भारत सरकार
अंतरिक्ष विभाग

सत्यमेव जयते

Government of India
Department of Space

Indian Institute of Space Science and Technology

ANNUAL REPORT 2013-2014

Annual Report
2013-2014

Indian Institute of
Space Science and Technology

(Declared as Deemed to be University under section 3 of the UGC Act, 1956)

Valiamala P.O., Thiruvananthapuram 695547, Kerala, India.

Contents

Vision

To be a world class educational and research institution contributing significantly to the space endeavours

Mission

Create a unique learning environment enriched by the challenges of the space programme.

Nurture the spirit of innovation and creativity.

Establish Centres of Excellence in niche areas.

Provide ethical and value based education.

Promote activities to address societal needs.

Network with national and international institutions of repute.

Director's Foreword

It gives me enormous pleasure to outline some important milestones of the Indian Institute of Space Science and Technology (IIST), as we progress towards the seventh year of its academic journey. The year 2013-14, witnessed a new group of students who performed well in JEE Main as well as JEE Advanced Examination and took admission in IIST to pursue their interest in Space Studies. Their scholarly eagerness to join B. Tech programmes in Aerospace Engineering, Avionics and the Physical Sciences was overwhelming and academically uplifting. It has now become a matter of pride and privilege for the institute to underscore the fact that all the three under graduate programmes continue to be ranked among the top programmes in their respective categories. Furthermore, IIST has started several Post Graduate programmes that have been received by the students with a resounding response, as they have taken to the programmes with the right tempo of academic fervour and diligence.

Concurrently, the Institute continues to focus on its research and its associated publication output in internationally and nationally reputed journals. The above focus, inspires and motivates each faculty member to excel in her/his quest for knowledge and expand the research frontiers in their specialized fields of inquiry. The faculty members and students also get an impetus and opportunity to work extensively on research projects on various specialized fields at IIST and also on high end technology, in collaboration with the different centres of ISRO. In line with the above mentioned research activities of the institute, various departments have also organized colloquia, seminars, workshops and conferences for the diffusion of specialized knowledge as well as to maximize scholarly peer-interactions in their respective areas. While the quantum of the work done by the faculty is relatively on a higher scale, the efforts are to push the limits of endeavor and knowledge dissemination to gain international reputation and acclaim. In 2013-14, a laudable number of projects, seminars were organized in the Institute and working papers were published by the faculty members.

The year has also been remarkable for the successful completion of several projects, which focus on a plethora of variegated subjects, which indicates the quality of infrastructure as well as the aesthetic resonances of the academic climate of the institute. The labs and the infrastructure, the institute has today, are comparable with the best in the country. IIST library is continuously expanding its collection of academic material and subscriptions to consortiums of database and journals needed for research and teaching. The academic ambience of the institute are further enhanced by the sports facilities, fitness centres and the verdant outdoor landscapes which are compelling attractions to the students for their intellectual and emotional stimuli. The cafeteria and the green scenery provide the students the conducive environment to disseminate, reflect on, exchange and share knowledge among their peers.

I am happy to render this fourth yearly report as the Director of IIST. I have witnessed the institute grow from an organization with potential to an institution which has become iconic and path-breaking. And whatever we have achieved, would not have been possible without the unstinting support of the faculty members and students, the administrative acumen of the staff and the indulgence of the Board of Management.

K S Dasgupta
Director

Key Functionaries

Dr. A. P. J. Abdul Kalam
Honourable Chancellor

Dr. K. Radhakrishnan
Chairman, Board of Management, IIST
Chairman, ISRO/Secretary, DOS

Dr. K.S. Dasgupta
Director

Prof. A. Chandrasekar
Registrar
Dean, Academics

Dr. Thomas Kurian
Dean
Research & Development

Prof. Kurien Issac
Dean
Intellectual Property Rights & Continuing Education

Prof. Kuruvilla Joseph
Dean
Student Activities

Prof. Raju K George
Dean
Student Welfare

Board of Management

Chairman

Secretary, Department of Space, Government of India.

Members

Secretary, Department of Atomic Energy, Government of India.

Secretary, Department of Higher Education, Government of India.

Chief Secretary, Government of Kerala.

Prof. Roddam Narasimha, Member, Space Commission.

Director, Indian Institute of Technology, Bombay.

Director, Indian Institute of Technology, Madras.

Director, Indian Institute of Science, Bangalore.

Director, Vikram Sarabhai Space Centre, Thiruvananthapuram.

Director, Space Applications Centre, Ahmedabad.

Additional Secretary, Department of Space, Government of India, Bangalore.

Scientific Secretary, ISRO Head Quarters, Antariksh Bhavan, Bangalore.

Nominee of UGC Chairman.

Director, IIST-Member Secretary.

Indian Institute of Space Science and Technology (IIST), established in 2007, became a Deemed to be University under section 3 of UGC Act, 1956 in 2008. IIST, envisaged as a research driven institute, offers various academic programmes giving emphasis on Space Science and Technology. In addition to the B. Tech. courses in Aerospace Engineering, Avionics and Physical Sciences, IIST offers M.Tech., M.S., Doctoral and Post Doctoral programs in various disciplines.

Research activities at IIST integrate Space Technology and Space Science programmes with basic science and applied research. IIST also provides an opportunity for Scientists/Engineers of ISRO to pursue higher studies through IIST-ISRO sponsorship programme for M. Tech. and Ph.D degrees.

ACADEMIC PROGRAMMES

IIST offered three undergraduate programs and thirteen postgraduate programs during 2013-14. The academic programs offered during 2013-14 are:

B.TECH PROGRAMMES (4 YEARS)

1. Aerospace Engineering
2. Avionics
3. Physical Science

For the previous three years, (2010-2012) the admission to B.Tech. programmes was through ISAT - IIST Admission Test exclusively conducted by the Institute.

In 2012, CBSE announced that **Joint Entrance Examination** (JEE), the All India Common Entrance Examination conducted for admission in various engineering courses. Based on this, IIST decided to conduct admission for its B.Tech. programmes for the academic year 2013-14 through direct counseling of students based on their performance in JEE (Main) conducted by CBSE as well as JEE (Advanced) examination conducted by IITs .

156 students were admitted for the academic year 2013 - 2014 in the three B.Tech. programmes.

Admission 2013-14

Branch	Gen	OBC	SC	ST	PD-Gen	PD-OBC	PD-SC	Total
Aerospace Engineering	29	16	9	5	1	0	0	60
Avionics	29	15	9	5	1	1	0	60
Pysical Sceiences	18	10	5	2	1	0	0	36
Total	**76**	**41**	**23**	**12**	**3**	**1**	**0**	**156**

M.TECH/MS PROGRAMME (2 YEARS)

Applications for M.Tech/MS programmes are screened based on GATE score and the admission was through test and interview. The total number of seats in each programme is ten, out of which six seats are reserved for open merit candidates and the remaining four for DOS/ISRO employees. Category-wise details of students admitted during the report period across various M.Tech/MS Programmes of IIST are as follows:

Admission 2013-14

Name of the M.Tech/MS Programme	Candidates admitted against				DOS/ISRO	
	Gen	OBC	SC	ST	candidates	Total
Propulsion	2	2	0	0	4	8
Aerodynamics & Flight Mechanics	3	2	0	0	0	5
Structures & Design	3	2	0	0	0	5
RF & Microwave Engineering	2	2	0	0	2	6
Digital Signal Processing	0	3	1	0	2	6
VLSI & Microsystems	0	2	1	0	1	4
Control Systems	0	3	1	0	2	6
Machine Learning & Computing	3	1	0	0	0	4
Geoinformatics	2	1	1	0	0	4
Materials Science &Technology	2	0	0	0	1	3
Optical Engineering	3	2	1	0	0	6
Solid State Technology	3	1	0	0	0	4
Astronomy & Astrophysics	3	2	0	0	0	5
Total	**26**	**23**	**5**	**0**	**12**	**66**

DOCTORAL PROGRAMMES

Admission was based on test and interview and restricted to those candidates who qualified JRF-NET/GATE or equivalent exams. During this period, 14 students registered for Ph.D.

Department	Full time	Part time	Total
Aerospace Engineering	1	1	2
Avionics	3	1	4
ESS	3	0	3
Physics	3	0	3
Chemistry	2	0	2
Total	**12**	**2**	**14**

CONVOCATION

The second convocation of IIST was held on June 3, 2013 at Dr. Srinivasan Auditorium, VSSC. Dr. R.Chidambaram, Principal Scientific Advisor to Government of India was the Chief Guest of the programme which was presided over by Dr. A.P.J. Abdul Kalam, Honourable Chancellor, IIST. Sri.S. Ramakrishnan, Director, VSSC was the Guest of Honour. Dr. K.Radhakrishnan, Chairman, Board of Management, IIST and Chairman, ISRO/Secretary, DOS addressed the gathering.

Out of 148 students who joined in 2008, degree was awarded to 124 meritorious students in Aerospace Engineering (42), Avionics (52) and Physical Sciences (30) who had successfully completed their B.Tech. course in June 2012.

PLACEMENT

Students of 2009 batch who completed the B.Tech. course with the required CGPA were placed at various ISRO centers as Scientist/Engineer 'SC'.

ADRIN	02	NRSC, Hyderabad	04
ISAC, Bangalore	19	PRL, Ahmedabad	01
ISTRAC, Bangalore	05	SAC, Ahmedabad	16
LPSC (Valiamala)	08	SCL, Chandigarh	14
LPSC (Bangalore)	01	SDSC, Sriharikota	09
LPSC (Mahendragiri)	07	VSSC,Thiruvananthapuram	26
MCF, Hassan	05	IIRS, Dehradun	01
NARL, Gadanki	04	**Total**	**122**

RESEARCH & DEVELOPMENT

Research programmes in IIST focus on various areas of Science, Engineering and Humanities. The institute currently has 59 full time and 19 part time research scholars.

Department	Full time	Part time	Total
Aerospace Engineering	5	7	12
Avionics	7	8	15
ESS	11	1	12
Physics	12	1	13
Chemistry	16	1	17
Mathematics	4	1	5
Humanities	4	0	4
Total	**59**	**19**	**78**

To provide a congenial academic and research atmosphere, the institute encourages students, research scholars and faculty members to actively participate in collaborative research. The institute supports them to present papers at national levels and international levels. The research scholars are actively contributing their works to journals of international repute. IIST funds projects for the faculty members, who are engaged in long term projects, and fast track projects. Apart from the projects in focused areas, IIST has two projects for B.Tech students. IIST has Centres of Excellence in various fields to catch up with the most modern developments in science and technology.

