulose Composite for Practical and Eco-friendly Marine Oil Spill Recovery (Indian Patent Filed)

2. K. M. Sureshan, R. Mohanrao, Fully Organic Polymer for water harvesting and as a Desiccant material (Patent Application No. 201841027913)

Summer Programme

a. IISER Thiruvananthapuram Summer Visiting Programme(SVP) - IISER-TVM Fellowship: 1440 online applications were received for 2018 IISER TVM Summer visiting programme. School wise distribution of applications are

Biology	:	650
Chemistry	:	307
Mathematics	:	91
Physics	:	392

A total of 37 students were selected by individual schools, based on merit out of which 30 students reported and 29 have successfully completed the project.

b. IISER Thiruvananthapuram SVP - Own Fellowship:
A total of 4 (No waiting List) students were selected by individual schools, based on merit out of which 3 students reported and have successfully completed their project.

c. IISER Thiruvananthapuram SVP - Prathibha Scholars:
A total of 7 students were selected by individual schools, based on merit out of which 5 students reported and have successfully completed the project.

d. ASc-INSA-NASI Project Fellowsip:
19 selected students from Indian Academy of Science (IASc-INSA-NASI) have been allotted to IISER Thiruvananthapuram for the Academy summer programme and 15 have completed their project.

e. External Students from other institutions:

According to present record, various individual laboratories from IISER Thiruvananthapuram selected 8 External Students from other institution and have carried out or are carrying out their project.

f. IISER Thiruvananthapuram students:

234 BS-MS & IPHD students from IISER Thiruvananthapuram have collected Registration Forms for carrying out projects during this summer in various laboratories.

ANVESHA the science club of IISER-TVM

Anvesha, the science club of IISER-Thiruvanthapuram came into being with the first batch of the institute at its helm. It began as a small forum for scientific discussions and talks, but has grown appreciably over about a decade to its current stature.

With the advent of newer batches and brighter heads, the club has now become a platform for scientific debates, talks, quizzes, fun-games, brainstorming sessions and many more enthralling activities. The science fest of IISER-TVM, which shares its name with the club, has been successfully organised by the students every years, with the desire and will to make the next edition always riding high. We are committed to put all our efforts to make the club functional throughout the year, with a load variety of programs to experience and celebrate the beauty of science.

Year round activities

- **Anvesha science festival (3 days in October)**
- **National Science Day celebration**
- **Int'nal Girls and Women in Science day celebrations**
- **School Outreach activities by students**
- **Popular science talks by eminent scientists and speakers**
- **Some surprise events such as sky observation, tree plantations etc.**

Over the years, we have grown into a club that manages and executes events and competitions throughout the year, with the annual science fest and national science day celebrations taking center stage in the festivities. The club is also continually committed to conduct activities aimed at 'giving back' to the society, through the IISER@School initiative and other awareness programmes.

Science in depth at schools

Special Correspondent

THIRUVANANTHAPURAM: Indian Institute of Science Education and Research Thiruvananthapuram has launched IISER@School programme to enrich scientific temper of students and encourage them to take up scientific research.

IISER Director V. Ramakrishnan flagged off the programme on Tuesday and the first programme was conducted at Government Higher Secondary School, Vithura. Under the programme, a mobile unit consisting of students, faculty, and staff, with a mini lab, would visit government and aided schools in the State and conduct a symposium on 'Discovering Science' at each venue. Dean (R&D), IISER-TVM, M.P. Rajan addressed the high school students at Vithura. An interactive session followed, where various experiments were demonstrated. The students got an opportunity to see radiometer demonstration, analysis of isotopes of hydrogen in water, cryogenics, Meissner effect, DNA extraction, and Foldscope, a paper microscope. The session concluded with puzzles and brain games. School Principal Anitha P.R. and teachers were present to help the IISER team.

Team members of IISER@School programme interact with students of GHSS, Vithura, on Wednesday.

According to IISER, the programme is aimed at introducing high school students to the world of science through experiments and demonstrations that will instil appreciation of science in young minds.

32 schools

IISER outreach committee and Anvesha team, the science club of the institute, are the organisers of this programme. In the current academic year, the programme will cover 32 schools in the State. In the next five years, it will cover at least 100 schools. Schools wishing to invite IISER team to visit their school can write to Dean (Research and Development), IISER Thiruvananthapuram or request through mail deanrdc@iisertvm.ac.in, a release said.

The 2017-18 academic year will go down as the year when the club started functioning entirely out of the permanent campus. The year saw the club host multiple events, for IISER students and students from other colleges. The activities for the Varsha semester kicked off with an open discussion, *Vox Populi*, where students deliberated over deciphering the driving force of science; whether our explorations into science should be driven by need, or by curiosity. As a part of our commitment towards spreading awareness about problems of concern to the scientific community, and with climate change getting an ever increasing share of the spotlight, we screened the award winning documentary by Fisher Stevens, *Before the Flood*.

The 2017 edition of the annual science fest happened between the dates of 27th and 29th October, 2017. It saw the introduction of many new events and competitions like the Integration Bee and *Error 404* (the coding competition) for our students, Paper presentation, Potpourri and Rebus puzzle solving, which saw popular success. It also saw the return of traditional events like the debate, Crime Scene Investigation (CSI) and Qrious, the science quiz. Aficionados, the experiment demonstration competition was held on the 27th in the Indoor stadium. We also introduced *Vendetta*, the gaming competition and *Contingency*, the crisis management competition for attracting participants who wanted to participate in non-science related games and events. The year saw a slight dip in student participation for the expo, which we intend to rectify in the upcoming edition of the fest. The expo was also accompanied by Into the Black Hole,a mini planetarium set-up hosted out of a dark room set aside specifically for the purpose. The same saw good participation and was widely appreciated by student and faculty members.

The closing ceremony for the fest was hosted in the seminar room in the Chemical Sciences Block (CSB) and saw Prof. Murty Srinivasula deliver a lecture teasing apart the historical associations between research in Immunology and the Nobel prize.

The Vasanth semester law lesser Anvesha events, but the ones conducted were very well received and saw active participation from student and faculty members. The lecture by Prof. Kip Thorne delivered in ICTS, Bangalore on 11th January, was live streamed to the PSB seminar room. We also hosted a lecture and interactive session by Prof. Rohini Godbole (Centre for High Energy Physics, IISc Bangalore) to celebrate the International day for Women and Girls in science. With a packed hall and the vivacious dialogue initiated by Prof. Godbole, the event was the most successful lecture the club has ever hosted.

The club also celebrated the National Science Day on February 28th. Prof. S Ramakrishnan from

TIFR, Mumbai delivered the NSD lecture, based around his work studying the properties of matter at ultra-low temperatures, and why it is important to do so. *Vivaksha*, the annual science quiz held as part of NSD was made into an intercollegiate event this time, and was hosted by Mr. Arun A S, an esteemed quizmaster in the Kerala quizzing circle. This was the first intercollegiate event hosted by Anvesha in the permanent campus, and the response from external teams gives us hope to do more such events in the future. We also had a science fiction story writing competition, an e-poster making competition and a science comic making competition as a part of NSD 2017.

The 2017-18 academic year was one marked by many new beginnings for the club. Despite minor hiccups faced in the planning and execution of some events, the events were mostly well received and the response gives us the confidence to host more such events in the future. The Anvesha laboratory, which was hosted in the Pratheeksha building in the transit campus is yet to be rehoused in the permanent campus. We hope that this academic year will see the re-opening of the Anvesha laboratory and that the institute will continue to graciously support the club activities.

Counseling Center

Here at the IISER Trivandrum Counseling center, we offer mental health services to the students in order to reduce their psychological problems and distress and enhance their mental health, well-being, and quality of life. The center consists of a psychologist (Dr. Neelima Gopinath) and a psychiatrist (Dr. Mary P R) who provide effective counseling services to students who come to them with a wide range of problems.

Overall, the student turn over was good for the last one year and also student satisfaction seems to be adequate as majority of students are coming for regular follow-ups. There is a 64 % increase in the students who came for counseling compared to the previous year, which shows that more students are aware of the center and is willing to come forward seeking help.

In total, 92 new students came for counseling in the specified period and 16 students who had already come before had to be seen again. Some of the students were seen more number of times as per their requirement. This past year 293 counseling/psychotherapy sessions was conducted. There were in total 69 BSMS students and 23 others that included Ph.D, IPhd, Post Doc, and Project students. Out of the total 92 students, 9 have been referred to the psychiatrist for further evaluation and treatment.

As per the statistics of students who consulted the psychiatrist there were in total 15 students and 114 sessions were conducted. One student was referred to MCH, Trivandrum, another one to MCH, Trissur and one to a psychiatrist in Nedumangadu. Detailed case files are being maintained for every student who comes for counseling / psychiatric consultation with at most confidentiality.

Stress related to academic and non-academic issues, relationship problems, adjustment issues, sleep disorders and primary psychiatric illness are the predominant problems faced by the students. Students are given supportive counseling, psychotherapy, stress management programs as well as medication in indicated cases.

The counseling center conducted a talk on **“Communication Skills”** by Dr. Kiran Kumar, Psychiatrist, Mental Health Center, Trivandrum, on 23rd January 2018. The talk was well received by the students and there was good number of participation. Plans for conducting workshops and

talks by prominent people in the field is in progress.

In the beginning of the semester (1st of August-2017), an orientation program was conducted for the new comers in which the importance of counseling was briefed. Also a brochure for counseling center has been given to them so as to give them an overall idea about the functioning of the center and how they can make use of the facilities being provided to them.

A counseling web page made with the idea to share information that promote mental health and bring awareness among students has been well received and more students are aware of our services and it has helped reduce stigma in seeking help.

Outreach Activities 2017-18

1. Interaction program with Scientists:

Interaction programme with scientists aimed at enabling the college students to interact with the faculty members of IISER TVM with a view to improve their scientific knowledge. Interaction programmes with scientists were held as one-day symposium at various colleges. The details are as follows

Sl No	Name of the college	Name of the Faculty from IISER TVM	Date	Co-ordinator from the college
1	St Joseph's college, Moolamattom, Idukki, Kerala	Dr. S. Gokulnath Dr. Satish Khurana Dr. Suhesh K. Singh Dr. Chiranjeevi	28.03.2017	Dr. Roby
2	Baselius College, Kottayam, Kerala	Dr. Ravi Pant Dr. Sabari Sankar Thirupathy Dr. Subrata Kundu Dr. Srilakshmi K	19-09-2017	Dr. Suma Bino Thomas
3	St. Xavier’s college, Aluva, Kerala	Dr. Manoj A G Namboothiri Dr. N. Sadanand Singh Dr. A Muthukrishnan	27-10-2017	Dr. Baby Divya
4	S. N. College Kannur, Kerala.	Dr. S. Gokulnath Dr. S. Kumaragurubaran Dr. Nisha N. Kannan Dr. Sumit Mohanty	12.02.2018	Dr. C. V. Ramesh

2. Outreach program at Schools:

Scientists and BS-MS students of IISER TVM conducted outreach programs at various schools to nurture scientific thinking and research skills in children at the school level.The details are as follows.

Sl No	Name of the School	Name of the faculty from IISER TVM	Date
1	Prof. Joseph Mundassery Memorial High School, Kandassankadavu, Thrissur, Kerala	Dr. Nisha N Kannan	22-09-2017
2	Evans High School, Parassala, Kerala	Dr. Sarbeswar Pal	23-10-2017
3	Jawahar Navodaya Vidyalaya, Vithura, Thiruvananthapuram, Kerala	Dr.Ullasa Kodandaramaiah	04-11-2017
4	Meenangal Tribal Govt. High School, Aryanad, Thiruvananthapuram (Part of Unnath Bharath Abhiyan)	Dr. S. Gokulnath Dr. Vinesh Vijayan	04.08.2018

3. Department Outreach program

Each department of IISER TVM conducted outreach program at various colleges to improve the knowledge of students in specific field of science. Details are as follows.

Sl No	Name of the college	Name of the Faculty from IISER TVM	Date	Name of the school from IISER TVM
1	S N College, Kollam, Kerala	Dr. Nisha N Kannan	20-10-2017	School of Biology
2	Loyola College, Chennai, Tamil Nadu	Dr. Vinayak Kamble	23-11-2017	School of Physics
3	BCM College, Kottayam, Kerala	Dr. Sivaranjana Reddy Dr. Subrata Kundu Dr. Muthukrishnan	10-11-2017	School of Chemistry
4	Madras Christian College, East Thambaram, Chennai.	Dr. Ravi Maruthachalam	15.02.2018	School of Biology
5	CMS College, Kottayam	Dr. Viji Z Thomas Dr. Devaraj P Dr. Donadze Guram	22.03.2018	School of Mathematics
6	Nehru College, Kasargod (SoC)	Dr. S. Gokulnath Dr. V. Sivaranjana Reddy Dr. Rajendar Goreti	26.03.2018	School of Chemistry

4. Institution visit by college students as a part of the walk with scholar program:

Institution visit to IISER TVM by various college students from Kerala is facilitated to provide students an overview about the current research ongoing at IISER TVM. List of institution visit is placed below.

Sl No	Name of the college	Date
1	MG University, Kottayam	19.06.2017
2	Trivandrum International School, Kerala	21-08-2017
3	BVRIT Hyderabad Engineering College for Women, Hyderabad, Telangana.	28.08.2017
4	BCM College, Kottayam, Kerala	25-10-2-17
5	Mar Athanasios College For Advanced Studies Tiruvalla (MACFAST), Kerala	26-10-2017
6	CMS College, Kottayam, Kerala	08-11-2017
7	Sigaram Academy of Excellence, Thiruvananthapuram, Kerala	04-12-2017

5. Kerala State Higher Secondary Education Department organized a Course and Career expo-**'DISHA'**, 2017-18. from January 6th to 10th 2018 at K. Karunakaran memorial Town Hall, Thrissur. Around **6 BSMS** students from IISER TVM participated in this programme.

8. Facilities

Laboratory

The institute has dedicated laboratories for undergraduate program in addition to advanced level research labs maintained by faculty members of various schools.

Biology Teaching Laboratory

The BS-MS Biology laboratories of IISER-TVM are located in the Permanent Campus at Vithura where students of I year (approximately 193) & II year (approximately 214) are being trained in doing projects and experiments related to Biological Diversity and Evolution (I Sem), Biological structure and Function (II Sem), Genetics (III Sem) and Cell Biology and Signalling (IV Sem). The topics for project work are given by the concerned faculties. Experiments related to Ecology and Evolution (I Sem) are mostly performed in a field setting. Taking complexities involved in conducting Biological experiments into consideration, all the experiments are performed ahead of actual class experiment to standardize the protocols with each set of reagents, to ensure quality of reagents. Substantial amount of time is spent on preparations for the experiments before the arrival of the students. The students are provided with a Laboratory manual with all the necessary details of the experiments in the first class itself. In the laboratory, the students will get an opportunity to test theory experimentally, and confirm the facts related to the design of experiments critically and analytically. Students follow safe laboratory practices, maintain proper record of the experiments and take active participation in doing the experiments.

Lab sessions are also conducted for 3rd & 4th year Biology Major Students (approximately 40 students in each year) as well as Integrated Phd students at the Advanced Biology Lab in the permanent campus at Vithura. The experiments are of high standards and are designed to complement their theory courses and ongoing research in the Institute encouraging the students to have a better understanding of biological concepts laying emphasis on scientific planning, analysis and interpretation of data. The syllabi has been prepared in consultation with various experts in Advanced Biology teaching and also by incorporating experiments from MS lab courses offered at reputed International Universities/ Research Centers. The advanced course covers

broader areas on Advanced Genetics, Advanced Cell and Molecular biology, Microbiology, Immunology, Biochemistry etc. Apart from a team of well-trained Technical Assistants the students are also assisted by PhD students under the concerned faculties in charge. The students work hand in hand with research labs of the institute and are exposed to sophisticated instruments such as Real Time PCR, Spectrophotometer, Microplate Reader, FPLC, Confocal microscopy, Stereomicroscopy, Flow Cytometry, Gel electrophoresis and techniques like PCR, quantitative real time PCR (qRT-PCR), Western Blotting, SDS-PAGE, Animal cell culture, In vitro transcription and translation, Chromatography, Microbiological and Immunological techniques.

Physics Teaching laboratories

School of Physics teaching methodology offers students many laboratory sessions where the class room theories are put into real-world experiments. The laboratories are equipped with modern instruments, tools, simulators, equipment and facilities providing state-of-art training to the students. The first two years gives a strong hands-on learning in mechanics, heat and thermodynamics, optics, electricity and magnetism. In the advanced semesters, as a major course in Physics, the students handle sophisticated instruments to perform advance level experiments such as scanning tunnelling microscopy, atomic force microscopy, X-ray diffraction, superconducting quantum interference device measurements, vacuum deposition, high-energy radiation counters, electron paramagnetic resonance, nuclear magnetic resonance and Digital circuits processors etc. The experimental sessions are planned in such way that 1. the students perform experiments after learning the theory part in the class and 2. each student gets an independent access to the instrument/equipment and submit the experimental results in digital form as if he submits a manuscript to a journal. The students are also given training to design their own experiments. Our strong commitment toward providing hands-on learning shapes the students to do independent research and also cement the understanding from the lecture class. Besides this, Ph. D. scholars work as teaching assistants to BS-MS lab sessions which helps them to get trained in teaching, demonstration of experiments and deeper understanding of concepts.

Chemistry Laboratory

The first and second year students were given training in the fundamental aspects of inorganic, organic and physical chemistry experiments which help them to understand the basic concepts of chemistry. This include both qualitative and quantitative analysis. Ten to twelve experiments are done in each semester. The course covers principles and application of chemical laboratory techniques including safety, preparation, detection and estimation of chemical compounds. The students get accustomed in the measurement of pH, paper chromatography, thin layer chromatography, column chromatography, visible-ultraviolet spectrophotometery, infrared spectroscopy, chemical kinetics, data analysis, and elementary analysis. Experiments were done from refractometry, conductometry, potentiometry, and cryoscopy. Physical properties like surface tension, viscosity, dipole moment were measured and recorded for various organic compounds. Extensive hands-on laboratory training was provided to each student. This helped them to gain proficiency in basic laboratory techniques and experience in modern laboratory instrumentation. Some of the experiments done during the advanced courses were: Isolation and analysis of natural products and preparation of their derivatives, multi-step organic synthesis (Benzoin condensation, Perkin reaction, Grignard reaction etc.) for fifth semester. Synthesis of transition metal complexes (Cobalt, Nickel, Molybdenum etc.) with various ligands and study of their kinetic, magnetic and spectral properties with group theoretical interpretation were undertaken during sixth semester. This helps them to acquire practice in multistep inorganic synthesis of metal complexes and also to understand the magnetic and spectral properties of complexes aid in the determination of structure. Advanced physical chemistry experiments in polarimetry, conductometry, potentiometry, cyclic voltammetry, study of the rotational barrier using NMR, solvatochromism, single crystal XRD measurements, life-time measurements study by TCSPC, verification of adsorption isotherm by volumetric titration etc. were practiced in the seventh semester. The courses enabled the students to analyse, interpret and solve problems in chemistry, to integrate chemical knowledge in the

successful conduct of research as well as work in team-based research.

Library

Central library of the institute, supports the academic and research needs of the institute community. The state of the art library facilitates access to online and print resources to its users. Reputed international journals and online resources in science and allied areas have been made available. Library is successful in providing most of the resources in electronic format which facilitate 24 x 7 e-library.

The library's extensive online collection from more than 50 international scientific publishers and societies includes full-text e-journal databases, e-journal archives, video journal, e-books, bibliographic and review databases, etc. Major online full-text databases including AACR, ACS Web Edition, AIP, AMS, Annual Reviews, APS, ASM,Electro Chemical Society Digital Library, IEEE ASPP+POP, IOP, JSTOR, Nature, OpticsInfobase, OUP, Project Euclid, RSC Gold, Science Online, ScienceDirect, SIAM, Wiley Online Library, etc. are made available.

Online access to McGraw Hill Express eBook Library, E-ROS Encyclopaedia of Reagents for Organic Synthesis, Reaxys, additional journals from Sage, Wiley, Microbiology Society, Element Publishing House, T & F etc. were added to the Library collection during this period. Library also provides access to 'Grammarly' online grammar checking and document authentication tool. Major bibliographic databases including, MathScinet, Scifinder Scholar, Web of Science, J-Gate etc. are also made available. Apart from the online resources, library possesses print books, CD ROMs, thesis etc. in core and allied subjects. Open Athens remote login facility is being extensively utilised by the faculty community for off campus access of the resources.

The library was completely shifted to the permanent campus in May 2017 and its functioning were enhanced to7 days a week from August 2017. Books in the library were RFID tagged during this period. Library was equipped with advanced RFID based Self Service Kiosk, which provides self-check-in and check-out of books. RFID DLA was implemented to undertake the automated stock taking of the library, shelf arrangement and rectification of the books, retrieval of the misplaced books and book sorting on the shelves etc., thereby providing a library of global standards. CCTV Surveillance system and RFID Gate was also introduced for improve security.

Mobile based "M-Library Service" was introduced to facilitate access to e-resources over mobile phone. Major databases were enabled for mobile pairing for offline/off the campus access. Mobile library week was conducted during 14-21 November, 2017. As part of this, several mobile oriented initiatives were held, including installation drive for Academic Mobile Apps, installation of QR Code Reader, mobile pairing of databases, tutorials, demonstration sessions etc. The "Shelf on Mobile" facility was introduced to provide the users with a virtual shelf facility on their mobile.

An e-learning cum training facility with projector was established in the library during 2017-18. Faculty, students and staff use this facility for group study, group e-learning, faculty-student interactive learning sessions etc.

Library orientation programme and several group wise training to students on online/offline library services was also held during this period. A training programme on Web of Science and EndNote was organized on 17.11.2017, for the faculty and research scholars, to increase awareness on these resources. A Training workshop on Oxford University Press Journal platform was organized on 02-11-2017.

In order to facilitate easy selection of the books, book fair was started. 1st IISER Book Fair was organised during 9-10 January, 2018.Library received 44 books as complementary copies, during 2017-18. 340 new users took library membership during this period.

IISER Thiruvananthapuram Library has membership/affiliation in major library consortium/ network including e-Shod Sindhu Consortium, IISER Library Consortium and the Developing Library Network (DELNET).

Computing and Networking Facility

The Internet connectivity at permanent campus is through two 100Mbps links from M/s BSNL and M/s RAILTEL. Additional bandwidth of 1Gbps leased line provided as part of the National Knowledge Network

(NKN) also available. Department buildings, hostels and residential blocks are interconnected using fibre cable and covered by Wireless network. IP Phones are provided to faculty and staff for voice communication.

There is a 70 seater computer lab at permanent campus. The computational cluster and several other servers provide instructional and research support including high performance computing, Moodle course management, DNS, DHCP and other services. The IT personnel of the institute provide both hardware and software support to the faculty, staff and students in addition to making computational software like GAUSSIAN, MATLAB, QCHEM etc. available for use. The LAN of the institute has over 400 PCs. Licences are available for the software like Windows, Office, EndNote, Adobe Acrobat Pro, Origin and Seqrite Antivirus.

All class rooms in the institute are provided with state of the art audio visual equipment. The institute has a fully functional virtual classroom funded by the NKN project. The classroom has been in use for course exchange between IISER Thiruvananthapuram, IISER Pune, IISER Bhopal, NCBS Bengaluru and TIFR Centre for Applicable Mathematics in Bengaluru as well as allowing for the streaming of research talks and colloquia from the premier institutes in the country. The virtual classroom facility also allows for the recording and storage of lectures and seminars organized by the institute.

Hostels

The hostels are furnished and have provisions for amenities like washing machine,Television,News papers and Internet Facilities.

There are seven Hostel buildings that are functional in the Permanent campus.There are seven Hostel buildings in Transit campus.

Being the Mentor Institute of Indian Institute of Information Technology-Kottayam,Four of the hostels were allotted to IIITK.

9. Sports and cultural Activities

Annual Report – Sports (2017-2018)

IISER TVM students have participated in 3 major sports events, Intra-, Inter-IISER and batch tournaments during the academic year 2017-2018. ITSAV'17, our institute annual sports meet, was conducted from 15th – 17th September, 2017, in Jawahar Navodaya Vidyalaya sports ground, Palode (mainly athletic events, cricket and football) and the rest of the games were conducted in our indoor stadium. IISER Mohali hosted IISM'17 during 18th -21th December 2017. Inter-batch badminton (boys and girls), volleyball (boys and girls), football (boys) and kho kho (boys) tournaments were conducted in 2017-2018. The inagural edition of the ICL (IISER Cricket league) was successfully completed. In all these sports activities, our students participated with great zeal, spirit and enthusiasm.

ITSAV'17

For ITSAV'17, students and faculties of our institute were divided into four groups to bring out a fierce competition. The event was started off proudly with an inaugural ceremony and by lighting the torch of IISER-TVM Sports. More than 20 sport events including cricket, football, throw ball, volleyball, basketball, table tennis, badminton, kabaddi and athletics were arranged. Points were allotted to individual and group events, based on which the winners were decided in girls and boys categories separately. The final results of ITSAV- 2017:

The overall girls championship was won by Team D (Captain: Elwina Thomas, IMS14047) The overall boys championship was also won by Team D (Captain: Subhajith Das, IMS14131)

IISM'17

Ten institutes from all over India including 7 IISERs Pune, Mohali, Kolkata, Bhopal, TVM, Tirupati and Berhampur, NISER Bhubaneswar, IISc Bangalore and CBS Mumbai fought with spirit and vigour in complete sportsmanship. Our contingent had a total strength of 131 students: including 80 boys and 41 girls. The team spirit and efforts of our contingent were appreciable and really inspiring. IISER TVM contingent secured 3 gold, 1 silver and 3 bronze in individual events, bagged gold in 4x400m relay boys, silver in 4*400m relay girls, bronze in 4*100m relay both boys and girls. We were runners up in football boys and basketball boys. A list of medal winners is given below:

Name of the Student	Event	Medal
Kedar Sharma (IMS14073)	10000 Metre (Men)	Gold
Kedar Sharma (IMS14073)	5000 Metres (Men)	Gold
Ahmed Hussain Madhani (IMS15085)	400 Metres(Men)	Gold
Kedar Sharma (IMS14073) Lithin (IMS16107) Akshai Krishnan (IMS16018) Ahmed Hussain Madhani (IMS15085)	4 X 400 Metres (Men)	Gold
Akshai Krishnan (IMS16018)	800 Metres (Men)	Silver
Akshai Krishnan (IMS16018)	400 Metres (Men)	Bronze
Nandakishore (IMS16125) Anoop K (IMS15032) Banoth Kalyan Singh(IMS14039) Sankalp Kumar(IMS14120)	4X100 Metres(Men)	Bronze

Sreya N (IMS16186) Nafia V K (IMS15098) Neethu B (IMS16127) Anakha Anson (IMS17052)	4 X 400 Metres (Women)	Silver
Rizwana Rahmathulla A (IMS17184) Akhila S Kumar (IMS17033) Prema Mondal (IMS17172) Shatri Awanti Milind (IMS15126)	4 X 100 Metres (Women)	Bronze
Saddal Kuljeet Singh (IMS15119) Maby Johns (IMS16108) Phulung Basumatary (IMS16143) Abhishek Raghunathan (IMS17012) Akshay Raj K(IMS17039) Mahesh Kumar Choudhary(IMS17137) Karanveer Singh (IMS13078) Siddharth Shivanandan (IMS17202) Dhruv (IMS15054) Akshay Ankush Yadav(IMS14005) Muthusamy R (IMS15097) Subrabalan M (IMS17218)	Basketball (Boys)	Silver
Bijoy John Mathew (IPHD13007) Sreerag Sreedhar (IMS15139) Anoop K (IMS15032) Akhil Dev (IMS15018) Subhajit Das (IMS14131) Vishnulal (IMS150142) Ajmal S (IMS15015) Suryakanta Tanty (IMS15142) Mithun P V(IMS15090) Rithwik P Nambiar (IMS16156) Aman Rastogi(IMS16027) Rigzin Norboo (IMS16158) Manu Prasad K K (IMS16110) Avinas N Shaji (IMS16060) Godwin Paul (IMS17110) Sreehari K (IMS15135)	Football (Men)	Silver

Inter-batch tournaments

In addition to ITSAV'17 and IISM'17, students have actively participated in inter-batch tournaments of cricket, badminton, football, volleyball and table tennis. IISER Cricket League (ICL) was introduced during Vasanth semester. The inaugural tournament consisted of 4 teams competing in a round robin tournament with the top two teams playing the final. The inaugural tournament was won by The Rising Challengers led by Shubham Sewariya of Batch 13.