Ph.D AWARDED / COMPLETED

Shine S. R. - "Studies on Film Cooling in Rocket Combustion Chambers"

V. Ashok - " Computation of High speed chemically reacting Viscous flows with cartesian mesh on a GPU based parallel system"

V. S. Sooraj - 'Investigations on Fine Finishing of Surfaces using Elastic Abrasives'

PROJECTS

01.	Autonomous landing System using GPR	Dr. Thomas Kurian, S. Chris Prema
02.	Design and Implementation of Helmet antennas	Dr. Basudeb Ghosh
03.	Ultrasensitive Self Powered Nanomechanical Sensors for Low Cost Sensor Networks	Dr. Seena V.
04.	Polymer MEMS with Integrated Novel Electromechanical Transduction Schemes	Dr. Seena V.

05.	Multi-objective, Multi-disciplinary Design Optimization of a Semi-ballistic Re-entry Vehicle using High Fidelity Heat Flux Estimation	Pankaj Priyadarshi
06.	To study the effect of real gas on the aerodynamic coefficients and heat transfer coefficients of re-entry module configurations	Pankaj Priyadarshi
07.	Development of carbon foams for high temperature thermal protection applications	Dr. K. Prabhakaran
08.	Plasma Modification of CNT and polymer nano composites thereof for space applications	Dr. N. Gomathi
09.	Graphene-DMA Hybrid Materials; Development of Electronic-Nose Technologies for Biomedical Applications	Dr. S. Mahesh
10.	Plasma Modification of CNT and Polymer Nanocomposites thereof for Space Applications.	Dr. K.G. Sreejalekshmi
11.	Star formation in young Galactic clusters associated with massive stars	Dr. Sarita Vig
12.	Evaluation of the potential of hyperspectral remote sensing for species level classification and biophysical characterization of mangroves of Bhitarkanika National Park, Orissa	Dr. L. Gnanappazham
13.	Aerosol - Cloud Interaction under varying meteorological conditions	Dr. M. V. Ramana
14.	Black carbon , Aerosol, Meteorological and Ozone Profiling Study (BAMPS)	Dr. M. V. Ramana
15.	Space Technology and its Penetration into the Socio Economic Space of the Households of India, IIST	Dr. Lekshmi V. Nair Dr. Shaijumon C.S.
16.	Study of select issues of new product development in R&D organizations	Dr. Ravi V.
17.	A study on Creative Writers and Artists in DoS	Dr. Gigy J. Alex
18.	Dynamics and rheology of a dilute suspension of periodically forced spheroids in a quiescent fluid at low Reynolds number	Dr. C. V. Anilkumar, Dr. Ramamohan T. R.
19.	Polymer nanocomposites for electronic and photonic applications	Dr. Pramod Gopinath Dr. Honey John
20.	Controlled synthesis of coherent polarization of light and its application in optical imaging	Dr. Rakesh Kumar Singh
21.	Investigating excited state dynamics of isolated molecular ions, hybrid molecular ions and cluster ions	Dr. Umesh R. Khadane

22.	Design of autonomous walking Humanoid Robot	Sam K. Zachariah
23.	Rocket Injector Spray studies	Dr. V. Aravind
24.	Active suspension wheeled rovers on uneven terrain	Dr. Kurien Issac, Sam Noble
25.	Whirling beam experiments for flapping wing micro aerial vehicles	Dr. Kurien Issac, Dr. G. Rajesh

In addition to the above projects, the following research programmes are envisaged in line with NASA/CALTECH programmes so that the research carried out in IIST will be useful for ISRO programmes in future.

01.	Decoder for CCDS recommended turbo codes	IIST/VSSC
02.	Development of tactile sensor for under actuated robotic hand	IIST/VSSC
03	Design and development of an integrated enterprise network security system	IIST/VSSC
04.	Study of switching topologies and control schemes for isolated DC/DC converters	IIST/VSSC
05.	Design and implementation of a compact wideband micro strip patch antenna	IIST/VSSC
06.	Fabrication and characterization of grapheme based RF transistor	IIST/SAC
07.	Design and development of high performance Hydrogen sensor	IIST/PRC
08.	Development of a virtual reality model for disaster simulation	IIST/NRSC
09.	Object based high resolution (optical) image analysis for land slide, land use and land cover classification	IIST/NRSC
10.	Design and development of brushless DC motor	IIST/NRSC
11.	PDPA system for 3 component velocity and droplet size distribution	IIST/LPSC
12.	Comprehensive stationery plasma thruster diagnostics instrumentation	IIST/LPSC
13.	Flexible wiping substrate for SERS detection of explosives	IIST/VSSC
14.	Silicon grapheme based composite as anode material for lithium battery cells	IIST/VSSC

15.	Ceramic foam by emulsion casting	IIST/VSSC
16.	Development of carbon foam-CMC sandwich composites	IIST/VSSC
17.	Intrinsically conducting polymide composite with CNT or grapheme having electrostatic charge mitigating characteristics for space applications	IIST/VSSC
18.	Space Technology and its mediation into socio economic space of householdvehicles	IIST/DECU

CLIMATE OBSERVATORY AT PONMUDI

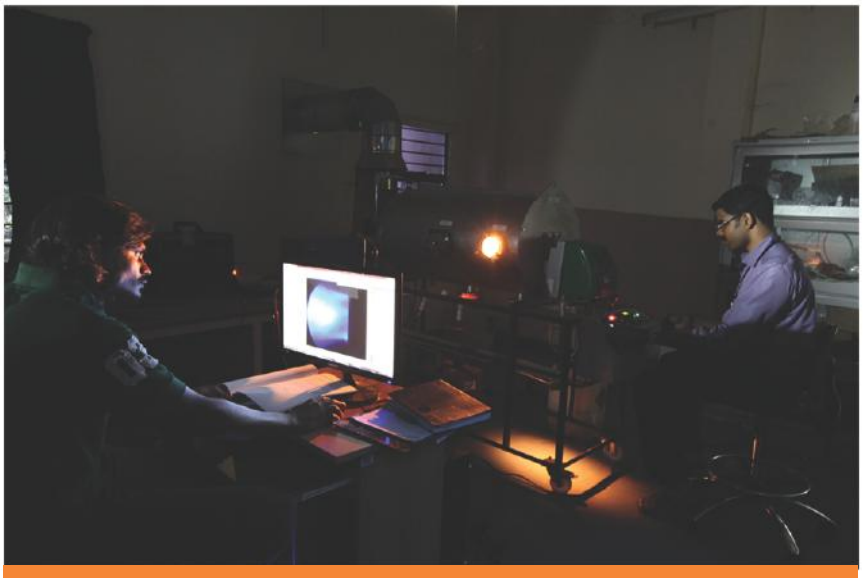
A climate observatory was established, as part of IIST's research facility, over Ponmudi hills (1081meter asl; 8°45'26"N, 77°6'50"E) for intensive measurements of aerosol-cloud-turbulence-solar radiation parameters. The purpose was to obtain representative statistics of cloud properties which were needed to understand cloud microphysical studies of processes. Ponmudi hills are in the southern tip of Western Ghats close to Thiruvananthapuram and this location is known for the highest occurrence of clouds throughout the year. The research consists of: creating an integrated observational data set of aerosol-cloud-turbulence-solar radiation to quantifying the cloud radiative forcing, and quantitative understanding of aerosol-cloud interaction under varying meteorological conditions and their role in the Earth's climate system.

CENTRE OF EXCELLENCE

Advanced Propulsion and Laser Diagnostics (APLD) Laboratory

Department of Aerospace Engineering has established a centre of exellence in Advanced Propulsion and Laser Diagnostics (APLD) which will serve as (i) centre for conducting academic research in IIST which would assist ISRO activities, (ii) national facility for performing advanced research and (iii) national technological development centre for aerospace organizations. The APLD facility will be established in three phases. The first phase will focus on the establishment of basic facilities for the academic programmes in IIST, including research. The further expansion is aimed at generating ample

for scientific and academic research at the national level and the end objective of building and setting up the centre is to compliment the needs of ISRO's research and technological development.



The current objective is to perform propulsion research studies through laser diagnostic techniques. The short term scope and objective of setting up the laboratory is to primarily focus on applying 10 Hz and 1 MHz laser diagnostic techniques to basic propulsion facilities while the long term goal is to apply it to real scale engines that are most relevant to ISRO's technological development. The laboratory currently have the capability to perform PIV and PLIF measurements, and is equipped with: (i) Double Pulsed Nd-YAG PIV Laser , (ii) Precision Dye Laser, (iii) Intensified CCD Camera, (iv) PIV CCD Camera (v) High Resolution Wavemeter, (vi) Optical Tables, (vii) Optical Components and (viii) High Speed DAQ System. The lab will be upgraded with a second dye laser for two line LIF thermometry measurements and particle size analyser for droplet size measurements. The basic propulsion facilities established are (i) Test Setup for Rocket Injector Spray Characterization from atmospheric to critical conditions, (ii) Single Element Coaxial Combustion Facility, and (iii) Supersonic Free Jet Facility for dual bell nozzle characterization and cavity induced oscillations.

In the year 2013-14 the installation of the Double Pulsed Nd-YAG PIV Laser and Precision Dye Laser was successfully completed. Efforts were also invested in establishing Single Element Shear Coaxial Combustion Setup and proof of concept demonstration of OH-PLIF in LPG-Air Shear Coaxial Flame was carried out using the laser and camera system. Laser Diagnostic Facility for OH-PLIF concentration measurements from flame and the proof of concept demonstration in IIST will compliment ISRO's research needs and will contribute to ISRO's Injector design, characterization and development in future.