OTHER ACTIVITIES:

Yoga/Meditation

Yoga/meditation practice was conducted on 5 days per a week to integrate the physical and mental elements of students. On the occasion of INTERNATIONAL DAY OF YOGA, 21st June, 2018, a Talk cum Demonstration titled "Importance of YOGA" was organized on 21st June 2018 in the indoor stadium, Vithura campus. The inaugural-address was delivered by our director, Prof. V. Ramakrishnan, and Shri. Shyju Krishnan delived a talk on Yoga. Around 50 participants from IISER TVM took part in the program. Shri. Shyju Krishnan conducted yoga practice for the participants.

Hindi Week Celebration-2017

The Hindi week celebration of our Institution was conducted in a befitting manner from 18 September to 22 September, 2017. In connection with this an exhibition of Hindi books was conducted and it was inaugurated by the Director Prof.V.Ramakrishnan. Various competitions were conducted for students and staff. Valedictory function of Hindi week was held on 22 September 2017 at Indoor Stadium, IISER TVM. It was inaugurated by the Director and Shri.R Jayapal, Senoir Hindi Officer, IIST judged various competitions and delivered a lecture. Cash prize and certificates were distributed for the winners. After the valedictory function various cultural programmes like song, skit etc was also conducted by the students.

Vigilance Awareness Week

The vigilance awareness week 2017 was held on 30th October to 4th November 2017 and the theme of the programme was “My Vision – Corruption Free India”. In connection with this the following programs were organized.

- A workshop on 01.11.2017 for Faculty/Staff/Students on the topic “public participation in promoting Integrity and Eradicating Corruption“.
- A quiz completion for Faculty/Staff/Students.
- Vigilance awareness program for vendors/Contractors.

Run for Unity

“**Rashtriya Ekta Diwas**” was celebrated on the occasion of the birth anniversary of Iron Man of India, Sardar Vallabhbhai Patel. A run for unity was conducted on 31st October, 2017, at Vithura Campus. Director flagged off the two kilometer running event, starting from the campus main entrance to Jersey farm and return to the main entrance. The pledge taking ceremony was organised in the indoor stadium after the running event. 70 students and several staff members participated in the celebrations.

Awards

Sports Color: It recognizes a student's extraordinary contribution towards institute sports. The praise worthy performances of the following students in the ITSAV'17 and IISM'17 has landed them this year's Sports Color. They are –

PHULUNG (IMS16143), MABY JOHNS (IMS161108), ANAGHA SIVADAS P (IMS16031), AMAN RASTOGI (IMS16027), SREERAG SREEDHAR(IMS15139), KALYANI S (IMS15118), AHMMED HUSSAIN (IMS15085), BIJOY JOHN MATHEW (IPHD13007).

Sports Citation: The another prestigious award of Institute Sports, given only to the students of our passing out batch in recognition of a student's consistent and remarkable performance in sports throughout

the years for their unswerving dedication, admirable talent and sincerity to the games. They are-

ATHUL KRISHNAN (IMS13042), SASTRI C.S (IMS13046), FATHIMA FAIBA A P (IMS13058), INDRANI DAS (IMS13068), BHAGHYA M S (IMS13044), SHUBHAM SAWARIYA (IMS13125), KARANVEER (IMS13078).

Special Mention: People who have performed extremely well but narrowly missed this year's sports color deserve a special mention-

ARUN KUMAR MOURYA (IPHD13004), AKHIL DEV (IMS15018), AKSHAY ANKUSH YADAV (IMS14005), SOWMYA SAGAR DEY (IMS13131), AKASH ASHIBAD PANDE (IPHD13001), GIRISH M (IMS16080), SREYA N (IMS16186), KESHAV SINGH (IMS16096), AKSHAI KRISHNAN T(IMS16018), RAVI PRAKASH PANKAJ (IMS16151)

Sports Streak: People who have consistently performed in their respective fields . They are-

SURYAKANTA TANTY (IMS15142), SADDAL KULJEET SINGH (IMS15119) , SUBHAJITH DAS (IMS14131).

Emerging Player:

SRIJAN DELAMPADY (IPHD17028), P. CHARULEKHA (IMS17166), PRAJAKTA BALIRAM BODKHE (IMS17170), ANAKHA ANSON (IMS17052, RIZWANA RAHMATHULLA (IMS17184), PREMA MONDEL (IMS17172), SIDDARTH SHIVANANDAN (IMS17202), MAHESH KUMAR CHOUDHARY (IMS17137).

Sports Person of the Year: KEDAR SHARMA (IMS14073) for his extraordinary performance and contribution towards the institute sports and performance in IISM'17.

Roll of Honor: The "Roll of Honor" is awarded to a student who has performed exceptionally well in Sports and Athletics at every platform and brought glory to the Institute. This year it goes to AJSAL SHEREEF (IMS13009) who has been an integral part of almost all the sports in IISER-TVM. His extraordinary contributions are given below:

Second year (2014)

ITSAV: 1500 m - 2nd position, 100 m and 400 m relay - 2nd position

Third year (2015)

ITSAV: 100 m relay - 3rd position

Fourth year (2016)

ITSAV: 800 m - 3rd position, 400 m - 2nd position, 200 m - 2nd position, Long Jump - 2nd position,

Relay 400 m - 1st position, Realy 100 m - 2nd position, Kho-Kho – Winning team

IISM (2015): 400 m Relay Gold

IISM (2016): 400 m Relay Gold

Ishya

Ishya, the annual cultural fest of IISER Thiruvananthapuram always brings back fond memories to any IISERite. Ishya'18 was no different. It was spread out over the Vasanth semester of 2018, starting with Ishqya where many students showed off their cultural talents, held on 7th Feb. The next event was the curtain raiser, where the promo and music video composed and directed by our own students was unveiled on February 17. Also scheduled, was a talk by Ms. Ashla Rani, Executive Assistant to Chairman, Pallium India, the company working as a model for compassionate, high quality palliative care bringing support and relief to those in pain through its network of care centers.

During the month of March, Ishya vibes started going up as weekly events like Just A Minute, Pencil Sketching, water colouring, poem, essay, story writing in hindi, english and malayalam took place and IISERites participated in large numbers. Also during this period, box events like Doodle Making, Scribbled stories, Wiki Games were held.

The gaming tournament, much to the delight of gamers all around, was organized in March. Lumera Obscura, the photography competition brought the genius behind the lens in many-a-students. A graffiti competition was held whereby the wall surrounding CDH 1 was turned a lot more colourful.

Batch night was hosted by batch 17 on 11th March. The event, called Masquerade showcased talents of the freshers as they wowed the audience. Also organized was a food court serving delicious food.

An important event, EK Bharat Shreshta Bharat, in collaboration with DD National, was conducted for the first time this year, where the states Odisha, Himachal Pradesh, Jammu andKashmir and West Bengal portrayed their cultures on 27th January. This event is an initiative by the MHRD to help promot the cultural integrity amongst the students.

The main events of Ishya'18 surpassed all expectations this time, sponsored mainly by HEXA. Inter-collegiate events comprised of heart-warming cultural performances along with inter collegiate events like Mudra where the best of the best dance troops battled it out. Also conducted were Awaaz, where some of the sweetest voices rendered the audience speechless and Put Funda, an open general quiz by QM Major Chandrakant Nair.

Intra-collegiate events included Tarang, the group dance competition where contestants set fire to the stage. Rawaaz the fashion show for IISER TVM saw the skill and confidence of stylists amongst the students. Alaap the singing competition set some of the sweetest tunes ever heard in the campus. Also conducted was Step up, a spot choreography competition. The finals for Domitor IISER's personality contest were also held during the main 3 days of Ishya.

As a proverbial cherry on the top, the south Indian fusion rock sensation, Agam performed to the joy of IISERites.

This year, Ishya also finalised its official logo for all upcoming events. The design chosen by popular vote, is a phoenix spreading its wings and rising like a beacon of hope and spirit. Like the phoenix, Ishya looks forward to rising and achieving greater heights in the future.

10. Permanent Campus

A. GENERAL & MASTER PLAN

The permanent campus of IISER has been set up in an area of 200 acres of land at Vithura in the valley of scenic Ponmudi hills. The site at Vithura is 40km from Thiruvananthapuram. The land was handed over by Govt. of Kerala to the institute on 15.10.2008. The campus is highly uneven with smaller and larger hills and borders a reserve forest. Part of the area lies between an 800 m high steep sided hill Kottamala and a perennial stream called Makki.

The master plan has been prepared taking maximum advantages of the terrain.

- The Academic Complex has been located as a compact integrated cluster on the central plot midway between the lowest and highest elevations.
- The students' hostels have been located towards the south east periphery of the campus with covered pedestrian connectivity to all the academic complex.
- The residential zone of faculty members and staff is set up in the 35 acres of undulating terrain in the western portion of the campus and is separated by the Makki river with the academic zone.
- Construction has been done as per the plans with minimum foot print and retaining maximum green cover.

  Master Plan has also taken into consideration energy conservation, rain water harvesting, waste water recycling etc and with a view to provide for future expansion.
- The Campus has been developed taking into account green building concepts and is aiming to achieve four star rating as per GRIHA (Green Rating for Integrated Habitat Assessment).
- The Campus area falls within the high rain fall zone of South Kerala. The total average annual rain fall is 300 mm and with 8 months of the year having rain fall over 20 cm. There are two streams passing through the project area having catchment of 200 ha and 100 ha respectively totally falling within the forest. This catchment is adequate to supply the entire water requirements for the Campus. Taking the average rainfall of 300 mm, the total water annually passing through the campus is 90 lakh m^3 while the annual water requirement for the Campus is only 3.65 lakhs m^3 which constitutes only about 4% of the water availability. In order to cater the water requirements for a period of 4 dry months a small reservoir of storage (50,000 m^3) has already been constructed in the Vattakuzhy thodu on the southern part near the entrance to the Campus.
- A very good rain water harvesting system has been constructed for collecting water from roof of buildings for recharging the ground water.

The major facilities available includes:-

I. Academic Complex

Administrative Block, Computer Centre, Lecturer Theatre Complex, Physical Science Block, Chemical Science Block, Biological Science Block, Mathematical Science Block, Humanities Block, Common Instrumentation & Workshop, Animal House, Solvent Store.

II. Faculty Residence

Directors Bungalow, Type A,B,C,D, E, Quarters, Faculty Club, Health Centre.

III. Students Hostels

M.S. Boys Hostel Cluster, Girls Hostel Cluster (M.S& Ph.D), PhD Boys, Hostel cluster, Central Dining Hall.

IV. Recreation

Sports ground, Indoor Stadium, Tennis Courts, Students Club, Coffee Shop.

V. Others

Campus School, Shopping Centre, Guest House.

VI. Engineering Services

Pump house, UG reservoir, Main receiving station & 4 other substations, Sewage Treatment Plant – 2 Nos, Effluent Treatment Plant – 1 No.

The total plinth area of academic complex proposed is 40523 sqm and residential complex is 76477 sqm totaling to 1,17,000 sqm Out of this, in the first phase Academic Complex with a plinth area of 31183 sqm and the Residential complex and other services with an area of 38188 totaling 69371 m^2 are in the verge of completion. The tendered cost of Phase-I work is Rs. 253 Crores.

B. PHASE I: BALANCE CONSTRUCTION OF BUILDINGS & STRUCTURES (PHASE I BALANCE BUILDING AND DEVELOPMENT WORKS & PHASE II WORKS) IN THE CAMPUS IISER TVM

The 26th meeting of Buildings & Works Committee held on 14.11.2014 decided to recommend, entrusting the remaining works of Phase I and Phase II works to Central Public Works Department (CPWD). The MoU was entered with CPWD by IISER TVM on 15.01.2015.

The balance works undertaken by CPWD mainly comprises the following:-

Construction of Primary School, 4 No. Hostel Blocks (SB3, SB4, SB5, DB1), Indoor Stadium, Substation II, Overhead Tank-II, Entrance Gate, 5 Nos. Housing Blocks (C1, C2, C3, D1 & D2), Roads, Overhead Tank-III, Substation Building III, Physical Science Block, Biological Science Block, Animal House and Concourse.

Among the above, works in respect of Primary School and Double Bedded Hostel-1 has been completed on 30.08.2016. The hostel blocks SB3, SB4 & SB5 and the residence block C3 and Shopping Complex are also completed. The Physical Science Block has been virutually completed and started functioning.

In addition to the above, the works of Health Centre and Guest House are also progressing under CPWD.

C. PHASE-II - PACKAGE – I - WORK OF CONSTRUCTION OF HOSTELS AND DINING HALL

The work was awarded to M/s RDS Project Limited for a value of Rs. 131, 22, 97,959/. The contractor has started work on 05.05.2015. The work is monitored by the Project Engineering Department and is progressing steadily. Out of the 05 hostel blocks03 blocks (A,B& C) along with the CDH has been completed and occupied by students.

The scheduled date of completion of the entire work is fixed as February 2018.

D. DETAILS OF COMPLETED WORKS

The following works have been completed and handed over for occupancy.

1. Chemical Science Block
2. Common Instrumentation Facility building
3. Single Bedded Hostel-1
4. Single Bedded Hostel-2
5. Single Bedded Hostel-3
6. Single Bedded Hostel-4
7. Single Bedded Hostel-5
8. Double Bedded Hostel -1
9. B1 Residence
10. Primary School building
11. Water Treatment Plant
12. Main Receiving Sub Station
13. Substation -4
14. C3 Residence Block
15. Physical Science Block
16. Block A,B,C & CDH of Phase II Hostels
17. Shopping Complex

11. Statement of Accounts

The Annual Statement of Accounts of IISER Thiruvananthapuram for the year 2017-18 consists of Balance Sheet with Schedule forming part of Balance Sheet;Income and Expenditure Account with supporting Schedules; and Receipts and Payments Account

I. Grants & Receipts

A. Grants

- The unspent balance as on 01.04.2017 : Rs. 200.38 crore
- The grants received from MHRD during the year : Rs.242.53 crore

  Capital Grant: Rs. 185.33 crore
  Revenue Grant: Rs. 57.20 crore

- Total fund available for the year 2017-18:Rs. 442.91 crore

  Revenue Receipts

  The revenue of the institute from Annual Fees & Others for the year is Rs. 2.43 crore.

II. Expenditure

- The amount utilised for acquiring Capital Assets during the year:

  Construction, Lab Equipment & Other Assets : Rs. 290.97 crore

- The amount utilised for Revenue Expenditure during the year:

  Revenue Expenses : Rs. 67.60 crore

- Total expenditure for the year 2017-18 : Rs. 358.57 crore

III. External Projects & Fellowships

- Total grant available during the year : Rs. 26.77 crore
- Utilisation : Rs. 8.45 crore
- Unutilised balance : Rs. 18.32 crore

SEPARATE AUDIT REPORT ON THE ACCOUNTS OF INDIAN INSTITUTE OF SCIENCE, EDUCATION AND RESEARCH, THIRUVANANTHAPURAM FOR THE YEAR ENDED 31 MARCH 2018

We have audited the attached Balance Sheet of the Indian Institute of Science, Education and Research, Thiruvananthapuram as at 31 March 2018, the Income & Expenditure Account and Receipts & Payment Account for the year ended on that date under Section 19(2) of the Comptroller and Auditor General's (Duties, Powers and Conditions of service) Act, 1971 read with section 22 of the NIT Act. 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, Income & Expenditure Account and Receipt & Payment Account dealt with by this report have been drawn up in the format approved by the Ministry of Human Resource Development, Government of India.

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 BALANCE SHEET.

A.1 SOURCES OF FUNDS

A.1.1 Corpus/ Capital Fund: ₹792.91 crore (Schedule 1)

This includes an amount of ₹84.34 crore being unutilized capital grant which should have been shown as current liability in the Balance Sheet. This has resulted in overstatement of Capital Fund to the tune of ₹84.34 crore with corresponding understatement of Current Liability in the Balance of the Annual Accounts.

A.1.2 Current Liabilities and provisions Rs. 59.32 crore

This is overstated by ₹5.59 crore due to inclusion of leave salary payable under (Sub Sch.2) sundry creditors for expenses which should have been shown under Schedule 3,B Provisions. This has also resulted in understatement of Provisions to that extent.

A.1.3 Unspent balance of External Projects. Sch.3 A :₹18.32 crore.

This is understated by ₹1.24 crore due to netting of debit balances in 26 numbers of Endowment Funds (Sponsored Projects). According to the revised Format of Accounts issued by MHRD, credit balance should be shown on the liability side of the Balance Sheet and debit balance to be shown as receivable on the asset side of the Balance Sheet. Due to netting of debit balances in the above head the Current Assets also stand understated to the extent of ₹1.24 crore.

B Income and Expenditure Account

B.1 Income

B.1.1 Interest Earned - Schedule 12: ₹0.40 crore & Other Income - Schedule 13: ₹4.87 crore

This is overstated by ₹3.54 crore due to inclusion of interest earned on investment from Government of India grant in Income and Expenditure Account. According to Rule 230 (8) of GFR 2017, which came into effect from 08 March 2017, all interests or other earnings against grants-in aid released to any grantee institution should be mandatorily refunded immediately after the finalization of accounts. This has also resulted in understatement of Current Liability by ₹3.54 crore.

B.2 Expenditure

B.2.1 Depreciation - Schedule 4: ₹ 23.25 crore

According to the guidelines issued by MHRD, depreciation on fixed assets has to be provided on Straight Line method (i.e. applying depreciation rates on the gross value of assets not fully written off) and depreciation on additions has to be provided for the whole year. The Institute adopted Written Down Value method applying the rates of Straight Line method. Thus the provision for depreciation is understated by ₹3.47 crore due to short provision of depreciation on tangible assets on account of applying depreciation on the net value of assets. The short provision of depreciation has resulted in overstatement of Fixed Assets by the same extent.

C. General

(1) No provision was seen made in the annual accounts for retirement benefits on the basis of actuarial valuation as prescribed in AS-15.

(2) According to the MHRD guidelines, Fixed Assets in the course of construction should be shown under work-in-progress till they are ready for their intended use. Those works in progress, (opening balance plus additions during the year) which get completed in the current year, are transferred to the respective Fixed Assets. During 2017-18, additions to Building (Tangible Asset) amounting to ₹210.33 crore included only ₹1.14crore as deduction from Capital work- in progress of the previous year. Balance amountof ₹209.19 crore was shown as addition from advances which should have been routed through Capital work- in progress. This irregular accounting practice is brought to notice.

D. Grant- in- aid

Out of the Grants-in Aid of ₹ 442.92 crore(including ₹200.39 crore brought forward from previous year) the Institute could utilize a sum of ₹ 358.58 crore leaving a balance of ₹ 84.34 crore as unutilized grants as on 31 March 2018.

v. Subject to our observations in the preceding paragraphs, we report that the Balance sheet, Income & Expenditure Account and 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 a 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 2018; 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 Director of Audit (Central)

Place : Chennai
Date : 5 February 2019.

Annexure I

(i) Adequacy of Internal Audit System

The Internal Audit System was not adequate as no Accounting Manual was prepared and inventory of asset registers were not maintained properly.

(ii) Adequacy of Internal Control System

Management Information System (MIS) is also not implemented. Fixed Asset register is not maintained in accordance with the GER Provisions. Hence Internal Control System is weak.

(iii) Physical Verification of Fixed Assets

IISER is not maintaining Fixed Asset Register in conformity with the generally accepted accounting procedure as per Form GFR 22 of GFRs 2017.

The Institute has conducted annual physical verification of fixed assets for the period 2017-18.

(iv) Physical verification of Inventories

Physical verification of inventory has been conducted for the period 2017-18.

(v) Regularity in payment of statutory dues

IISER is regular in payment of statutory dues.

Sd/-

Director(CS/GST)II

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

BALANCE SHEET AS AT 31st MARCH 2018

Amount-Rs.

SOURCES OF FUNDS	Schedule No	2017-18	2016-17
UNRESTRICTED FUND			
CORPUS/ CAPITAL FUND	**1**	7,92,90,67,480	6,36,59,76,822
DESIGNATED/ EARMARKED FUNDS	**2**		
CURRENT LIABILITIES AND PROVISIONS	**3**	59,31,83,655	54,81,49,958
UNSPENT BALANCE OF EXTERNAL PROJECTS	**3A**	18,32,24,936	14,68,45,385
TOTAL		**8,70,54,76,071**	**7,06,09,72,165**
APPLICATION OF FUNDS			
FIXED ASSETS	**4**		
TANGIBLE ASSETS		3,79,23,14,866	1,26,72,13,230
INTANGIBLE ASSETS		5,89,19,113	4,95,70,141
CAPITAL WORK-IN-PROGRESS		2,69,00,66,302	2,54,74,44,810
INVESTMENTS FROM EARMARKED / ENDOWENT FUNDS	**5**		
LONG TERM INVESTMENT			
SHORT TERM INVESTMENT			
INVESTMENT - OTHERS	**6**		
CURRENT ASSETS	**7**	92,67,03,525	61,52,47,712
LOANS, ADVANCES & DEPOSITS	**8**	1,23,74,72,265	2,58,14,96,272
TOTAL		**8,70,54,76,071**	**7,06,09,72,165**
SIGNIFICANT ACCOUNTING POLICIES	**23**		
CONTINGENT LIABILITIES AND NOTES TO ACCOUNTS	**24**		

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH
THIRUVANANTHAPURAM

INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/YEAR ENDED 31st MARCH 2018

PARTICULARS	Schedule	2017-18	2016-17
INCOME			
Academic Reciepts	9	2,42,69,175	1,21,87,523
Grants & Subsidies	10	72,43,92,535	64,67,64,507
Income from Investments	11		
Interest Earned	12	39,69,737	93,53,408
Other Income	13	4,86,54,563	5,94,95,690
Prior Period Income	14		
Depreciation Added Back due to change in adopting depreciation rates from Income Tax Act to Companies Act			
TOTAL (A)		**80,12,86,010**	**72,78,01,128**
EXPENDITURE			
Staff Payments & Benefits	15	32,73,55,922	23,51,44,234
Acadamic Expenses	16	20,45,51,790	22,94,91,485
Administrative & General Expenses	17	15,20,54,756	14,46,77,828
Transportation Expenses	18	1,84,11,402	2,24,88,540
Repairs & Maintanence	19	2,19,07,983	1,47,96,364
Finance cost	20	1,10,682	1,66,057
Other Expenses	21		
Depreciation	4	23,24,76,169	14,01,55,690
Prior Period Expenses	22		
TOTAL (B)		**95,68,68,704**	**78,69,20,198**
Balance being excess of Income over Expenditure (A-B)		**(15,55,82,694)**	**(5,91,19,070)**
Transfer to/ from Designated Fund			
Building Fund			
Others (Specify)			
BALANCE BEING SURPLUS/ (DEFICIT) CARRIED TO CAPITAL FUND		**(15,55,82,694)**	**(5,91,19,070)**
Significant Accounting Policies	23		
Contingent Liabilities & Notes on Accounts	24		

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

RECEIPTS AND PAYMENTS FOR THE PERIOD/YEAR ENDED 31.03.2018

(Amount Rs.)

RECEIPTS	2017-18	2016-17	PAYMENTS	2017-18	2016-17
I. Opening Balance			I. Expenses		
a) Cash in hand			a) Establishment Expenses	28,68,95,754	23,39,55,139
b) Bank Balances			b) Acadamic Expenses	26,02,10,369	23,42,91,485
i) In current accounts			c) Administrative Expenses	15,07,68,185	14,56,35,009
a) Canara Bank A/c	2,17,35,457	3,257	d) Transportation Expenses	1,81,91,587	2,24,88,540
b) IDBI Bank A/c	38,72,785		e) Repair & Maintanence Expenses	2,09,46,294	1,27,96,364
c) SBI Bank A/c	9,500		f) Prior period Expenses		
ii) Deposit/Savings accounts					
a) SBT		38,79,94,925	II. Payments made against earmarked endowement funds		
b) Canara Bank	23,07,19,282	54,80,81,711			
c) SBI	20,58,37,857	9,48,29,038	III. Payment against Sponsered Projects	3,49,84,800	4,38,99,776
d) Canara Bank Project A/c	52,62,454	6,52,35,180			
e) IDBI Bank Project A/c	14,78,10,377		IV. Payment against sponsered fellowships		
			V. Investments and deposits made		

			a) Out of Earmarked/ Endowment funds		
II. Grants Received			b) Out of Own Funds (Investments-Others)		
a) From Government of India	2,17,18,00,000	2,17,54,00,000			
b) From State Government			VI. Term Deposits with Scheduled Banks		
c) From other sources (details)					
DST		8,63,07,309			
CSIR	85,51,233	18,61,609			
KVPY	35,82,000	20,28,000	VII. Expenditure on Fixed Assets & Capital		
UGC	33,600	54,23,044	Work-in-Progress		
DBT	3,30,000		Purchase of Fixed Assets and	76,46,10,733	2,05,12,35,068
ICMR	1,59,991	3,19,952	Expenditure on Capital Work-in-progress		
External Projects (including interest)	10,34,33,763	12,78,36,639			
			VIII. Other payment including Statutory payment	8,55,88,459	
III. Acadamic Receipts	2,98,48,725	1,78,33,385			
			IX. Refunds of Grants		
IV. Receipts against Earmaked/ Endowment Fund					
			X. Deposits & Advances	1,24,12,36,030	2,07,62,39,577

V. Receipts against sponsered projects			XI. Other payments		
VI. Receipts against Sponsered Fellowships and Scholarships			VIII. Closing Balances		
			a) Cash in hand		
VII. Income on Investments from			b) Bank Balances		
a) Earmarked/ Endow. Funds			i) In current accounts		
b) Own Funds (()th. Investment)			a) Canara Bank A/c	34,002	2,17,35,457
			b) IDBI Bank A/c	2,14,555	38,72,785
			c) SBI Bank A/c	18,00,104	9,500
VIII. Interest Received					
a) On Bank deposits	1,26,99,579	7,16,25,365	ii) In deposit /savings accounts		
b) Loans. Advances etc.			a) SBT		10,15,31,897
c) Savings Bank Account	39,69,737	93,53,408	b) Canara Bank	42,52,61,706	23,07,19,282
			c) SBI	30,60,45,714	10,43,05,960
			d) Canara Bank Project A/c	1,17,74,065	52,62,454
			e) IDBI Bank Project A/c	17,75,81,379	14,78,10,377
IX. Investment encashed					
X. Term Deposits with Schedule bank encashed	70,91,51,822	90,61,96,220			
XI. Other Income (Incuding prior period income)	2,94,31,841	1,65,98,524			
XII. Deposits & Advances	9,79,03,733	91,88,61,104			
XIII. Miscellaneous receipts including Statutory receipts					
XIV. Any other receipts					
	3,78,61,43,736	**5,43,57,88,670**		**3,78,61,43,736**	**5,43,57,88,670**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 1- CORPUS/CAPITAL FUND: (Amount-Rs.)

	2017-18		2016-17	
Balance as at the beginning of the year		6,36,59,76,822		4,79,84,60,116
Add: Contributions towards Corpus/Capital Fund	2,43,89,59,510		2,27,13,39,914	
Add: Grant from UGC, Government of India and State Government to the extent utilised for capital expenditure	2,90,97,49,172		1,14,28,23,961	
Add: Assets purchased out of Earmarked funds				
Add: Assets purchased out of sponsored projects, where ownership vests in the institution				
Add: Assets donated/ gifts received				
Add: Other additions	41,06,377		20,60,369	
Add: Excess of income over expenditure transferred from income and expenditure account	(15,55,82,694)		(5,91,19,070)	
Total		**11,56,32,09,187**		**8,15,55,65,290**
Less: Deficit transferred from the income and expenditure account				
Less: Utilised during the year		3,63,41,41,707		1,78,95,88,468
BALANCE AT THE YEAR-END		**7,92,90,67,480**		**6,36,59,76,822**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 2-DESIGNATED/ EARMARKED FUNDS (Amount-Rs.)