Virtual Reality Laboratory

Department of Avionics has established the center of excellence in Virtual Reality for various space and scientific applications. The development is planned in three phases. In the first phase, Desktop VR Lab consisting of high-end workstation with latest graphic capabilities, 3D monitors, 3D vision-pro glasses and application software such as Vizard, Blender, Google Sketch, Adobe Master Suit collection, 3D Max and Maya were procured. The facility will be scaled up by creating an immersive studio type Virtual reality center in phases 2 and 3. The proposed facility will be supported by advanced haptic devices, sensors and force feedback systems for various real life application such as navigation, fly through etc. Some objectives to establish center of excellence in Virtual Reality are the following:

1. Provide UG/PG students enough infrastructures to get hands on exposure on VR experiments and developments.
2. Develop VR simulations for ISRO using data captured by different satellite and high-performance camera.
3. Develop sophisticated and advanced VR library in open source domain for variety of purposes.
4. Exploit this facility for aerospace, atmospheric, astronomical, computer vision and humanities research areas by collaborating with different department within and outside IIST.

Research and development objectives of VR lab

1. Research in Space application
    a. Planetary exploration
    b. Indigenous software development
    c. Design of VR test bed prototype
    d. Virtual prototyping of space shuttle
    e. Virtual walk/fly through
2. General research areas
    a. Disaster modeling and simulation
    b. 3-d VR visualization of compounds and chemical
    c. For theoretical and nonlinear dynamical studies.
    d. Developing VR teaching simulations for better understanding of the concepts in different key subjects of Avionics, aerospace, Physical science and humanities

Center for Advanced Research in Nanoscience and Technology

Department of Chemistry has established a Centre for Advanced Research in Nanoscience and Technology to facilitate and augment the activities in Nanoscience and Technology and to address challenges in Space Science and Technology and related areas,

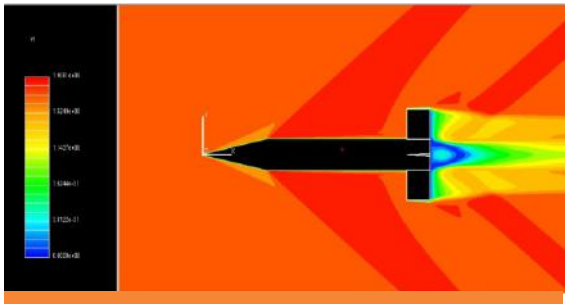
Currently the facilities such as Atomic Force Microscope, Particle Size Analyzer, Glove Box, electrospinning machine, contact angle goniometer, HPLC, planetary ball mill and surface area analyser are available in the centre. Procedures to procure X-ray Diffractometer and Plasma Reactor are in progress. Facilities in the centre assist the research activities in the department significantly.

STUDENT PROJECTS

Student projects are carried out in IIST under the guidance of IIST faculty and ISRO scientists. The objective is to provide the students hands-on experience and knowledge to work as a team in the design, development and building of space systems.

Sounding Rocket Project

After the successful launch of the sounding rocket, Vyom, on May 11, 2012, which has a capability to carry a payload of 10 kg to an altitude of 14 km, IIST has taken up the design of Vyom Mk II. The aim of Vyom MkII is to carry a maximum payload of 15-20 kg to a peak altitude of 70 km. It is a challenging aim, as the mission objectives have to be achieved while maintaining the simplicity and reliability of a single stage rocket.



The subsystem requirement specifications are being drawn up, based on detailed discussion within IIST and inputs from VSSC. Conceptual design and sizing studies are in progress under the guidance of IIST faculty and VSSC specialists. The work involves design and analysis studies in Aerodynamics, Solid Motor Propulsion, Structural Analysis and Flight Mechanics, the four major areas in Aerospace

Engineering. Preliminary solid motor sizing studies and initial trajectory studies have been carried out. A single stage rocket with and without payload separation is being studied.

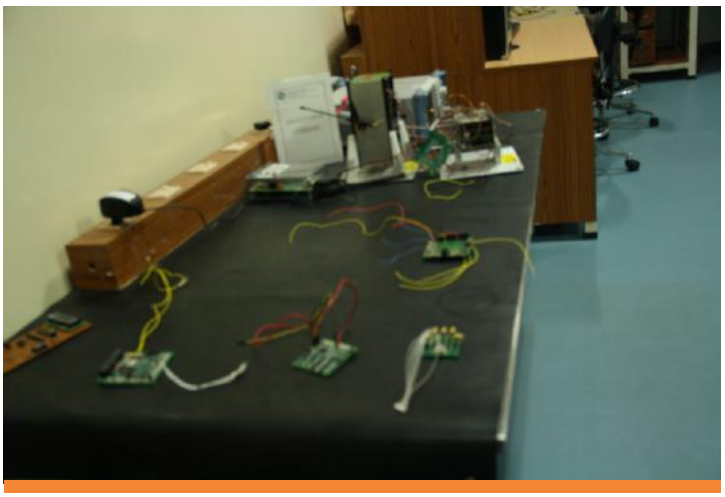
A novel Multi-objective Multi-Disciplinary Design Optimization (MO-MDO) approach is being attempted in the design of the sounding rocket. As part of the above initiative, an MO-MDO study has been conducted to design the fin for the rocket based on fixed propulsion inputs. A paper based on the above study won the second best paper award in the ASET-2014 conference conducted by the Aeronautical Society of India. A manuscript based on more refined work is being communicated to an international journal. The objectives of the study were: maximization of the altitude, maximization of payload mass, maximization of static margin, and minimization of fin tip torsion angle. Propulsion system optimization studies incorporating aerodynamic and trajectory analysis have also been initiated. Preliminary CFD studies are also in progress to validate the data obtained from engineering methods.

Like its predecessor, Vyom Mk II project remains a student-centered activity where students get a real life exposure in the design of a live Aerospace vehicle project under the direction and guidance of Aerospace professionals from IIST and ISRO. It allows them to relate what they learn in classrooms with the state-of-the-art practice in industry.

Nano-Satellite Project

The students have conceived a 3-axis stabilized nano-satellite of mass less than 2 kilograms. The conceptual design of the satellite has been completed and the payload and components have been identified, based on the functional requirements and availability. The nano-satellite is to be launched in a polar sun synchronous orbit of about 670 km altitude as a piggyback payload in the PSLV rocket.

Prototype of Electrical Power System is ready and EMI/EMC tests are being conducted on it. The payload is chosen to be Geiger muller counter and a breadboard version of it is ready. Miniaturisation and PCB fabrication of payload is under progress. The subsystems on communication, on board computer and attitude dynamics are in the advanced stage of development.



PATENTS APPLIED

- **V.S. Sooraj , V. Radhakrishnan, Nirmala James**, *"Multipurpose resilient elasto-magnetic-abrasive spheres for fine finishing of surfaces"*, applied for Indian patent, filed on July 26, 2013
- **K. G. Sreejalekshmi and S. Titus**. *'Substituted 4-hydrazinothiazoles and processes for their preparation'* Indian Patent Filed: 2462/CHE/2013, June 18, 2013.
- **K. Joseph and V. Raj.** *"Detection of infertility using gold nanoparticles based fructose sensor."* Patent No.4962/CHE/2013, November 1, 2013.
- **K. Joseph and V. Raj.** *"Rapid and naked eye detection of cholesterol in serum using tomatine assembled gold nanoparticles"* Patent No.2747/CHE/2013, July 26, 2013.
- **K. Prabhakaran, R. Narasimman.** "Process for the preparation of high density carbon foams" Indian Patent File No. 6108/CHE/2013, December 26, 2013.

PUBLICATIONS

i) JOURNAL PAPERS

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- **C. R. Bijudas**, M. Mitra, P. M. Mujumdar. (2013). "Time reversed Lamb wave for damage detection in a stiffened aluminum plate". *Smart Materials and Structures*, **22** (10): pp. 105026.
- **C.R. Bijudas**, M. Mitra, P. M. Mujumdar. (2013). "Coupling effect of piezoelectric wafer transducers in distortions of primary Lamb wave modes". *Smart Materials and Structures*, **22** (6):pp. 065007.
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- **L.N. Sulbhewar**, **P. Raveendranath**. (*2013*)." Assessment of induced potential effects on the performance of piezoelectric beam finite elements". *International Journal of Aerospace and Lightweight Structures*, 3(4): pp. 513-530.
- **L.N. Sulbhewar**, **P. Raveendranath**. (*2014*). "A novel efficient coupled polynomial field interpolation scheme for higher order piezoelectric extension mode beam finite elements". *Smart Materials and Structures*, 23:pp. 25024-25033.
- **L.N. Sulbhewar**, **P. Raveendranath**. (*2014*). "An accurate novel coupled field Timoshenko piezoelectric beam finite element with induced potential effects". *Latin American Journal of Solids and Structures*, 11(9): pp. 1628-1650.

- **D. Agarwal, P. Basu, T. J. Tharakan, Salih, A.** (2014), "Prediction of Gas-Core Vortices during Draining of Liquid Propellants from Tanks", Aerospace Science and Technology, 32 (1): pp. 60-65.
- **A. Salih, S. Ghosh Moulic** (2013), "A Mass Conservation Scheme for Level Set Method Applied to Multiphase Incompressible Flows", International Journal for Computational Methods in Engineering Science & Mechanics, 14 (4): pp. 271-289.
- **P. Basu, D. Agarwal, T.J. Tharakan, A. Salih** (2013), "Numerical Studies on Air-Core Vortex Formation during Draining of Liquids from Tanks", International Journal of Fluid Mechanics Research, 40 (1): pp. 27-41.
- **K. Kiran Sagar, Aman Raj Verma, Pankaj Priyadarshi** (2014), "Comment on "Aeroship: A Hybrid Flight Platform", AIAA Journal of Aircraft, 51(2), pp. 701-701.
- **R. V. Ramanan** (2013), "Interplanetary Mission Opportunities", Planex Newsletter (PRL, Ahmedabad), 3(2): ISSN: 2320-7108.
- **V. Adimurthy, R. V. Ramanan** (2014), "Mars Orbiter Mission: An overview", Planex Newsletter (PRL, Ahmedabad), 4(1): ISSN: 2320- 7108
- **Litesh N. Sulbhewar**, **P. Raveendranath.** (2014). "Geometric effects on the accuracy of Euler-Bernoulli piezoelectric smart beam finite elements". *Advanced Materials Research*, 984-985, pp. 1063-1073.
- Muthukumaran C. K., **Vaidyanathan A**. (2014). "Experimental study of elliptical jet from sub to supercritical conditions". *Physics of Fluids*, 26 (4), pp: 044104.
- Habisreuther P., Galeazzo F.C.C., **Prathap C**., Zarzalis N. (2013). "Structure of laminar premixed flames of methane near the auto-ignition limit". *Combustion and Flame*, 160: pp. 2770-2782.
- **Sai Krupa M., Dileep Kumar N.,** Suresh Kumar R., **Chakravarthy P.,** Karodi Venkateshwarulu. **(2013). "**Effect of Zirconium Diboride Addition on the Properties of Silicon Carbide Composites". *Ceramics International*, 39 (8): pp. 95679574.
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- **S. Srivastava, A. Sarkar, B. S. Manoj.** "Hazard Control Algorithms for Heterogenous Multi-Agent Cloud-Enabled Robotic Network," *Proceedings of IEEE ANTS, December 2013.*

- **Sarkar, S. Srivastava, B. S. Manoj**. "Elevation Mapping Using Stereo Vision Enabled Heterogenous Multi-Agent Robotic Network", *Proceedings of IEEE Global Humanitarian*

- **Sanjeev K Mishra**, Jayanta Mukherjee. "Integrated Bluetooth and UWB antenna with WiMAX-WLAN Band-notched Characteristics", *Asia Pacific Radio Science Conference (AP-RASC'13), Taipei, Taiwan,* September 3- 7, 2013.

- Avinash R Vaidya, **Sanjeev K Mishra**, Jayanta Mukherjee. "High-Gain Broad-Band Planar Antennas with Feed Patch Array and Partially Reflective Surfaces", *IEEE-19th Asia-Pacific Conference on Communications (APCC 2013), Bali, Indonesia, pp. 709- 714,* August 2013.

- **Vinitha Ramdas**, **Deepak Mishra**, **Sai Subrahmanyam Gorthi**. **"**Efficient Speech Coding Using A Hybride Dictionary In A Quantized CS Frame Work", *ICISP-2014*.

- **Waghmare Rahul G**., **Mishra Deepak,** G. R.K., **Sai Subrahmanyam**. "UKF based multi-component phase estimation in digital holographic Moiré", *IEEE Fourth National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics* (NCVPRIPG), 2013.

Department of Chemistry

- **A.S. Rama Teja, Sarah Titus, R. Rakesh**, **K.G. Sreejalekshmi**. "Hymecromone functionalized poly (4-vinylpyridine) and its photodeformation", *National Seminar on Recent Trends in Materials Science and Technology,* IIST, Thiruvananthapuram, July 10-12, 2013.

- **J. Cyriac.** *ISMAS Young Scientist Award Lecture,* 12th ISMAS Triennial International Conference on Mass Spectrometry,TRICON-2013, Goa, March 2013.

- **J. Lavanya**, S. Neogi, **N. Gomathi**. "Comparitive study on electro catalytic activity of oxygen and nitrogen doped graphene for electrochemical cancer biosensor", *International Conference on Stem cells and cancer (ICSCC-2013) , International Centre for Stem Cells, Cancer and Biotechnology (ICSCCB), Pune,* October 19-22, 2013.

- **J. Lavanya**, **L.G. Nair**, **N. Gomathi**, S. Neogi. "Electro catalytic activity of Plasma Functionalized Reduced Graphene Oxide", *Research Scholars day 2013*, IIST, Thiruvananthapuram December 16-17, 2013

- **J. Lavanya**, **L.G. Nair**, **N. Gomathi.**, S. Neogi. "Study on RF plasma treated Reduced Graphene Oxide", *poster presented in Chemcon 2013, Indian Institute of Chemical Engineers(IIChE), Mumbai ,* December 27-30, 2013.

- Anjali lal, **J. Mary Gladis**. **"**Synthesis of Bimetallic and trimetallic nanoparticles", *National Seminar on Emerging Trends in Chemical Sciences [ETCS-2013] ,Department of Chemistry, University of Kerala, Kariavattom ,* May 29-31, 2013.

- **K. Jalaja**, **N.R. James**. "Cationically modified gelatin nanofibers: A green nanofabrication method for biomedical applications", *Payyanur college, Payyanur,* June 25, 2013.

- **K. Jalaja**, **N.R. James**. "A Facile Cross-Linking Approach Using Sucrose Based Material for Gelatin Nanofibers", *IIST, Thiruvananthapuram,* July 10-12, 2013.
- **K. Jalaja**, **N.R. James**. "Biocompatible electrospun gelatin nanofiber scaffold for tissue engineering application", *ICAPM-2013, MG University, Kottayam,* October 11-13, 2013.
- **K. Jalaja**, **N.R. James**. "Fabrication of chitosan nanofibers using gelatin as a core template for coaxial electrospinning", *IUMRS_ICA 2013, IISc Bangalore,* December 16-20, 2013.
- **K. Jalaja**, **N. R. James**. "Electrospunnanofibers based on cationized gelatin: A green nanofabrication method for biomedical applications". *2nd International Conference on Advanced Functional Materials - ICAFM 2014, NIIST,* Thiruvananthapuram, February 19-21, 2014.
- **L. G. Nair, N. Gomathi, J. Lavanya.** "Functionalization of multiwall carbon nanotubes by RF plasma treatment", *poster presented in National Conference on Recent Trends in Material Science & Technology held in IIST,* Thiruvananthapuram July 10-12, 2013.
- **L.G. Nair**, **K. Joseph,** C. P. Reghunadan Nair., S. Neogi., **N. Gomathi**. "Surface Modification of Multiwall Carbon Nanotubes by N_2/O_2 Plasma treatment", *Chemcon 2013, Indian Institute of Chemical Engineers(IIChE), Mumbai,* December 27-30, 2013.
- **M. Ganiga**, A.K. Khatua, **J. Cyriac**. "*Flexible Wiping Substrate for Surface Enhanced Raman Scattering (SERS) Applications", National Conference on Recent Trends in Materials Science and Technology 2013*, IIST Thiruvananthapuram, July 10-12, 2013.
- M.K. Mahitha, **M. K. Kavitha, J. Honey.** "Synthesis and Photocatalytic studies of TiO_2 and TiO_2-Graphene composite", *NCMST*, IIST, Thiruvanathapuram, July, 2013.
- **M. K. Kavitha**, **P. Gopinath**, **J. Honey**. " Improved photocatalytic activity of Reduced Graphene oxide-ZnO hybrid", *IUMRS ICA, IISc Bangalore*, December 16-20, 2013.
- **M. M. Ali**, **K. Y. Sandhya**. **"**Adsorption of 1-naphthol by reduced graphene oxide and the mechanism thereof", *Research Scholars day 2013*, IIST, Thiruvananthapuram December 16-17, 2013.
- **P.R. Sarika**, **N.R. James**. "Transparent pullulan aldehyde-gelatin films for corneal tissue engineering", *First International and Third National Conference on Biotechnology, Bioinformatics and Bioengineering,* Tirupati , June 28-29, 2013.
- **P.R. Sarika**, **N.R. James**. "Polysaccharide based nano materials for drug delivery applications", *National Conference on Recent Trends in Materials Science and Technology*, IIST, Trivandrum, July 10-12, 2013.
- **P.R. Sarika**, **N.R. James**. "Polymer scaffolds for tissue culture under microgravity", *Amrita Bioquest 2013, International Conference for Biotechnology for Innovative applications,* August 10-14, 2013.

- **P. R. Sarika**, **N.R. James**. "Design and development of gumarabic curcumin conjuate for cancer therapy". *Research Scholars day 2013*, IIST, Thiruvananthapuram December 16-17, 2013.

- **R. Konnola, K. Joseph.** "Cure Kinetics Studies on Carboxyl Terminated poly (acrylonitrile-co-butadiene)-POSS Composites Using Differential Scanning Colorimetry", *FAPS-MACRO 2013*, IISc Bangalore, May 15-18, 2013.

- **R. Konnola., K.M Usha., K. Joseph**. Oral presentation entitled" Multi-scale composites-Challenges in processing and enhancement in mechanical properties", *International Conference on Safety by Design 2013* , JCET, Ottappalam, August 16-17,2013.

- **R. Konnola, K. Joseph.** Oral presentation entitled "Kinetic Analysis of the Nonisothermal Decomposition of POSS-CTBN nanocomposite", *ICAPM 2013*, MG UNIVERSITY, Kottayam, October 11-13, 2013.

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- **R. Konnola, K. Joseph.** "Effect of Polyhedral Oligomeric Silsesquioxane on the Surface Morphology, Fracture Toughness, Thermal and Mechanical Properties of Nanoclay/Epoxy Nanocomposites", *ICAFM 2014*, NIIST, Thiruvananthapuram, February 19-21, 2014.

- **R. Narasimman, S. Vijayan.**, **K. Prabhakaran**. "Activated carbon particles stabilized molten sucrose foam and preparation of carbon foam", *National Conference on Materials Science and Technology (NCMST-2013), IIST,* Thiruvananthapuram, July 10-12, 2013.

- **R. Narasimman, S. Vijayan**, **K. Prabhakaran**. "Particle Size Effect On The Foaming Characteristics Of Activated Carbon Dispersions In Aqueous Sucrose Resin And Properties Of The Resultant Carbon Foams", *Carbon 2013*, J Rio de Janerio, Brazil, July 14-19, 2013.

- **R. Narasimman, S. Vijayan**, **K. Prabhakaran.** "Macrocellular Carbon Foam for CO_2 Adsorption", *IUMRS-ICA, IISc, Bangalore,* December 16-20, 2013.

- **R. Rakesh, S. Titus, K.G. Sreejalekshmi**. "Electronic structures and spectroscopic properties of benzopyranone derivatives: A DFT study", *Research Scholars day 2013*, IIST, Thiruvananthapuram December 16-17, 2013

- **S. Mahesh**, **D. Raju**, **C.L. Lakshmi**, **K.D. Renuka, K. Joseph**, "Light Induced Transformation of Soft Nanostructures", In the proceedings of *International Conference on Advanced Functional Materials (ICAFM)*, February 19-21 , 2014.

- **S. Titus, K.G. Sreejalekshmi**. "Structure based docking assisted identification of 4-benzylidenehydrazinothiazoles as novel aurora kinase inhibitors" Recent Advances in Computational Drug Design (RACDD-2013), IISc Bangalore, September 16-17, 2013**.**

- **S. Titus, K.G. Sreejalekshmi.** "Computational approach towards the development of densely functionalized thiazoles as novel anticancer agents", *4th International conference on stem cells and cancer*, Haffkines Institute, Mumbai, October 19-22, 2013.