	FUND-WISE BREAK UP				TOTAL	
	Fund AAA	**Fund BBB**	**Fund CC**	**Endowment Funds**	**2017-18**	**2016-17**
A a) Opening balance of the funds b) Additions to the Funds: c) Income from investments made on account of funds d) Accrued interest on investments of the funds e) Interest on savings Bank Account f) Other additions (specify nature)						
TOTAL (A)	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**
B Utilisation/Expenditure towards objectives of funds i. Capital Expenditure ii. Revenue Expenditure						
TOTAL (B)						
CLOSING BALANCE AS AT THE YEAR-END (A-B)	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**
Represented by						
Cash and bank balances						
Investment						
Interest accrued but not due						
Total						

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 2 (A)-ENDOWMENT FUNDS (Amount-Rs.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sl. No	Name of the Endowment	Opening Balance		Additions during the year		Total		Expenditure on the object during the year	Closing Balance		Total
		Endowment	Accumulated Interest	Endowment	Interest	Endowment	Accumulated Interest		Endowment	Accumulated Interest	
						(3)+(5)	(4)+(6)				(10)+(11)
1											
	Total	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 3- CURRENT LIABILITIES AND PROVISIONS

	Sub Sch No.	2017-18	2016-17
A. CURRENT LIABILITIES			
1. Deposits from staff			
2. Deposits from students			
3. Sundry Creditors:			
a) For Goods & Services	1	58,87,247	
b) Others	2	11,98,66,840	9,48,33,392
4. Deposits Others (including EMD, Security Deposits)	3	5,85,03,805	6,19,51,807
5. Statutory Liabilities(GPF,TDS,WC TAX, CPF, GIS,NPS) :			
a) Overdue			
b) Others	4	27,06,991	46,39,419
6. Other current Liabilities	5	40,62,18,772	38,67,25,340
a) Salaries			
b) Receipts against sponsored projects			
c) Receipts against sponsored fellowships and scholorships			
d) Unutilised Grants			
e) Grants in advance			
f) Other Funds			
g) Other liablities			
Total (A)		**59,31,83,655**	**54,81,49,958**
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)		**59,31,83,655**	**54,81,49,958**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 3 (a)-ENDOWMENT FUNDS (Sponsored Projects) Amount in Rupees

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sl. No	Name of the Project	Opening Balance 2017-18		Receipts / Recoveries during the year	Total	Expenditure during the year	Closing Balance 2017-18	
		Credit	Debit				Credit	Debit
1	CEFIPRA-DR.ARCHANA PAI	554052	0	-549569	4483	0	4483	
2	CSIR-DR.AJAY VENUGOPAL	167384	0	1815	169199	185247		16048
3	CSIR-DR.D.V.SENTHIL KUMAR	0	0	1489949	1489949	0	1489949	
4	CSIR-DR.SUKHENDU MANDAL	0	414740	761499	346759	346759	0	0
5	DAE-DR.M.M.SHAIJUMON	0	77482	0	-77482	0		77482
6	DAE-DR RAMESH CHANDRANATH	0	0	1358544	1358544	111295	1247249	
7	DAE-DR.TAPAS KUMAR MANNA	182321	0	0	182321	0	182321	
8	DAE-NBHM-DR.UTPAL MANNA	116386	0		116386	0	116386	
9	DBT-A1-DR.HEMASOMANATHAN	356984	0	234000	590984	550401	40583	
10	DBT-A2-DR.HEMASOMANATHAN	650175	0	243649	893824	442295	451529	
11	DBT-A3-DR.ULLASA	467074	0	673996	1141070	749215	391855	
12	DBT-DR.KALIKA PRASAD-BT/PR3632/ BRB/10/977/2011	0	900563	39483	-861080	0		861080
13	DBT-DR.MAHESH HARIHARAN	0	616403		-616403	0		616403
14	DBT-DR.SADANANDA SINGH	0	0	1000000	1000000	38327	961673	
15	DBT-DR.REJI VARGHESE	0	3509934	4029594	519660	729397		209737
16	DBT-DR.ULLASA KODANDARAMAIAH	141449		0	141449	298907		157458
17	DBT -IISC-MOHAMMED AIYAZ	551752	0	626000	1177752	593883	583869	
18	DBT-NER-DR.M.M.SHAIJUMON	0	324324	0	-324324	0		324324

19	DBT-RAMALINGASWAMI - DR.RAVI MARUTHACHALAM	0	269123	1610000	1340877	1320000	20877	
20	DBT-RICE DR KALIKA PRASAD	1436519	0	1345799	2782318	1822872	959446	
21	DBT-Prof. SRINIVASA MURTY SRINIVASULA	0	0	2898400	2898400	0	2898400	
22	DBT-TAPAS KUMAR MANNA	2714984	0	1248073	3963057	3034358	928699	
23	DST-DR.ARCHANA PAI	18	0		18	0	18	
24	DST-WOS - DR.TAMIL SELVI	0	0	1033527	1033527	505373	528154	
25	DST-DR.TAPAS KUMAR MANNA	593059	0		593059	0	593059	
26	DST-FIST-DR MAHESH HARIHARAN	0	0	35630178	35630178	0	35630178	
27	DST-FT-DR.ANIL SHAJI	36605	0		36605	0	36605	
28	DST-FT-DR.K.M.SURESHAN	0	1196840	1196840	0	0	0	0
29	DST-INDO-EU-DR.K.GEORGE THOMAS	0	239287	239287	0	0	0	0
30	DST-INSPIRE FACULTY AWARD-DR.AJAY VENUGOPAL	0	644590	1013590	369000	79693	289307	
31	DST-INSPIRE FACULTY AWARD-DR. ULLASA	0	610114	0	-610114	445326		1055440
32	DST INSPIRE FACULTY AWARD MAMATA SAHOO	474901	0	15686	490587	1472236		981649
33	DST-INSPIRE FACULTY-DR.S.GOKULNATH	1392640	0		1392640	1502057		109417
34	DST-INSPIRE FACULTY-DR.VINAYAK	1062494	0	42280	1104774	1548512		443738
35	DST-INSPIREFACULTY-MITHUN MUKHERJEE	193683	0	44767	238450	111072	127378	
36	DST-JSPS-DR.NISHANT.K.T	37350	0	0	37350	0	37350	
37	DST-MPG-DR.ARCHANA PAI	57360	0	25047	82407	82407	0	0
38	DST-MPG-DR.SHANKARNARAYANAN	706901	0	-149349	557552	548295	9257	
39	DST(NANOMISSION) PROF.K GEORGE THOMAS	46310287	0	2675878	48986165	6471210	42514955	
40	DST-RAMANUJAN-DR.ANIL SHAJI	827747	0		827747	0	827747	
41	DST-RAMANUJAN-DR.JISHY VARGHESE	1318416	0	117403	1435819	141387	1294432	

42	DST-RAMANUJAN-DR.K.M.SURESHAN	0	1764476	0	-1764476	16000		1780476
43	DST-RAMANUJAN-DR.RAMESH RASAPPAN	350530	0	206525	557055	1032713		475658
44	DST-RAMANUJAN-DR.RAVI PANT	153333	0	565036	718369	781036		62667
45	DST-RAMANUJAN-DR.REJI VARGHESE	263707	0	28000	291707	218000	73707	
46	DST-RAMANUJAN-DR. SHANKARNARAYANAN	584526	0		584526	96000	488526	
47	DST-RAMANUJAN-RAJENDER GORETI	697993	0	24468	722461	584921	137540	
48	DST-RFBR-DR.ULLASA KODANDA RAMAIAH	0	1482757	0	-1482757	0		1482757
49	DST SERB-ANIL SHAJI	0	0	928228	928228	63728	864500	
50	DST- SERB-DR.ALAGIRI KALIYAMOORTY	0	0	2654519	2654519	2444125	210394	
51	DST-SERB -DR.DEEPSHIKA JAISWAL NAGAR	980595	0	261269	1241864	1366606		124742
52	DST-SERB-DR.GOKULNATH	1452558	0	55943	1508501	1237144	271357	
53	DST SERB-DR.M.M.SHAIJUMON	0	0	2233311	2233311	474818	1758493	
54	DST-SERB-FT-DR.AYAN DATTA	136490	0	0	136490	0	136490	
55	DST SERB PROJECT -DR.RAJENDER GORETI	992600	0	22833	1015433	1429128		413695
56	DST-SERI-DR.MANOJ.AG NAMBOOTHIRY	26641	0	0	26641	0	26641	
57	DST-SERI-DR MANOJ AG NAMBOOTHIRY (NEW)	0	0	5446094	5446094	1687347	3758747	
58	DST-SJF-DR.K.M.SURESHAN	10727816	0	843512	11571328	2028918	9542410	
59	DST-SJF-DR.SUNISH.K RADHAKRISHNAN	17940671	0	598761	18539432	1504834	17034598	
60	DST-TMD-MES-DR.M.M SHAIJUMON	0	0	5616550	5616550	1386631	4229920	
61	DST-UKIERI-DR.HEMA SOMANATHAN	159449	0	0	159449	54657	104792	
62	DST-UKIERI-DR.RAJEEV.N.KINI	23566	0	-23566	0	0	0	0
63	DUPONT DR.RAVI MARUTHACHALAM	1293881	0	0	1293881	33850	1260031	
64	INDO-ITALIAN-DR.MAHESH HARIHARAN	0	0	340000	340000	189929	150071	

65	ISRO-DR DEEPSHIKA	0	0	1742000	1742000	155100	1586900	
66	ISRO-DR.DEEPSHIKHA JAISWAL NAGAR./19012/35/2016-II	1813823	0	96944	1910767	83907	1826860	
67	IUSSTF-BASE-ABBEY MEPRATHU PHILIP	0		745000	745000	745000	0	0
68	IUSSTF-DR.M.M.SHAIJUMON	285757		0	285757	0	285757	
69	JC BOSE-PROF K.GEORGE THOMAS	540014		716000	1256014	2064797		808783
70	KSCSTE-DR.MAHESH HARIHARAN	2679287		105834	2785121	334893	2450228	
71	KSCSTE-DR.REJI VARGHESE			946000	946000	316340	629660	
72	MPG-DR.ARCHANA PAI	1733026		-1527626	205400	205400	0	0
73	MPG-DR.SHANKARNARAYANAN	0	862432	1158213	295781	295781	0	0
74	MHRD-COE-DR.AMAL MEDHI	14670730		501432	15172162	0	15172162	
75	NISSAN-RNTBCI-DR.M.M.SHAIJUMON	0	100046	0	-100046	0		100046
76	RAENG-DR.JOY MITRA	0		2807154	2807154	787518	2019636	
77	SERB-BIKAS.C.DAS-ECR/2017/000630	0		1635000	1635000	70000	1565000	
78	SERB-BIKAS CHANDRADAS-EEQ/2016/000045	3978000		162817	4140817	312940	3827877	
79	SERB-CHIRANJEEVI.P-SERB/F/7728/2016-17	423000		17418	440418	0	440418	
80	SERB-DR.AJAY VENUGOPAL	212479		0	212479	0	212479	
81	SERB-DR.A.KALIAMOORTHY-ECR/2016/000202	921235		71429	992664	504571	488093	
82	SERB-DR JISHY VARGHESE-EMR/2016/004978	0		930000	930000	130000	800000	
83	SERB-DR.JOY MITRA-SR/S2/CMP-0139/2012	38090		0	38090	131262		93172
84	SERB-DR.MADHU THALAKULAM	2153442		65265	2218707	354058	1864649	
85	SERB-DR.MAHESH HARIHARAN	0		31000	31000	10000	21000	
86	SERB-DR.RAJEEV N KINI	0	573811	0	-573811	0		573811
87	SERB-DR.RAMESH RASAPPAN	4076055		571802	4647857	4456815	191042	
88	SERB-DR.RAVI PANT-EMR/2015/000363	5641212		234304	5875516	6004034		128518

89	SERB-WEA - DR.R.S. SWATHI	100000		721	100721	235484		134763
90	SERB-DR.SUKHENDUMANDAL-EMR/2016/007501	0		0	0	49000		49000
91	SERB-DR.SUKHENDU MANDAL-SB/S1/IC-14/2013	0	558911	6003	-552908	565357		1118265
92	SERB-DR.TAPAS K MANNA-EMR/2016/001562	990550		1690000	2680550	354349	2326201	
93	SERB-DR.VINESH VIJAYAN	0	187974	718094	530120	166600	363520	
94	SERB-DR.V.SIVARANJANA REDDY	1953509		74849	2028358	1243754	784604	
95	SERB-HEMA SOMANATHAN	0		731569	731569	0	731569	
96	SERB-IMPRINT DR GEORGE THOMAS	0		12463980	12463980	4534908	7929072	
97	SERB PROJECT DR.SUHESH KUMAR SINGH	1550000		17949	1567949	1554049	13900	
98	SERB PROJECT-SAIKAT CHATTERJEE	200000		3437	203437	32960	170477	
99	SERB-THIRUMURUGAN A	2714300		112598	2826898	2140866	686032	
100	UGC-UKEIRI-JOYMITRA-184-16/2017(IC)-NEW	0		948300	948300	69600	878700	
101	UGC-UKIERI-DR.JOY MITRA-184-26/2014(IC)	0	181175	0	-181175	16568		197743
102	WT-DBT-DR.NISHANT.K.T-IA/I/11/2500268	0	2940322	4900650	1960328	1960328	0	0
103	WT-DBT-DR.SATISH KHURANA-IA/1/15/2/502061	10983119		5348805	16331924	5521263	10810661	
104	WT-DBT-DR.SUNISH.K.R-500140/Z/09/Z	0		460672	460672	460672	0	0
105	WT-DBT-NISHA KANNAN/1A/E/15/1/502329	1037094		3084328	4121422	2512232	1609190	
	Others	9471070		657802	10128872	6406727	3722145	
	Total	**16,43,00,689**	**1,74,55,304**	**12,09,27,592**	**26,77,72,977**	**8,45,48,041**	**19,56,21,808**	**1,23,96,872**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH
THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 3 (b)-SPONSORED FELLOWSHIPS AND SCHOLARSHIPS