- **S. Titus, K.G. Sreejalekshmi**. "Synthesis and solvatochromism of coumarin conjugated PAMAM: in search for a novel imaging probe", *Research Scholars day 2013*, IIST, Thiruvananthapuram December 16-17, 2013

- **S. Titus, K.G. Sreejalekshmi**. **"**Synthesis and single crystal X-ray studies on aminothiazole monohydrate, a structural analogue to dasatinib", *International Conference on Materials and Characterization Techniques (ICMCT-2014),* VIT Z University, Vellore, March 10- 12, 2014.

- **S. Vijayan**, **R. Narasimman**, **K. Prabhakaran**. "Preparation of alumina foams by thermo-foaming molten sucrose-alumina powder dispersions", *National Conference on Material Science and Technology, NCMST-2013***,** IIST, Thiruvanathapuram, July 10-12 , 2013.

- **T. Remyamol, J. Honey, P. Gopinath.** "Polyaniline grafted reduced graphene oxide as optical limiter", *NCMST*, IIST, Thiruvananthapuram, July 10-12, 2013.

- **T. Remyamol, J. Honey, P. Gopinath.** "Phenylene diamine mediated covalent grafting of polyaniline on reduced graphene oxide for optical limiting". *ICANMEET*, Sathyabhama University, Chennai, July 24-26, 2013.

- **T. Remyamol, J. Honey, P. Gopinath.** "Nonlinear optical and optoelectronic applications of polyaniline-reduced graphene oxide hybrid".,*MRSI Annual Technical Meeting VSSC*, Thiruvananthapuram, November 27, 2013.

- **V. Kumar.**, K.S.S. Kumar, **K.Y. Sandhya**, C.P. Reghunadhan Nair. "Silane and Urethane Chemistry to Access Superhydrophobicity in $CaCO_3$ Nanoparticles", *FAPS-MACRO,* Indian Institute of Science, Bangalore, May 15-18, 2013**.**

Department of Earth and Space Sciences

- **Arun Prasad**, **L. Gnanappazham.** "Spectral distance as an approach for species level discrimination of Mangroves", *International conference on 'Geospatial Momentum for Society and Environment' , Ahmedabad,* December 16 19, 2013. *(Received BEST PAPER Award for the Technical Session : Remote sensing and Image Processing)*

- **Arun Prasad**, **L. Gnanappazham.** "Spectral Seperability among mangrove species of *Rhizophoraceae* family using field spectroscopy", *IEEE International Symposium on Ocean Electronics, SYMPOL 2013, CUSAT, Cochin,* October 23 25, 2013.

- **A Chandrasekar**, **M Dhanya**. "3DVAR assimilation of SAPHIR radiance from Megha-Tropiques: Case Study of a heavy rainfall over southern Indian Peninsula" , *SAARC Seminar on High Impact Weather Events and their prediction over SAARC Region, New Delhi,* December 2, 2013.

- **S. Mandal**, R. Kumar, I. Chattopadhyay. " *Recent Trends in the Study of Compact Objects: Theory and Observation"*, *ASI Conference Series, 2013, 8, 4550*

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Department of Humanities

- **Shaijumon C. S.** (2014). "Changing Indo-US Economic Relations: Prospects and Challenges after Global Financial Crisis", *In the National Seminar on Asian Re-balancing and the Changing Dimensions of Indo-US Relations,* , Department of Political Science, University of Kerala, January 9-10, 2014.
- **Shaijumon C. S.** (2014). "Autonomy a Key to Academic Success: Experiences of IIST", *National Seminar on New Trends in Higher Education, University College, Kerala University,* March 27- 28, 2014.

Department of Mathematics

- **Anilkumar C.V.**, Suja Eapen. "A comparative study of chaotic behavior of Total Electron Content at low, mid and high latitude stations", AGU Chapman International Conference on causes and consequences of the Extended Solar Minimum between Solar Cyclesat Key Largo, Florida, USA., 8-12 April 2013.
- **N. Natarajan**. "On the Superconvergence of h-p finite element method for parabolic equation", National Conference on Recent advances in Numerical methods and its applications, 27-29 January, 2014: pp 15-17.
- **K. Mukherjee**, S. Natesan, An efficient hybrid numerical scheme for singularly perturbed problems of mixed parabolic elliptic type. Lecture Notes in Computer Science, 2013, 411-419.
- **K.S.S.Moosath**, "Banach-Tarski Paradfox - Measure theoretic implications", National Seminar on Analysis at KKTM, Kodungallur, November 19-20, 2013.
- **K. S. S.Moosath**, "Inverse and Implicit Function Theorems and certain Applications", National Seminar on Mathematical Analysis and its applications, March 13-15, 2014.
- **Raju K. George** , **Bhaskar Dubey**, "Controllability of Linear Time-invariant Dynamical Systems with Fuzzy Initial Condition", ICMSC-2013, UC-Berkeley, San-Francisco, U.S.A in October 2013.
- **Sarvesh Kumar**, "Finite volume approximations for incompressible miscible displacement problems in porous media with modified method of characteristics", LNCS, 2013, pp.379-386.
- **Sarvesh Kumar**, "Discontinuous Galerkin finite volume element methods and its application to miscible displacement problems", SCTEMM-2013, Russia, July 08-11, 2013.

Department of Physics

- **Haripadmam P. C., Honey John, Pramod Gopinath**. "Effect of fabrication technique on optical limiting property of Polystyrene-ZnO nanotop composite films", *31st Young Physicists' Colloquium,* August 22-23, 2013.
- **Haripadmam P.C., Honey John, Pramod Gopinath**. "Enhanced optical limiting in ZnO nanotop-CNT-PMMA composite films", *In Proceedings of the 23rd Swadeshi Science Congress,* November 6-8, 2013.

- **Haripadmam P. C., Honey John, Pramod Gopinath**. "Improvement in Optical Limiting Properties of PMMA-ZnO nanocomposites films prepared using oleic acid as a dispersing agent", *In the proceedings of IIST Research Scholars' Day*, December 16-17, 2013.

- **Haripadmam P.C., Honey John, Pramod Gopinath.** "Improvement in Optical Limiting Properties of PMMA-ZnO nanocomposites films prepared using triton as a dispersing agent", *In the proceedings of DAE-BRNS National Laser Symposium-22,* January 8-11, 2014: CP-06-60.

- **Jyothish M.**, **Rakesh Kumar Singh**. *"*Sampling distance requirements of discrete LCT*", International Conference on Optics and Optoelectronics (ICOL) Dehradun,* March 5-8, 2014.

- **Kavitha M. K., Pramod Gopinath., Honey John.** "Improved photocatalytic activity of Reduced Graphene oxide-ZnO hybrid", *IUMRS ICA, IISc Bangalore, December 16-20, 2013: pp. 20.*

- **Mishra P. M.,** Rajput J., Safvan C. P., **Vig S., Kadhane U.** (2013). "Exploring Plasmon excitation in PAHs as a consequence of proton collision", *Topical conference on atomic processes in plasmas. IPR, Gandhinagar,* November 18-20, 2013.

- **Mishra P. M., Kadhane U**. (2014). "Coupling of Plasmon excitation in collision of proton and photon with PAHs, Modelling ion-PAH collision using Monte Carlo simulation", *Stored particle atomic physics research collaboration. TIFR, Mumbai*, January 28-29, 2014.

- **Rakesh Kumar Singh,** Dinesh N. Naik., Hitoshi Itou., **Maruthi M. Brundavanam.,** Yoko Miyamoto., Mitsuo Takeda. "Relation between vectorial source structure and coherence-polarization of light", *Proc. SPIE 87880 (2013) 87880, Munich, Germany,* May 13-16, 2013.

- Brijesh Kumar Singh, **Rakesh Kumar Singh,** Mehta B. S., Senthilkumaran, P. " Control generation of periodic polarization structure by interference"*, Workshop on Recent Advances in Photonics(WRAP) Delhi,* December 17-18, 2013.

- Brijesh Kumar Singh, **Rakesh Kumar Singh,** Mehta, B. S., Senthilkumaran, P. "Polarization modulation in speckles", *International Conference on Optics and Optoelectronics (ICOL) Dehradun,* March 5-8, 2014.

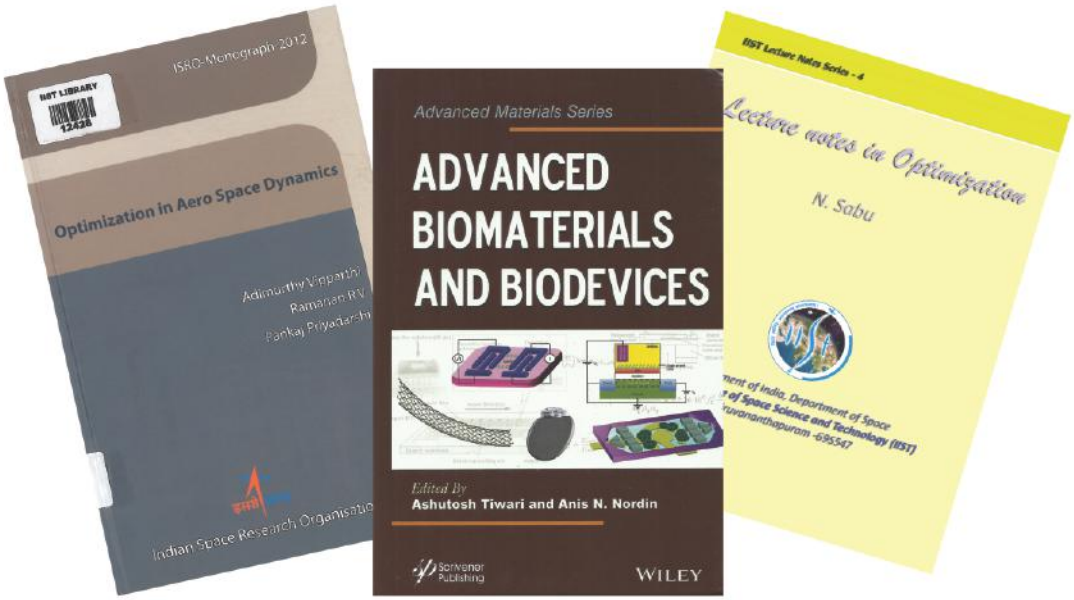
- **Rakesh Kumar Singh**, **Vinu R.V.**, **Anandraj Sharma M**. *"Holographic method for viewing the object through scatterer", International Conference on Optics and Optoelectronics (ICOL) Dehradun,* March 5-8, 2014.