Amount in Rupees

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Sl. No	**Name of the Sponsor**	**Opening Balance as on 01.04.2017**		**Transactions during the year**		**Closing Balance as on 31.03.2018**		
		Credit	Debit	Credit	Debit	Credit	Debit	
1	DST - INSPIRE - BSMS	1,32,75,200			4,30,35,504		2,97,60,304	
2	CSIR (Ph D Research Scholars)		79,88,692	9,503,919	12,81,894	2,33,333		
3	KVPY (BSMS)		6,04,686	35,82,000	34,18,000		4,40,686	
4	UGC (Ph D Research Scholars)	7,49,000		33,600	1,24,038	6,58,562		
5	DBT (Ph D Research Scholar)		3,75,000	3,55,000	3,30,800		3,50,800	
6	ICMR (Ph D Research Scholar)	24,094		1,84,991	1,84,991	24,094		
	Total	**1,40,48,294**	**89,68,378**	**1,36,59,510**	**4,83,75,227**	**9,15,989**	**3,05,51,790**	

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 3(c)-UNUTILIZED GRANTS FROM UGC, GOVERNMENT OF INDIA AND STATE GOVERNMENTS — **Amount in Rupees**

	2017-18	2016-17
A. Plan grants: Government of India (MHRD)		
Balance B/F	2,00,38,71,438	1,57,79,11,215
Add: Receipts during the year	2,42,53,00,000	2,17,54,00,000
Total (a)	**4,42,91,71,438**	**3,75,33,11,215**
Less Refunds		
Less: Utilized for Revenue Expenditure	67,60,17,308	60,66,15,816
Less: Utilized for Capital Expenditure	2,90,97,49,172	1,14,28,23,961
Total (b)	**3,58,57,66,480**	**1,74,94,39,777**
Unutilized carried forward (a-b)	**84,34,04,958**	**2,00,38,71,438**
B. UGC Grants: Plan		
Balance B/F		
Add: Receipts during the year		
Total (c)	NIL	NIL
Less Refunds		
Less: Utilized for Revenue Expenditure		
Less: Utilized for Capital Expenditure		
Total (d)	NIL	NIL
Unutilized carried forward (c-d)		
C. UGC Grants Non-Plan		
Balance B/F		
Add: Receipts during the year		
Total (e)	NIL	NIL
Less Refunds		
Less: Utilized for Revenue Expenditure		
Less: Utilized for Capital Expenditure		
Total (f)	NIL	NIL
Unutilized carried forward (e-f)		
D. Grants from State Govt.		
Balance B/F		
Add: Receipts during the year		
Total (g)	NIL	NIL
Less Refunds		
Less: Utilized for Revenue Expenditure		
Less: Utilized for Capital Expenditure		
Total (h)	NIL	NIL
Unutilized carried forward (g-h)		
Grand Total (A+B+C+D)	**84,34,04,958**	**2,00,38,71,438**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 4 - FIXED ASSETS (PLAN) (Amount-Rs.)

	DESCRIPTION	GROSS BLOCK				DEPRECIATION					NET BLOCK	
		Opening Balance as on 01.04.2017	Additions	Deductions	Closing Balance	Rate of Depreciation	Opening Balance	Depreciation for the year	Deductions / Adjustment	Total Depreciation	31.03.2018	31.03.2017
	TANGIBLE ASSETS											
1	LAND:											
	a) Freehold											
	Land obtained from Govt	1			1	0.00%					1	1
	Vithura	9,54,506			9,54,506	0.00%					9,54,506	9,54,506
2	Site Development											
3	BUILDINGS:	20,33,30,964	2,10,32,78,200		2,30,66,09,164	2.00%	1,34,60,787	4,58,62,968		5,93,23,755	2,24,72,85,409	18,98,70,177
4	Roads & Bridges					2.00%		-				
5	Tubes & Water Supply					2.00%		-				
6	Sewage & Drainage					2.00%		-				
7	Electrical Installation and equipment	1,94,28,986	9,567		1,94,38,553	5.00%	43,59,988	7,44,361	(2,00,902)	53,05,251	1,41,33,302	1,50,68,998
8	Plant and Machinery	4,68,39,067	70,95,401	31,000	5,39,03,468	5.00%	80,28,304	22,95,308	1,550	1,03,22,062	4,35,81,406	3,88,10,763

9	Scientific & Laboratory Equipment	1,15,36,57,996	55,00,19,508	50,91,332	1,69,85,86,172	8.00%	27,96,40,736	11,39,22,942	4,07,307	39,31,56,371	1,30,54,29,801	87,40,17,260
10	Office Equipment					7.50%		-				
11	Audio Visual Equipment					7.50%		-				
12	Computers & Peripherals	11,75,95,472	4,51,54,642	1,38,112	16,26,12,002	20.00%	4,68,75,136	2,31,74,995	27,622	7,00,22,509	9,25,89,493	7,07,20,336
13	Furniture, Fixtures and Fittings	8,35,99,016	1,44,80,423		9,80,79,439	7.50%	1,94,91,573	58,94,090		2,53,85,663	7,26,93,776	6,41,07,443
14	VEHICLES	7,11,323	24,41,575		31,52,898	10.00%	4,28,444	2,72,446		7,00,890	24,52,008	2,82,879
15	Library Books & Scientific Journals	2,33,07,544	12,80,427		2,45,87,971	10.00%	99,26,677	14,66,130		1,13,92,807	1,31,95,164	1,33,80,867
16	Small Value Assets											
	TOTAL (A)	**1,64,94,24,875**	**2,72,37,59,743**	**52,60,444**	**4,36,79,24,174**		**38,22,11,645**	**19,36,33,240**	**2,35,577**	**57,56,09,308**	**3,79,23,14,866**	**1,26,72,13,230**
17	CAPITAL WORK-IN PROGRESS - Construction	2,18,78,51,704	25,13,05,794	1,14,17,016	2,42,77,40,482						2,42,77,40,482	2,18,78,51,704
18	CAPITAL WORK-IN PROGRESS - Lab Equipment	35,95,93,106	19,23,35,289	28,96,02,575	26,23,25,820						26,23,25,820	35,95,93,106
	CAPITAL WORK IN PROGRESS (B)										**2,69,00,66,302**	**2,54,74,44,810**
	TOTAL A+B										**6,48,23,81,168**	**3,81,46,58,040**

S. No.	INTANGIBLE ASSETS	GROSS BLOCK				DEPRECIATION					NET BLOCK	
		Opening Balance as on 01.04.2017	Additions	Deductions	Closing Balance	Rate of Depre-ciation	Opening Balance	Amortization for the year	Deductions / Adjustment	Total Amortization / Adjustments	31.03.2018	31.03.2017
19	Computer Software	1,71,70,679	20,01,928		1,91,72,607	40.00%	1,53,36,970	15,34,255		1,68,71,225	23,01,382	18,33,709
20	E-Journals	28,66,75,742	4,66,26,453		33,33,02,195	40.00%	23,89,39,310	3,77,45,154		27,66,84,464	5,66,17,731	4,77,36,432
21	Patents					9 Years						
	TOTAL -(C)	30,38,46,421	4,86,28,381	-	35,24,74,802		25,42,76,280	3,92,79,409	-	29,35,55,689	5,89,19,113	4,95,70,141
	GRAND TOTAL (A+B+C)	**4,50,07,16,106**	**3,21,60,29,207**	**30,62,80,035**	**7,41,04,65,278**		**63,64,87,925**	**23,29,12,649**	**2,35,577**	**86,91,64,997**	**6,54,13,00,281**	**3,86,42,28,181**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 4 A - FIXED ASSETS (PLAN+NON PLAN) (Amount-Rs.)

	DESCRIPTION	GROSS BLOCK				DEPRECIATION					NET BLOCK	
		Opening Balance as on 01.04.2017	Additions	Deductions	Closing Balance	Rate of Depre-ciation	Opening Balance	Depreciation for the year	Deduc-tions / Adjust-ment	Total Deprec-iation	31.03.2018	31.03.2017
1	TANGIBLE ASSETS LAND: a) Freehold Land obtained from Govt	1			1	0.00%					1	1
2	Vithura Site Development	9,54,506			9,54,506	0.00%					9,54,506	9,54,506
3	BUILDINGS:	20,33,30,964	2,10,32,78,200		2,30,66,09,164	2.00%	1,34,60,787	4,58,62,968		5,93,23,755	2,24,72,85,409	18,98,70,177
4	Roads & Bridges					2.00%		-				
5	Tubes & Water Supply					2.00%		-				
6	Sewage & Drainage					2.00%		-				
7	Electrical Installation and equipment	1,94,28,986	9,567		1,94,38,553	5.00%	43,59,988	7,44,361	(2,00,902)	53,05,251	1,41,33,302	1,50,68,998

8	Plant and Machinery	4,68,39,067	70,95,401	31,000	5,39,03,468	5.00%	80,28,304	22,95,308	1,550	1,03,22,062	4,35,81,406	3,88,10,763
9	Scientific & Laboratory Equipment	1,15,36,57,996	55,00,19,508	50,91,332	1,69,85,86,172	8.00%	27,96,40,736	11,39,22,942	4,07,307	39,31,56,371	1,30,54,29,801	87,40,17,260
10	Office Equipment					7.50%		-				
11	Audio Visual Equipment					7.50%		-				
12	Computers & Peripherals	11,75,95,472	4,51,54,642	1,38,112	16,26,12,002	20.00%	4,68,75,136	2,31,74,995	27,622	7,00,22,509	9,25,89,493	7,07,20,336
13	Furniture, Fixtures and Fittings	8,35,99,016	1,44,80,423		9,80,79,439	7.50%	1,94,91,573	58,94,090		2,53,85,663	7,26,93,776	6,41,07,443
14	VEHICLES	7,11,323	24,41,575		31,52,898	10.00%	4,28,444	2,72,446		7,00,890	24,52,008	2,82,879
15	Library Books & Scientific Journals	2,33,07,544	12,80,427		2,45,87,971	10.00%	99,26,677	14,66,130		1,13,92,807	1,31,95,164	1,33,80,867
16	Small Value Assets											
	TOTAL (A)	**1,64,94,24,875**	**2,72,37,59,743**	**52,60,444**	**4,36,79,24,174**		**38,22,11,645**	**19,36,33,240**	**2,35,577**	**57,56,09,308**	**3,79,23,14,866**	**1,26,72,13,230**
17	CAPITAL WORK-IN PROGRESS - Construction	2,18,78,51,704	25,13,05,794	1,14,17,016	2,42,77,40,482						2,42,77,40,482	2,18,78,51,704
18	CAPITAL WORK-IN PROGRESS - Lab Equipment	35,95,93,106	19,23,35,289	28,96,02,575	26,23,25,820						26,23,25,820	35,95,93,106
	CAPITAL WORK IN PROGRESS (B)										**2,69,00,66,302**	**2,54,74,44,810**
	TOTAL A+B										**6,48,23,81,168**	**3,81,46,58,040**

S. No.	INTANGIBLE ASSETS	GROSS BLOCK				DEPRECIATION					NET BLOCK	
		Opening Balance as on 01.04.2017	Additions	Deductions	Closing Balance	Rate of Depre-ciation	Opening Balance	Amortization for the year	Deduc-tions / Adjust-ment	Total Amortization / Adjustments	31.03.2018	31.03.2017
19	Computer Software	1,71,70,679	20,01,928		1,91,72,607	40.00%	1,53,36,970	15,34,255		1,68,71,225	23,01,382	18,33,709
20	E-Journals	28,66,75,742	4,66,26,453		33,33,02,195	40.00%	23,89,39,310	3,77,45,154		27,66,84,464	5,66,17,731	4,77,36,432
21	Patents					9 Years						
	TOTAL -(C)	**30,38,46,421**	**4,86,28,381**	**-**	**35,24,74,802**		**25,42,76,280**	**3,92,79,409**	**-**	**29,35,55,689**	**5,89,19,113**	**4,95,70,141**
	GRAND TOTAL (A+B+C)	**4,50,07,16,106**	**3,21,60,29,207**	**30,62,80,035**	**7,41,04,65,278**		**63,64,87,925**	**23,29,12,649**	**2,35,577**	**86,91,64,997**	**6,54,13,00,281**	**3,86,42,28,181**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

(Amount-Rs.)

	SCHEDULE 4 B FIXED ASSETS (NON PLAN)												
		GROSS BLOCK				DEPRECIATION					NET BLOCK		
	DESCRIPTION	Opening Balance as on 01.04.2017	Additions	Deductions	Closing Balance	Rate of Depreciation	Opening Balance	Depreciation for the year	Deductions / Adjustment	Total Depreciation	31.03.2018	31.03.2017
	TANGIBLE ASSETS											
1	LAND: a) Freehold Land obtained from Govt Vithura											
2	Site Development											
3	BUILDINGS:											
4	Roads & Bridges											
5	Tubes & Water Supply											
6	Sewage & Drainage											
7	Electrical Installation and equipment											
8	Plant and Machinery											
9	Scientific & Laboratory Equipment											
10	Office Equipment											
11	Audio Visual Equipment											
12	Computers & Peripherals											
13	Furniture, Fixtures and Fittings											
14	VEHICLES											

15	Library Books & Scientific Journals											
16	Small Value Assets											
	TOTAL (A)	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**
17	CAPITAL WORK-IN PROGRESS (B)											

S. No.	INTANGIBLE ASSETS	GROSS BLOCK				DEPRECIATION					NET BLOCK	
		Opening Balance as on 01.04.2017	Additions	Deductions	Closing Balance	Rate of Depreciation	Opening Balance	Amortization for the year	Deductions / Adjustment	Total Amortization / Adjustments	31.03.2018	31.03.2017
18	Computer Software											
19	E-Journals											
20	Patents											
	TOTAL -(C)	-	-	-	-		-	-	-	-	-	-
	GRAND TOTAL (A+B+C)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

(Amount-Rs.)