- **Remyamol T., Pramod Gopinath, Honey John.** "*Polyaniline grafted reduced graphene oxide as optical limiter", In the proceedings of the National Conference on Materials Science and Technology NCMST 2013,* July 10-12, 2013 pp. 45.

- **Remyamol T, Pramod Gopinath, Honey John.** "Phenylene diamine mediated covalent grafting of polyaniline on reduced graphene oxide for optical limiting", *In IEEE conference proceedings of International Conference on Advanced Nanomaterials and Emerging Engineering Technologies 2013,* July 24-26, 2013: pp. 204-207.

- **Remyamol T, Pramod Gopinath, Honey John.** "Synthesis, characterization, and improved photocurrent generation of polyaniline-phenylene diamine functionalized reduced graphene oxide hybrid", *IIST Research Scholars Day-2013,* December 16-17, 2013.
- **Sai Krishna, Vinu R.V., Anandraj Sharma M., Rakesh Kumar Singh.** *"*Influence of polarized source structures on statistical properties of laser speckle*", International Conference on Optics and Optoelectronics (ICOL) Dehradun,* March 5-8, 2014.
- **Srinivasa Raju M.,** Rajesh K Singh., **Pramod Gopinath.**, Ajai Kumar. "Effect of Magnetic Field at Different Pressures on the Laser Produced Barium Plasma", *In the proceedings of ISAMP-TC2013 on "Atomic Processes in Plasmas",* November 18-20, 2013.
- **Vinu R.V.**, Manoj K. Sharma, **Rakesh Kumar Singh**, P. Senthilkumaran. *"*Evaluation of Dammann grating using polarization interferometer*", Workshop on Recent Advances in Photonics (WRAP) Delhi,* December 17-18, 2013.
- **Vinu R.V.**, Manoj K. Sharma, **Rakesh Kumar Singh**, P. Senthilkumaran. *"*Generation of off-axis intensity maximum in transverse spatial correlation*", International Conference on Optics and Optoelectronics (ICOL) Dehradun,* March 5-8, 2014.

III) BOOKS / BOOK CHAPTERS



- **Vipparthi Adimurthy, Ramanan R.V., Pankaj Priyadarshi,** (2103) "Optimization in Aero Space Dynamics", ISBN No. 978-81-908956-5-1, ISRO, Bangalore, India.
- **N.Selvaganesan**. (2013) "Fuzzy Based Modeling, Control and Fault Diagnosis of Permanent Magnet Synchronous Generator" in *Handbook of Research on Computational Intelligence for Engineering, Science and Business*, Vol.1 pp. 487-520 (IGI Global): USA.

- **Rajesh Joseph Abraham**, "A Genetic Proportional Integral Derivative controlled Hydrothermal Automatic Generation Control with Superconducting Magnetic Energy Storage" in *Intelligent Solutions for Electricity Transmission and Distribution Networks*, Springer.

- **V. Seena,** P.Ray, P. Kovur, M.Kandpal, V. R. Rao. Chapter titled "Polymer MEMS Sensors" in "Advanced Biomaterials and Biodevices", pp.305-342. ISBN 978-1-118-77363-5. (WILEY-Scrivener Publishing): USA.

- P. Ray, **V. Seena,** V.R.Rao, Chapter titled "Polymer cantilevers and novel transduction techniques for nano electromechanical sensing", in *"Nanocantilever beams: modeling, fabrication, and applications", Pan Stanford Publishing (In Press), ISBN - 13: 9789814613231*

- Sabu Thomas**, K. Joseph**, S.K. Malhotra., Koichi Goda., M.S. Sreekala Eds. (2013). "Advances in Polymer Composites-Volume II - Nano Composites", (John Wiley & Sons Ltd.)

- Sabu Thomas**, K. Joseph**, S.K. Malhotra., Koichi Goda., M.S Sreekala Eds. (2013). "Advances in Polymer Composites,"-*Volume I*

- **N. Gomathi**, A.K Chanda, S. Neogi, (2013) "Atmospheric Plasma Treatment of Polymers for Biomedical Applications" *in Atmospheric Plasma Treatment of Polymers: Relevance to Adhesion*, M.Thomas and K.L .Mittal. Eds., Scrivener Publishing LLC., pp.199-215.

- **Chandrasekar A., M. Govindankutty,** 2013. "Studies on the impacts of 3DVAR assimilation of satellite observations on the simulation of monsoon depressions over India",in *Data Assimilation for Atmospheric, Oceanic and Hydrologic Applications (Vol. II)*, Seon Ki Park and Liang Xu. Eds., Springer; ISBN 978-3-642-35087-0, pp 643-705.

- **Gigy J Alex,** (2013). "Eluding Identity : Shifting Paradigms of culture and identity in *Parzania* and *1947 : Earth*", *In Alternative Voices : Re(searching) Language, Culture, Identity...(edited by Hasnain Imtiaz, Sangeeta Bagg Gupta and Shailendra Mohan*), pp. 112-119, (Cambridge Scholars Publishing New Castle Upon Tyne): UK .

- **Shaijumon C. S**. (2013). Trends in Indian Economy, *In Mathrubhumi Year Book Plus 2014 (edited by Chandran P V*), pp. 625-686, (Mathrubhumi Printing and Publication): Kozhikode.

- **Shaijumon C. S.** (2014). "Role of Village Resource Centers in Technology Diffusion and Development", *In Technologies for Sustainable Development: A way to reduce poverty? (edited by Jean-Claude Bolay et. al),* pp. 287-297, (Springer International Publishing): Switzerland.

- **Shaijumon C. S**.(2014). "Indo-US Trade Relations", *In South Asia in the Globalised World (edited by C Vinodan*), pp. 118-132, (New Century Publications): New Delhi.

- **Shaijumon C. S.** (2014). "*Space based services for educational outreach : A case of ISRO Village Resource Centres", In Higher Education in India New Perspectives (edited by Jacob Chacko*), pp. 94-113, (Manak Publications): New Delhi.

- **N.Sabu** (2013),**"**Lecture notes in Optimization", *Published by IIST.*

- **E. Natarajan** (2013), "Lecture Notes in Partial Differential Equations", *IIST Lecture Notes Series-2, Published by IIST.*

CONFERENCES/ WORKSHOPS AT IIST

IIST hosted number of conferences/workshops and special lectures to promote interaction with the research community in India and abroad.

Department of Chemistry

- National Conference on Recent Trends in Material Science and Technology, 10-12 July, 2013.
- Two-day workshop on Computational Drug Discovery and Hands-on training on Materials Science Suite (Schrodinger Suite 2013) was conducted in the Department of Chemistry during 25-26th February, 2014.

Department of Earth and Space Sciences

- GIS training Programme IIST - ESRI NIIT India 2013 : August 11 – 13, 2013 & November 9, 2013
- One day workshop on Compressive sensing (ESS and Avionics): January 22, 2014

Department of Humanities

- Humour: Texts/ Contexts , December 7-8, 2013
- National Workshop on Social Science Research Methodology, June 20-22, 2013.
- Two day Workshop on Project Management October 20-21, 2013.

Department of Mathematics

- Workshop organized: ATM Workshop on "Computational Algebraic Geometry", February 9-13, 2014.
- Workshop on “Differential Equations and its Applications (WDEAP 2013)” from December 18 – 21, 2013.
- Advanced Workshop on Homogenization from December 9–14, 2013

INVITED LECTURES

During this period, IIST organized lectures by various academicians from India and abroad.

- **Christophe Chatelain**, Institut Jean Lamour, Universite de Lorraine, France, April 9, 2013, "The influence of disorder on the phase transition of the Potts model."
- **Hari B Hablani,** IIT Mumbai, May 14, 2013, "Experiences in Navigation design."
- **A. K. Nandakumaran,** IISc Bangalore, May 19, 2013, "Fundamental theorem of calculus, Why is it so fundamental ?"
- **Chacko Jacob**, IIT, Kharagpur, June 6, 2013, " Synthesis of multiwall carbon nanotubes by Chemical vapour Deposition Does the catalyst matter?"
- **Pankaj Biswas,** BITS, Pilani, June 7, 2013, "Numerical solutions to non-algebraic equations"
- **Thirupathi Gudi ,** IISc Bangalore, June 9, 2013, "Adaptive finite element methods for obstacle problem."
- **Krishana Dev Kumar**, Professor & Canada Research Chair in Space Systems, Department of Aerospace Engineering, Ryerson University, June 21, 2013, "Spacecraft Design, Dynamics and Control: Ongoing Research and Future Challenges."
- **C. Amarnath**, IIT Bombay, July 5, 2013, **"**Exploration and Research**."**
- **S Sivaram**, NCL,Pune, July 10-12, 2013, "Sustainable materials based on aliphatic polyesters: teaching old chemistry some new tricks."
- **Vijayamohanan Pillai**, Director, CECRI, Karaikudi, July 10-12, 2013, "Transformation of carbon nanotubes to graphene quantum dots: Size dependant optical and electron transfer properties."
- **Ajith P**., International Centre for Theoretical Sciences, TIFR Bangalore, September 25, 2013 "Gravitational-wave astronomy: A new observational window to the Universe."
- **Sampath Srinivasan**, IISc, Bangalore, September 25, 2013, "Interfacial Studies Using Transition Metal Nitrides and Carbides."