	SCHEDULE 4 C - INTANGIBLE ASSETS											
	DESCRIPTION	GROSS BLOCK				DEPRECIATION					NET BLOCK	
		Opening Balance as on 01.04. 2017	Addi-tions	Dedu-ctions	Closing Balance	Rate of Depre-ciation	Opening Balance	Depre-ciation for the year	Dedu-ctions / Adjust-ment	Total Depre-ciation	31.03. 2018	31.03. 2017
1 2 3	Computer Software E-Journals Patents											
	TOTAL -(C)	-	-	-	-		-	-	-	-	-	-
	GRAND TOTAL (A+B+C)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

(Amount-Rs.)

SCHEDULE 4C (i)- PATENTS AND COPYRIGHTS						
Description	**Op. Balance**	**Addition**	**Gross**	**Amorti-zation**	**Net Block 2017-18**	**Net Block 2016-17**
A. Patents Granted						
1. Balance as on 31.03.18 of patents obtained in (Original value- Rs. ……../-						
2. Balance as on 31.03.18 of patents obtained in Original value- Rs. ……../-						
3.. Balance as on 31.03.18 of patents obtained in (Original value- Rs. ……../-						
4. Patents granted during the Current Year						
TOTAL	NIL	NIL	NIL	NIL	NIL	NIL
Description	**Op. Balance**	**Addition**	**Gross**	**Patents Granted/ Rejected**	**Net Block 2017-18**	**Net Block 2016-17**
B. Patents Pending in respect of Patent applied for						
TOTAL	-	-	-	-		-
C. Grand Total (A+B)	NIL	NIL	NIL	NIL	NIL	NIL

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

(Amount-Rs.)

SCHEDULE 4 D FIXED ASSETS (OTHERS)

	DESCRIPTION	GROSS BLOCK				DEPRECIATION					NET BLOCK	
		Opening Balance as on 01.04. 2017	Addi-tions	Dedu-ctions	Closing Balance	Rate of Depre-ciation	Opening Balance	Depre-ciation for the year	Dedu-ctions / Adjust-ment	Total Depre-ciation	31.03. 2018	31.03. 2017
	TANGIBLE ASSETS											
1	LAND: a) Freehold Land obtained from Govt Vithura											
2	Site Development											
3	BUILDINGS:											
4	Roads & Bridges											
5	Tubes & Water Supply											
6	Sewage & Drainage											
7	Electrical Installation and equipment											
8	Plant and Machinery											
9	Scientific & Laboratory Equipment											
10	Office Equipment											

11	Audio Visual Equipment											
12	Computers & Peripherals											
13	Furniture, Fixtures and Fittings											
14	VEHICLES											
15	Library Books & Scientific Journals											
16	Small Value Assets											
	TOTAL (A)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
17	CAPITAL WORK-IN PROGRESS (B)											

S. No.	INTANGIBLE ASSETS	GROSS BLOCK				DEPRECIATION					NET BLOCK	
		Opening Balance as on 01.04. 2017	Additions	Deductions	Closing Balance	Rate of Depreciation	Opening Balance	Amortization for the year	Deductions / Adjustment	Total Amortization / Adjustments	31.03. 2018	31.03. 2017
18	Computer Software											
19	E-Journals											
20	Patents											
	TOTAL -(C)	-	-	-	-		-	-	-	-	-	-
	GRAND TOTAL (A+B+C)	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**	**NIL**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 5- INVESTMENTS (Amount-Rs.)

INVESTMENTS FROM EARMARKED/ENDOWMENT FUNDS	2017-18	2016-17
1. In Central Government Securities 2. In State Government Securities 3. Other approved Securities 4. Shares 5. Debentures and Bonds 6. Term Deposits with bank 7. Others (to be specified)		
TOTAL	**NIL**	**NIL**

SCHEDULE 5(A)- INVESTMENTS FROM EARMARKED/ ENDOWMENT FUNDS (FUND WISE) (Amount-Rs.)

	2017-18	2016-17
1. Endowment Fund Investment		
TOTAL	**NIL**	**NIL**

SCHEDULE 6- INVESTMENTS OTHERS (Amount-Rs.)

	2017-18	2016-17
1. In Central Government Securities 2. In State Government Securities 3. Other approved Securities 4. Shares 5. Debentures and Bonds 6. Others (to be specified)		
TOTAL	**NIL**	**NIL**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 7- CURRENT ASSETS (Amount-Rs.)

	Sub Sch. No.	2017-18	2016-17
1. Stock			
a) Stores and Spares			
b) Loose Tools			
c) Publications			
d) Laboratory Chemicals, consumables and glass wares			
e) Building materials			
f) Electrical materials			
g) Stationery			
h) Water supply material			
2. Sundry Debtors:			
a) Debts Outstanding for a period exceeding six months			
b) Others			
3. Cash balances in hand (including cheques/drafts and imprest)	6	-	-
4. Bank Balances:			
Institute balance			
a) With Scheduled Banks:			
-On Current Accounts	7	26,49,258	2,65,51,643
-On Term Deposit Accounts (includes margin money)	7	58,02,54,370	39,42,01,879
-On Savings Accounts	7	15,04,52,453	4,17,35,486
b) With non-Scheduled Banks:			
-On Current Accounts			
-On Term Deposit Accounts			
-On Savings Accounts			
Project Balance			
a) With Scheduled Banks:			
-On Current Accounts			
-On Term Deposit Accounts (includes margin money)	7	39,92,000	
-On Savings Accounts	7	18,93,55,444	15,27,58,704
b) With non-Scheduled Banks:			
-On Current Accounts			
-On Term Deposit Accounts			
-On Savings Accounts			
5. Post Office- Savings Accounts			
TOTAL		**92,67,03,525**	**61,52,47,712**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2018

SCHEDULE 8- LOANS, ADVANCES & DEPOSITS (Amount-Rs.)

	Sub Sch. No.	2017-18	2016-17
1. Advances to employees: (Non interest bearing)			
a) Salary			
b) Festival			
c) Medical Advance			
d) Other (to be specified)			
2. Long Term Advances to employees: (Interest bearing)			
a) Vehicle Loan			-
b) Home Loan			
c) Others (to be specified)			
3. Advances and other amounts recoverable in cash or in kind or			
for value to be received			
a) On Capital Account			
b) To suppliers			
c) Others	9	81,05,18,612	2,43,36,16,047
4. Prepaid Expenses			
a) Insurance			
b) Other Expenses	8	1,48,04,293	2,24,76,735
5. Deposits			
a) Telephone			
b) Lease Rent			
c) Electricity			
d) AICTE, if applicable			
e) Others (to be specified)			
6. Income Accrued:			
a) On Investments from Earmarked/Endowment Funds			
b) On Investments-Others			
c) On Loans and Advances			
d) Others (includes income due unrealized-Rs……)	10	3,88,15,024	2,60,90,322
7. Other Current Assets Recievables			
a) Debit balances in sponsered projects			
b) Debit balances in fellowship & scholarships			
c) Grants recoverable			
d) Other recievables			
8. Claims Receivable	11	37,33,34,336	9,93,13,168
TOTAL		**1,23,74,72,265**	**2,58,14,96,272**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/YEAR ENDED 31st MARCH 2018

	2017-18	2016-17
SCHEDULE 9- ACADEMIC RECEIPTS		
FEE FROM STUDENTS		
Acadamic		
a) Tuition fee	2,06,37,930	99,87,718
b) Admission fee		
c) Enrolment fee		
d) Library fee	5,30,800	4,21,200
e) Laboratory fee		
f) Art & Craft fee		
g) Registration fee	3,82,050	2,91,200
h) Syllabus fee		
i) Other Receipts	8,90,550	8,39,200
j) Alumini Fee	2,20,500	
TOTAL (A)	2,26,61,830	1,15,39,318
Examinations		
a) Admission test fee		
b) Annual examination fee	6,65,345	5,43,005
c) Mark sheet, Certificate fee		
d) Entrance Examination fee		
TOTAL (B)	6,65,345	5,43,005
Other Fee		
a) Identity Card fee		
b) Fine/ Miscellaneous fee		
c) Medical fee		76,200
d)Transportation fee		
e)Hostel Fee	1,57,000	29,000
f)Mess Establishment	7,85,000	
TOTAL (C)	9,42,000	1,05,200
Sale of publications		
a) Sale of admission forms		
b) Sale of syllabus and question paper		
c) Sale of prospectus including admission forms		
TOTAL (D)		
Other Accademic Receipts		
a) Registration fee for workshops programmes		
b) Registration fees (Academic Staff College)		
GRAND TOTAL (A+B+C+D)	**2,42,69,175**	**1,21,87,523**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/YEAR ENDED 31st MARCH 2018

		2017-18	2016-17
SCHEDULE 10- GRANTS/ SUBSIDIES			
(Irrevocable Grants & Subsidies Received)			
Balance B/F		2,00,89,51,355	1,52,71,99,909
ADD: Receipts During the Year			
Capital Grant		2,42,53,00,000	2,17,54,00,000
General	1,43,63,07,500		
SC	27,79,95,000		
ST	13,89,97,500		
Revenue Grant			
General	43,95,50,000		
SC	9,05,50,000		
ST	4,19,00,000		
DST - INSPIRE (BSMS)			8,63,07,309
CSIR (Ph D Research Scholars)		95,03,919	18,61,609
KVPY (BSMS)		35,82,000	20,28,000
UGC (Ph D Research Scholar)		33,600	54,23,044
DBT		3,55,000	-
ICMR		1,84,991	3,19,952
		4,44,79,10,865	**3,79,85,39,823**
Less: Capital Expenses Incurred during the year		2,90,97,49,172	1,14,28,23,961
Less: Closing Unspent balance of grant		81,37,69,158	2,00,89,51,355
		72,43,92,535	**64,67,64,507**
TOTAL		**72,43,92,535**	**64,67,64,507**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/YEAR ENDED 31st MARCH 2018

SCHEDULE 11- INCOME FROM INVESTMENTS (Amount-Rs.)

	Earmarked or Endownment funds		Other investments	
	2017-18	2016-17	2017-18	2016-17
1) Interest a) On Govt. Securities b) Other Bonds/Debentures 2) Interest on term deposits 3) Income Accrued but not due on term deposits or interest bearing advances to employees 4) Interest on Savings Bank Accounts 5) Others (Specify)				
TOTAL	NIL	NIL	NIL	NIL
TRANSFERRED TO EARMARKED/ENDOWMENT FUNDS				
Balance	NIL	NIL	NIL	NIL

SCHEDULE 12- INTEREST EARNED (Amount-Rs.)

Particulars	2017-18	2016-17
1) On Savings Accounts with scheduled banks	39,69,737	93,53,408
2) On Loans a. Employees/ Staff b. Others		
3) On debtors and others receivables		
TOTAL	**39,69,737**	**93,53,408**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/ YEAR ENDED 31st MARCH 2018

SCHEDULE 13- OTHER INCOME (Amount-Rs.)

	2017-18	2016-17
A. Income from Land & Building		
a) Hostel room rent	39,36,050	26,69,257
b) License fee	8,47,485	4,15,826
c) Hire charges of Auditorium/ Play ground/ Convention Centre, Etc		
d) Electricity Charges recovered		8,48,000
e) Water Charges recovered		
Total	**47,83,535**	**39,33,083**
B. Sale of Institutes Publications		
Total	-	-
C. Income from Holding Events		
a) Gross reciepts from annual function/ sports carnival		
Less: Direct expenditure incurredon the annual function/ sports carnival		
b) Gross reciepts from fetes		
Less: Direct expenditure incurred on fetes		
c) Gross reciepts on educational tours		
Less: Direct expenditure incurred on tours		
d) Others (to be specify and separately disclosed)		
Total	-	-
D. Interest On Term Deposits:		
a) With Scheduled Banks	3,14,25,235	3,98,21,774
b) With Non-Scheduled Banks		
c) With Institutions		
d) Others		
Total	**3,14,25,235**	**3,98,21,774**
E. Interest On Savings Accounts:		
a) With Scheduled Banks		
b) With Non-Scheduled Banks		
c) With Institutions		
d) Others		
Total	-	-
F. On Loans:		
a) Employees/Staff		
b) Others	40,36,664	1,01,76,045
Total	40,36,664	1,01,76,045
G.Interest on Debtors and Other Receivables		

Total	-	-
H. Others		
a) Income from consultancy		
b) RTI Fees	40	995
c) Income from royalty		
d) Sale of application form	3,49,544	80,400
e) Misc. reciepts (Sale of tender form, waste paper, etc.)	80,59,545	54,83,393
f) Profit on sale/ disposal of Assets		
1. Owned asset		
2. Assets aquired out of grants, or received free of cost		
g) Other Incomes		
Total	**84,09,129**	**55,64,788**
GRAND TOTAL (A+B+C+D+E+F+G+H)	**4,86,54,563**	**5,94,95,690**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/YEAR ENDED 31st MARCH 2018

SCHEDULE 14 : PRIOR PERIOD INCOME (Amount-Rs.)

Particulars	2017-18	2016-17
1. Academic Receipts 2. Income from investments 3. Interest earned 4. Other Income		
Total	**NIL**	**NIL**

SCHEDULE 15- STAFF PAYMENT & BENEFITS

	2017-18	2016-17
a) Salaries and Wages	28,31,07,080	19,09,79,396
b) Allowances and Bonus	51,97,925	39,08,731
c) Contribution to Provident Fund		
d) Contribution to Other Fund (Leave Salary & NPS Employer Share)	1,48,38,783	3,20,45,866
e) Staff Welfare Expenses	6,85,230	
f) Retirement and Terminal Benefits		
g) LTC facility	21,14,112	24,37,243
h) Medical facility	17,82,972	15,71,093
i) Children Education Allowance	13,08,901	10,63,278
j) Honorarium		
k) Others (Leave Salary)	1,83,20,919	31,38,627
TOTAL	**32,73,55,922**	**23,51,44,234**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/YEAR ENDED 31st MARCH 2018

SCHEDULE 15 A- EMPLOYEES RETIREMENT AND TERMINAL BENEFITS (Amount-Rs.)

	Pension	**Gratuity**	**Leave Encashment**	**Total**
Opening balance as on …….				
Additions: Capitalized value of contributions Received from other Organizations				
Total (a)				
Less: Actual Payment during the Year (b)				
Balance available as on 31.03…. C (a-b)				
Provision required on 31.03…. As per Actuarial Valuation (d)				
A. Provision to be made in the curent year (d-c)				
B. Contribution to New Pension Scheme				
C. Medical Reimbursement to Retired Employees				
D. Travel to Home town on Retirement				
E. Deposit Linked Insurance Payment				
TOTAL (A+B+C+D+E)	NIL	NIL	NIL	NIL

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/ YEAR ENDED 31st MARCH 2018

SCHEDULE 16- ACADEMIC EXPENSES (Amount-Rs.)