- **Kannan N Iyer**, IIT Bombay, October 18, 2013, **"**Methodology for Hydrogen Management in Nuclear Reactor Containment."
- **Bindusar Sahoo**, IISER Thiruvananthapuram, October 23, 2013 "Nobel Prize in Physics 2013."
- **Thomas Tharian**, MME, LPSC, October 24, 2013, 'The science of Titanium alloys.'
- **Bhoje Gowd**, Senior Scientist, NIIST Thiruvananthapuram, November 1, 2013, "X-ray techniques for Material Characterization."
- **B. Santhosh**, Head, Structures design section, Composites entity, VSSC, November 13, 2013, " Rockets and Satellites: A Structural Engineering Perspective."
- **Anoop K Mukhopadhyay**, Chief Scientist, Central Glass and Ceramic Institute, Kolkata, November 13, 2013, "Nano Indentation and emerging technique for Material Characterization."
- **K .V. Gangadharan**, NIT K, November 26, 2013, "Demonstration of Virtual lab developed."
- **Deshdeep Sahdev**, IIT Kanpur, December 5, 2013 "Indigenous technology in a globalized world: A case study."
- **R. Shankar**, BHU, Varanasi, December 9, 2014 "Spectroscopy of multiply charged molecular ions induced by keV-electrons and studied by ion-ion coincidence technique."
- **Rajeev ,** ISI Bangalore, December 20, 2013, "Brownian Excursions."
- **K. Kapoor**, BITS, Hyderabad, January 10, 2014 "Recent developments in quantum Hamilton Jacobi method."
- **Govindan Rangarajan,** IISc Bangalore, January 24, 2014, "Brain Machine Interface"
- **Gangan Prathap**, CSIR-NIIST, Thiruvananthapuram, February 5, 2014, "Prathap's paradigm and prathap Points."
- **Kota Murali**, Semiconductor Research Centre, IBM-India, February 12,2014 "Nanotechnology - Enabling the future."
- **Muhamed Suceska,** Scientific Advisor, Brodarski Institute, Zagreb, Croatia, February 12, 2014, **"**Computational Modeling of Thermal Ignition of Energetic Materials**."**
- **T.N. Krishnamurti,** Department of Earth, Ocean and Atmospheric Science Florida State University, Tallahassee, FL, USA, February 21, 2014 "A Monsoonal link to the rapid Arctic ice melt."
- **Guido Kanschat ,** Interdiscplinary centre for Scientific Computing, Universitat Heidelberg, March 7,2014, " Scientific Software in Research and Education."
- **C.S Kundu**, IIT ,Kharagpur, March 14, 2014, "Silk protein matrices for tissue engineering and regenerative medicine."
- **Shyjumon Ibrahimkutty**, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany, March 17, 2014 "Synchrotron Small Angle X-ray Scattering (SAXS) analysis on Nanosystems."

FACULTY AND STAFF ACTIVITIES

During 2013-14, twelve regular faculty members and one visiting faculty member joined and at present, institute is having 96 faculty members.

IIST faculty members made significant contributions in the areas of teaching and research. They won several awards and honours.

AWARDS / RECOGNITIONS

- **Seena.V - Award for Excellence in Ph.D Thesis, IIT Bombay** received during 51st Convocation of IIT Bombay August 10, 2013.
- **Seena.V - SERB Women Excellence Award,** Science and Engineering Research Board (SERB), DST, Govt. of India.
- **V.S. Sooraj and Prof. V. Radhakrishnan**, "Multi-Application Studies of Elastomeric Abrasive Balls in Fine Finishing", Best paper award in IIST Research Scholars Day, 2013
- **S. Titus, K.G., Sreejalekshmi**. "Structure based docking assisted identification of 4-benzylidenehydrazinothiazoles as novel aurora kinase inhibitors" Best poster award in Recent Advances in Computational Drug Design (RACDD-2013), IISc Bangalore, September 16-17, 2013
- **S. Titus, K.G. Sreejalekshmi.** "Computational approach towards the development of densely functionalized thiazoles as novel anticancer agents", Best poster award in *4th International conference on stem cells and cancer*, Haffkines Institute, Mumbai, October 19-22, 2013.
- **V. Kumar,** K.S.S. Kumar, **K.Y. Sandhya**, C.P. Reghunadhan Nair. "Silane and Urethane Chemistry to Access Superhydrophobicity in $CaCO_3$ Nanoparticles", Best poster award in *FAPS-MACRO,* Indian Institute of Science, Bangalore, May 15-18, 2013**.**
- **Arun Prasad, L. Gnanappazham,** "Spectral distance as an approach for species level discrimination of Mangroves", Best paper award in *International conference on 'Geospatial Momentum for Society and Environment', Ahmedabad,* December 16 - 19, 2013.

CONFERENCE / WORKSHOP ATTENDED BY FACULTY MEMBERS

- **Pradeep Kumar P.,** *International Workshop on Design of Sub-Systems for Concentrated Solar Power Technologies,* IIT-Jodhpur, December 19-22, 2013.
- **Prathap C.,** *Pan Indian Combustion Academics Colloquium*, IIT, Madras, March 17-18, 2014.
- **Praveen Krishna,** *International Conference on Energy and Environment 2013,* RIT, Kottayam, December 13, 2013.
- **Shine S. R,** 22nd National and 11th International ISHMT-ASME Heat and Mass Transfer Conference, IIT Kharagpur.
- **Shine S. R.,** *ASME 2013 Gas Turbine India Conference*, GTIndia2013, Bangalore, December 5-6, 2013.
- **Ramanan R. V.**, 6th symposium on Applied Aerodynamics and Design of Aerospace Vehicles , SAROD 2013, November 21-23, 2013.
- **Chakravarthy P.**, *National Metallurgist Day*, IIT BHU, Varanasi, November 12-15, 2013.
- **Chakravarthy P.**, *National Aerospace Manufacturing Seminar*, November 22-23, 2013.
- **Chakravarthy P.,** 3rd international conference on advances in materials and manufacturing, Chitkatra university, Punjab, September 2013
- **Chakravarthy P**., International seminar on metal forming, IMTEX Bangalore, January 2014.
- **Pankaj Priyadarshi,** *IEEE Workshop on Computational Intelligence: Theories, Applications and Future Directions*, IIT Kanpur, July 14, 2013.
- **Pankaj Priyadarshi,** *National Conference on Wind Tunnel Testing (NCWT-03),* Vikram Sarabhai Space Centre, August 23-24, 2013.
- **Pankaj Priyadarshi,** *Workshop on Hypersonic Aerodynamics*, Hyderabad, November 21, 2013.
- **Pankaj Priyadarshi**, *6th Symposium on Applied Aerodynamics and Design of Aerospace Vehicles*, Hyderabad, November 22-23, 2013.
- **Pankaj Priyadarshi**, *22nd National and 11th ISHMT-ASME Heat and Mass Transfer Conference*, IIT, Kharagpur, December 28-31, 2013.
- **Pankaj Priyadarshi,** *International Workshop on Novel Combustion Concepts for Sustainable Energy Development*, January 2-4, 2014.
- **Sooraj V.S.,** National Aerospace Manufacturing Seminar, SAME, Trivandrum November 22-23, 2013.
- **V. S. Sooraj,** *International Conference on Precision Meso Micro Nano Engineering (COPEN),* December 2013.
- **Sooraj V.S**., International seminar on metal forming, IMTEX Bangalore, January 2014.
- **B. S. Manoj ,** *IEEE Indicon 2013*, IIT Mumbai, December 13-15, 2013.
- **B. S. Manoj,** IEEE RAICS 2013, Trivandrum, December 19-21, 2013.
- **B. S. Manoj**, *2nd International conference on Advances in Computing*, Communications and Informatics 2013 (ICACCI 2013), Mysore, August 22-25, 2013.

- **Chinmoy Saha**, *International Conference on Advanced Functional Materials (ICAFM 2014)***,** CSIR National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram, February 19-21, 2014.
- **Chinmoy Saha**, *URSI Regional Conference on Radio Science (URSI- RCRS 2014)* **,**Indian National Committee for URSI (INC-URSI), INSA and Symbiosis Institute of Technology, Pune, January 2-5, 2014.
- **Chinmoy Saha**, *IEEE International Conference on Applied Electromagnetics (AEMC 2013)***,** IEEE AP-MTT Kolkata chapter, KIIT University, Bhubaneswar, December 18-20, 2013.
- **Deepak Mishra**, *2nd International Conference on Advances in Computing*, Communications and Informatics 2013 (ICACCI 2013), Mysore, August 22-25, 2013.
- **M.Vanidevi**, *Workshop on Digital Wireless*, National Instruments, Jodhpur, February 23- 24, 2014.
- **Sanjeev K Mishra.** Jayanta Mukherjee, I*ntegrated Bluetooth and UWB antenna with WiMAX-WLAN Band-notched Characteristics*, 2013 Asia Pacific Radio Science Conference (AP-RASC'13), Taipei, Taiwan, September 3-7, 2013.
- **Gomathy N**., *National Conference on Recent Trends in Material Science and Technology (NCMST),* Department of Chemistry, Indian Institute of Space Science & Technology, Trivandrum, July 10-12, 2013.
- **Gomathy N**., *Chemcon 2013,* organized by Indian institute of Chemical Engineers(IIChE), Mumbai, December, 27-30, 2013.
- **J. Mary Gladis**, "*Nano India-2013"* conference organized by CSIR- National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram , February 19-20, 2013.
- **J. Mary Gladis**, *National conference on recent trends in Material Science and Technology (NCMST-2013)*, organised by Department of Chemistry, IIST, Thiruvananthapuram, July 10-12, 2013.
- **K.G. Sreejalekshmi,** *Two-day workshop on Computational Drug Discovery and Hands*-on training on *Materials Science Suite (Schrodinger GmBH*), Department of Chemistry during February 25-26, 2014.
- **K. Joseph**, Expert member for the *26th Kerala Science Congress-2014,* Veterinary and Agricultural Science University, Pookode, Kalpetta, January 30, 2014.
- **K. Joseph**, *9th International High Energy Materials Conference and Exhibits '(HEMCE-2014)'* Trivandrum, February 13-15 , 2014.
- **K. Joseph**, International Conference on Advanced Functional Materials(ICAFM-2014),Mascot Hotel, Trivandrum, February 19-21 ,2014.
- **K. Joseph**, Workshop on High Temperature Materials and Hot Structures, Uday Samudra Leisure Beach Hotel, Kovalam, Trivandrum.
- **S. Mahesh**, 16th CRSI National Symposium in Chemistry (NSC-16), Indian Institute of Technology (IIT), Mumbai, February 7- 9 ,2014.
- **K.Y. Sandhya,** National Conference on *Recent Trends in Materials Science & Technology (NCMST)*, a three day event conducted by Chemistry Dept., Indian Institute of Space Science & Technology Trivandrum, July 10-12, 2013.