Particulars	2017-18	2016-17
a) Laboratary Expenses	10,98,28,171	13,49,80,581
b) Field Work/ Participation	10,22,388	8,07,101
c) Expenses on Seminar/ Workshop		
d) Payment to visiting faculty		
e) Examination		
f) Student welfare expense		
g) Admission expenses	10,550	1,38,651
h) Convocation expense	8,14,014	9,57,957
i) Publication		
j) Stipend/ means-cum-merit scholarship	9,28,76,667	9,26,07,195
k) Subscription Expense		
l) Others (Specify)		
TOTAL	**20,45,51,790**	**22,94,91,485**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/ YEAR ENDED 31st MARCH 2018

SCHEDULE 17- ADMINISTRATIVE AND GENERAL EXPENSES (Amount-Rs.)

Particulars	2017-18	2016-17
A. Infrastructure		
a) Electricity and power	4,72,18,354	3,30,23,899
b) Water charges	11,48,838	20,53,989
c) Insurance		-
d) Rent, Rates and Taxes	3,82,52,680	5,17,33,901
B. Communication		
e) Postage & Telegram	11,71,415	11,75,937
f) Telephone and Internet Charges	37,59,656	80,11,695
C. Others		
g) Printing and Stationary	46,02,814	93,36,371
h) Travelling and Conveyance Expenses	54,78,084	55,42,013
i) Expenses on Seminar/Workshops	70,53,161	69,93,957
j) Hospitality		
k) Auditors Remuneration	4,48,721	1,38,510
l) Professional Charges		
m) Advertisement and Publicity	38,24,754	29,35,689
n) Magazine & Journals		
o) Others (specify)		
Sports / Cultural Festival / Celeberation expense	20,37,787	11,61,035
Consumables	81,97,509	25,75,041
Contingencies	1,13,39,601	87,68,980
Cable TV Charges	3,035	2,24,162
Newspaper & Periodicals	1,71,361	1,45,087
Office contingencies	1,08,41,032	50,42,818
Software License fees	8,76,024	9,50,471
Photography Charges		27,500
Publication charges	18,32,965	5,830
Guest house and other expenses	1,94,252	2,49,443
Gardening & Landscaping Chages		13,77,405
Other Adminstrative / Miscellaneous Expenses	12,58,222	21,26,481
Legal and consultancy charges	16,28,000	4,70,330
Anvesha Programme Expenses	1,52,599	1,61,257
Permananent Campus Inaguration expenses		1,02,230
Medical Centre - Consumables&Medicines	5,63,892	3,43,798
TOTAL	**15,20,54,756**	**14,46,77,828**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/ YEAR ENDED 31st MARCH 2018

SCHEDULE 18- TRANSPORTATION EXPENSES

(Amount-Rs.)

	2017-18	2016-17
1. Vehicles (owned by educational institution)		
a) Running expense	5,62,919	1,14,862
b) Repairs & Maintanence	18,992	34,425
c) Insurance Expenses	55,309	10,207
2. Vehicles taken on rent		
a) Rent/ Lease expenses	1,77,74,182	2,23,29,046
3. Vehicle (Taxi) Hiring expenses		
TOTAL	**1,84,11,402**	**2,24,88,540**

SCHEDULE 19- REPAIRS & MAINTANENCE

(Amount-Rs.)

	2017-18	2016-17
a) Building		
b) Furniture & Fixtures		
c) Plant & Machinary	2,19,07,983	1,47,96,364
d) Office Equipments		
e) Computers		
f) Laboratory & Scientific equipment		
g) Audio Visual equipment		
h) Cleaning Material & Services		
i) Book binding charges		
j) Gardening		
k) Estate Maintenance		
f) Others (Specify)		
TOTAL	**2,19,07,983**	**1,47,96,364**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD/ YEAR ENDED 31st MARCH 2018

SCHEDULE 20- FINANCE COSTS (Amount-Rs.)

	2017-18	2016-17
a) Bank Charges b) Others (specify)	1,10,682	1,66,057
TOTAL	**1,10,682**	**1,66,057**

SCHEDULE 21- OTHER EXPENSES (Amount-Rs.)

	2017-18	**2016-17**
a) Provision for Bad and Doubtful debts/ Advances b) Irrecoverable Balances Wrtitten off c) Grants/ Subsidies to other institutions/ Organisations c) Others (Specify)		
TOTAL	NIL	NIL

SCHEDULE 22- PRIOR PERIOD EXPENSES (Amount-Rs.)

	2017-18	2016-17
1. Establishment Expenses 2. Academic Expenses 3. Administration Expenses 4. Transportation Expenses 5. Repair & Maintenance 6. Other Expenses		
TOTAL	**NIL**	**NIL**

Schedule 23 - Significant Accounting Policies

1. Basis for preparation of Accounts:

The Annual Accounts of the institute are prepared on the basis of revised format and guidelines issued by the Ministry of Human Resource Development, Government of India and approved by the C&AG of India for all Central Educational Institutes w.e.f. FY 2014-15 (Communicated vide Lr.No.29-4/2012-IFD dated 17.04.2015 of MHRD, GOI).

2. Accounting Convention:

The financial statements are prepared on the basis of Historical Cost Convention and ongoing concern concept unless otherwise stated.

The institute follows accrual method of accounting.

3. Revenue Recognition:

The institute is significantly funded by the Ministry of Human Resource Development (MHRD, Government of India. The Government release the Grants-in-Aid under two major heads i.e., Capital and Revenue. Grants-in-Aid from GOI is accounted for in the same financial year for which it is sanctioned by the MHRD.

Government Grants to the extent utilized for meeting revenue expenditure on accrual basis are treated as revenue income of the year and depicted in the Income and Expenditure Account.

Admission fees, Tuition Fees and other fees received from students are accounted on accrual basis.

Interest on Fixed Deposits has been credited in the accounts on accrual basis.

No interest bearing advances for House Building, Purchase of Vehicles etc., has been sanctioned to staff to the said period.

4. Fixed Assets and Depreciation

The fixed assets are valued at cost of acquisition and inclusive of inward freight, duties, taxes, incidental and direct expenses related to acquisition.

No fixed asset has been received directly by way of non-monetary grant during the year under consideration.

The land at Jersey Farm, Vithura Nedumangad Taluk, Thiruvananthapuram District has been given by the Government of Kerala at no cost, hence the same has been shown at nominal value of Rs.1/- in Annual Account.

No gifted / donated assets and Books have been received during the year under consideration.

Fixed Assets are valued at cost less accumulated depreciation. No change has been made in the method and depreciation on fixed assets has been provided on Written Down Value Method at the following rates:

Tangible Assets:

1.	Land	0%
2.	Site Development	0%
3.	Buildings	2%
4.	Roads and Bridges	2%
5.	Tube wells and water supply	2%
6.	Sewerage and Drainage	2%

7.	Electrical installation and equipment	5%
8.	Plant and Machinery	5%
9.	Scientific and Laboratory Equipment	8%
10.	Office Equipment	7.5%
11.	Audio Visual Equipment	7.5%
12.	Computer and Peripherals	20%
13.	Furniture, Fixtures and Fittings	7.5%
14.	Vehicles	10%
15.	Library Books and Scientific Journals	10%

Intangible Assets (Amortization)

1.	E-Journals	40%
2.	Computer Software	40%
3.	Patents and Copyrights	9 Years

Depreciation is provided for the whole year on additions during the year for acquisition period of six months and above and for half year on additions for acquisition period of less than six months.

Where an asset is fully depreciated, it will be shown at a residual value of Rs.1/- in the Balance Sheet and will not be further depreciated.

Assets created out of Earmarked Funds and Funds of Sponsored Projects where the ownership of such assets vests in the Institution will be setup by credit in Capital Fund and merged with the Fixed Assets of the institution. Depreciation will be charged at the rates applicable to the respective assets. However no such assets are there at present.

Patents, copyrights and E Journals are grouped under intangible assets.

Electronic Journals (E-Journals) are separated from Library Books in view of the limited benefit that could be derived from the on-line access provided. E-Journals are not in a tangible form, but temporarily capitalized in view of the magnitude of expenditure and the benefit derived in terms of perpetual knowledge acquired by the Academic and Research Staff. Depreciation is provided in respect of E-Journals at a higher rate of 40% as against depreciation of 10% provided in respect of Library Books.

Software and Computer Peripherals are being shown under the Fixed Assets.

Stocks:

Expenditure on purchase of Chemicals, Lab ware, Office Consumables, Publications and other consumable items are accounted as revenue expenditure. Such items issued to Labs are treated as consumed and hence closing stock is taken as NIL.

Retirement Benefits:

All employees of the Institute are covered under the New Pension Scheme. As such no provision has been made for pension, however suitable provision on the basis of actuarial valuation has been made for the Earned Leave Encashment.

No long term or Short Term Investments are made by the institute in Government Securities, Bonds, Debentures and Shares.

Corpus / Earmarked / Designated Endowment Funds:

The funds of the institute are classified into following categories:

1. Corpus / Capital Fund: It refers to fund contributed by Government for establishment and activities of the institute. Corpus fund is the main fund of the institute and it denotes a permanent fund kept for the existence of the institute. The additions to this fund are Grants from Government to the extent utilised for Capital Expenditure. Assets purchased out of earmarked funds and sponsored project funds and excess of income over expenditure transferred from Income and Expenditure account.

Government Grants:

Plan grants received from Government are accounted on accrual basis.

To the extent utilised towards capital expenditure, Government Grants are transferred to the Capital Fund.

Unutilised Government Grants are carried forwarded and depicted under Current Liability in the Balance Sheet.

Capital Work-In Progress:

Deposit works are accounted for as Capital Work-in-Progress on the basis of statements received from Works Wing. Running Bills of Contractors are also accounted for as construction work in progress till completion. No depreciation is charged on Capital work in progress. Secured advances and Mobilization advances and Deposit work with CPWD are disclosed separately under the heads Loans and Advances.

Sponsored Projects:

The amount received under Sponsored Projects has been separately shown in Schedule 3 A.

The fellowships and scholarships funded by the UGC, CSIR, DST INSPIRE etc., are also shown separately in Schedule 3B

The Fellowships and Scholarships provided by the institute itself are accounted as Academic expenses.

Income Tax:

The income of the institute is exempt from Income Tax under Section 10 23 (C)(iii ab) of the Income Tax Act 1961. No provision for tax is therefore made in the accounts.

Foreign Currency transactions:

Foreign Currency transactions are accounted for at the rate of exchange prevailing on the dates of such transactions.

Schedule 24 – Contingent Liabilities and Notes on Accounts

The financial statement of the institute is prepared in three parts:

i. Receipt and Payment Account

ii. Income and Expenditure Account

iii. The Balance Sheet.

The Receipts and Payments Account consists of the figures of actual receipts and payments of the institute during the financial year 2017-18 as per Cash Book. The total receipts from the different sources as shown in Receipt and Payment Account comes to Rs.378.61cr. which inter alia includes grant of Rs.217.18

cr. received from Ministry of Human Resource Development and the total receipts towards Fees, interests and other resources of Rs.99.90 cr.

The Income and Expenditure Account is prepared on accrual basis. The total income during the financial year was Rs.80.13 cr

In Balance Sheet the acquired fixed assets, current assets are taken as assets while the Corpus Fund, Designated Fund, Endowment Funds, balance of Sponsored Projects and Grants received from Government and Current Liabilties etc are shown in respective Schedules under Sources of Funds / Liabilities.

Figures in Final Accounts have been rounded off to the nearest rupee.

Schedule 1 to 22 are annexed and they form an integral part of Annual Accounts.

The details of balances in Saving Bank, Current Accounts and in Fixed Deposit Accounts are given in Schedule 7 of the Balance Sheet.

The unutilized grant shown under Schedule 3(C) Plan Grants from MHRD is Rs.84.34 out of which advance payment including Rs.62.45 crore payment made to CPWD as Deposit work for construction of IISER Permanent Campus vide Balance Sheet Sub Schedule 7.

Sponsored Project Accounts:

The institute has received grants from DST, DBT, Wellcome Trust DBT Alliance Fellowships, DAE, ISRO, CSIR, UGC etc., in Research and Development (R&D) Projects. A separate bank account is maintained for Sponsored R & D Projects. The transactions of Sponsored Projects and Project wise closing balances are being shown in Schedule 3(A) of the Balance Sheet. From the financial year 2016-17, as per the funding agencies guidelines project wise bank account(s) are being maintained with IDBI Bank.

The treatment of Project Grant and its Utilisation is on Cash Basis.

Capital Works-in-Progress:

The construction work of institute's permanent campus situated at Jersey Farm, Vithura is under progress and expenditure related to the same is shown under Schedule 4 (Fixed Assets) of the Balance Sheet.

The expenditure on capital work-in-progress as at 31.03.2018 was of Rs.2,69,00,66,302/-. Out of which construction is Rs.2,42,77,40,482/- and uninstalled equipment procured during the period is Rs.26,23,25,820/-.The NPS subscription recovered from employees and employers contribution are remitted to NPS Trust Account regularly. NPS Accounts are maintained by NSDL. Hence separate schedule has not been prepared.

GPF is not applicable to the institute employees. Hence GPF accounts schedule has not been prepared.

Other Additions

The deduction/ adjustments depicted in negative balance under depreciation shown in Schedule 4 of tangible assets head Electrical Installation and Equipment is reversal of last year's depreciation account erroneously taken into account of capital work-in-progress.

As per the institute's policy, the overhead generated from the Externally Funded Projects have been segregated into four parts vis-a-vis, (i) 45% - income from overheads to institute, (ii) 5% - Staff Welfare Fund, (iii) 25% - School Departmental Fund and (iv) 25% - Project Investigator Fund. The said figures (ii) to (iv) have been depicted as other additions in Schedule 1 of Annual Accounts.

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भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान तिरुवनंतपुरम

Indian Institute of Science Education and Research Thiruvananthapuram