- **Samir Mandal**, *Conference on Accretion Onto Black Holes organized by TIFR*, Mumbai at International Centre, Goa, September 5-7, 2013.
- **Resmi, L.,** *Science with SKA*, IISER Mohali, March 19, 2014
- **Resmi L.**, *32nd Annual Conference of the Astronomical Society of India*, IISER Mohali, March 20 -22, 2014.
- **Deepak. T.G**., *Instructional Workshop on Matrix Analytic Methods in Stochastic Models*, National Institute of Technology, Calicut, January 6- 7, 2014.
- **Deepak. T.G**., *Eighth International Conference on Matrix Analytic Methods in Stochastic Models*, National Institute of Technology, Calicut, January 8-10, 2014.
- **E. Natarajan**, *CIMPA Research School on Current Trends in Computational methods for PDES,* Indian Institute of Science, Bangalore, July 8-19, 2013.
- **K. Mukherjee**, *International pre-school and CIMPA research school on "Current Trends in Computational Methods for PDEs",* held in the Department of Mathematics , IISc Bangalore ,June 24 July 7 and July 8-19, 2013.
- **K. Mukherjee**, *the International Conference on Emerging Trends in Applied Mathematics*, held in the Department of Applied Mathematics at University of Calcutta ,February 12 - 14, 2014.
- **K.S.S.Moosath,** *IISc Mathematics Initiative workshop on Differential Equations*, Government College, Chittur, May 15-21, 2013.
- **K.S.S.Moosath,** *National Conference on Differential Geometry by the Government College*, Chalakudy, October 22-23, 2013.
- **K.S.S.Moosath,** *Linear Algebra and Applications*, Government Engineering College, Sreekrishnapuram, October 31 - November 2 ,2013.
- **K.S.S.Moosath,** *National Seminar* conducted by Department of Mathematics, K.K.T.M College, Kodungallur, November 19-20, 2013.
- **K. Sakthivel**, *National Conference on Partial Differential Equations and Applications*, Bharathiar University, Coimbatore, January 30-31, 2014.
- **Raju K. George**, *Indo-French centre for Applied Mathematics* meeting Bangalore, April 26, 2013.
- **Raju K. George**, *Workshop on "IISc Mathematics Initiative Workshop on Differential Equations*" at Chittur , May 17 - 18, 2013.
- **Raju K. George**, *Lecture on Octave and Machine Learning* , May 25, 2013.
- **Raju K. George**, *Conference / Talk on Mathematical Modelling of Artificial Satellite* at Mar Ivanios College, Trivandrum, September 6, 2013.
- **Raju K. George**, *Young Talent Nurture (YTN-2013) Program,* May 28 -June 7, 2013.
- **Raju K. George**, *NPDE Workshop on ODE* ,Bhimtal , June 10-15, 2013.

- **Raju K. George**, *Kashmir University Conference on Functional Analysis* , October 28 - 29, 2013.
- **Raju K. George**, *Modelling Week* , NIT Calicut, November 2- 6, 2013.
- **Raju K. George**, *ODE Workshop* , IIST, Trivandrum, December 18-29, 2013 .
- **Sarvesh Kumar**, *The second international Conference on "Supercomputer Technologies of Mathematical Modeling"*, Yakutsk, Russia, July 8-11, 2013.
- **Sarvesh Kumar**, *International pre-school and CIMPA research school on "Current Trends in Computational Methods for PDEs",* held in the Department of Mathematics , IISc Bangalore during June 24 July 7 and July 8-19, 2013.
- **Sarvesh Kumar,** *International conference on "Emerging trends in applied Mathematics* , University of Calcutta, Kolkata, February 12-14, 2014.
- **Sarvesh Kumar**, *International conference on Mathematics and Engineering Sciences*, Chitkara University, HP, India, March 20-22, 2014.
- **Apoorva Nagar**, *Indian Statistical Physics Community Meeting 2014,* International Centre for Theoretical Sciences, Bangalore, February 1-3, 2014.
- **J Solomon Ivan,** *AQIS-2013* held at IMSc Chennai, August 25-30, 2013.
- **Kadhane U**., *1st VAMDC India meeting* at IPR, Ahmadabad, November, 2013.
- **Kadhane U**., *Stored particle atomic physics research collaboration.* TIFR, Mumbai, January 28-29, 2014.
- **Naveen Surendran**, *Workshop on Transport in Topological Insulators*, Harish-Chandra Research Institute, Allahabad, July 9-13, 2013.
- **Pramod Gopinath**, *National Colloquium on Theoretical Physics*, Srinivasa Ramanujan Institute for Basic Sciences, Mascot Hotel, Thiruvananthapuram, August 9-11, 2013.
- **Pramod Gopinath**, *23rd Swadeshi Science Congress*, Mahatma Gandhi University, Kottayam, November 6-8, 2013.
- **Pramod Gopinath**, *DAE-BRNS National Laser Symposium-22*, Manipal University, Manipal, January 8-11, 2014.
- **Pramod Gopinath**, *Annual Photonics Workshop on Nanophotonics*, Cochin University of Science and Technology, Cochin, February 27-28, 2014.
- **Rakesh Kumar Singh**, *Structural and Physical Properties of Solids, Indian School of Mines,* Dhanbad, November 18-20, 2013.
- **Rakesh Kumar Singh**, *Workshop on Recent Advances in Photonics (WRAP), Delhi,* December 17-18, 2013.
- **Rakesh Kumar Singh**, *International Conference on Optics and Optoelectronics (ICOL), Dehradun, March 5-8, 2014.*

INVITED LECTURES DELIVERED BY IIST FACULTY

Faculty Members of IIST gave invited lectures at various conferences / workshops in India and abroad.

- **Ramanan R.V.,** 'Interplanetary Mission Challenges and Opportunities', 6th symposium on Applied Aerodynamics and Design of Aerospace Vehicles , SAROD 2013, Hyderabad, November 21-23, 2013,
- **Ramanan R.V.,** "Interplanetary Mission Challenges and Opportunities' Structured Training Programme,STP2013, ISRO Inertial Systems Unit, December 6, 2013.
- **Pankaj Priyadarshi,** "Role of Aerothermodynamic Fidelity on the Design of Axisymmetric Semi-Ballistic Re-entry Vehicles ," Workshop on Hypersonic Aerothermodynamics , SAROD-2013, Hyderabad, November 21, 2013
- **Pankaj Priyadarshi,** "CFD in Aerospace Vehicle Design @ ISRO," Symposium on Applied Aerodynamics and Design of Aerospace Vehicles (SAROD-2013), Hyderabad, November 22, 2013.
- **Pankaj Priyadarshi,** "Genetic Algorithms," CEP Course on "Introduction to Optimization for Engineering Design", Alleppey, Kerala, December 6, 2013.
- **Pankaj Priyadarshi,** "Elite Attractor GA (EA-GA) , a New Multi Objective GA Variant," 9th Meeting of Special Interest Group on MDO , , Alleppey, Kerala, December 7, 2013.
- **Pradeep Kumar P.,** Two Lectures **"**Elements of Two-phase flow" and **"**Direct steam generation" in the MNRE-sponsored short-term course Design of Concentrated Solar Thermal Systems, at IIT, Jodhpur, December 16 - 18, 2013.
- **Prathap C**., "Determination of Burning velocity", IIT, Madras, NCCRD, February 10, 2014.
- **Prathap C**., "Introduction to Mechanical Engineering", National level **Technical Symposium**, Podhigai College of Engineering and Technology, Tirupattur, March 15, 2014.
- **Praveen Krishna I.R.,** *"Introduction to vibration and control of vibrations",* QIP short term course on Modern Control Perspectives in Solid and Fluid Mechanics, IIT Madras, Chennai , January 19, 2014.
- **Praveen Krishna I. R.**, *"Wind Milling in Aero-engines",* National Workshop on "Space Craft and Launch Vehicle Technology, *M. A. College, Kothamangalam, Kerala*, February 22, 2014.

- **B. S. Manoj**, "Cognitive Networking" at the DRDO sponsored Three-day Workshop on Software Defined Radio, Rajagiri School of Engineering and Technology, Kochi, May 14-16, 2013.
- **B. S. Manoj**, Keynote Talk titled "Securing Cyber Physical Systems", Summer School on Network and Information Security '13 (NIS'13), IIITM-K, Trivandrum, May 20, 2013.
- **B. S. Manoj**, Keynote/Plenary talk 2nd International conference on Advances in Computing, Communications and Informatics 2013 (ICACCI 2013), Mysore, August 22-25, 2013.
- **B. S. Manoj**, Technical Program Committee Chairs' message at IEEE RAICS 2013 Trivandrum, December 19-21, 2013.
- **Chinmoy Saha, "**Metamaterial Inspired Antennas:Recent Trends and Developments **"**,IEEE Indian Antenna Week 2013' Aurangabad, Maharashtra, June 3-7, 2013.
- **Chinmoy Saha, "**Metamaterial Inspired Antennas**",** TEQUIP Sponsored Faculty Development Seminar, JIS College of Engg. Kalyani, August 14, 2013.
- **Chinmoy Saha, "**Compact Multiple SRR Loaded UWB Circular Monopole Antenna with Controllable Dual Frequency Notch Characteristics"**,** "URSI RCRS 2014' Symbiosis, Institute of Technology, Pune, January 2-5, 2014.
- **Deepak Mishr*a,*** "Image processing, Image storage, compression, and retrieval" at TEQIP course on "Image Processing" at College of Engineering, Attingal, June 3-9, 2013.
- **Deepak Mishra,** "Basics of Image Processing analysis" at NIT Calicut for faculty Development Program on Image Computing and Applications, June 11-15, 2013.
- **Deepak Mishra,** "Recurrent Neural Networks and its application", FDP on Soft Computing Techniques in Engineering Applications, Department of Computer Science and Engineering, T.K.M College of Engineering, Kollam, June 21, 2013.
- **Deepak Mishra,** "Sparse signal Processing and compressed sensing" at computer science Department, Kerala University , June 26, 2013.
- **Deepak Mishra,** "An introduction to intelligent control: emphasis on Dynamic Neural Networks", National level seminar on "Advanced Control Techniques for Innovative Applications" at VIT Chennai, December 5, 2013.
- **Deepak Mishra,** "Fuzzy sets and Fuzzy Logic theory and applications", workshop on Softcomputing Department of Computer Science and Engineering Government Engineering College Sreekrishanapuram Palakkad, January 9-11, 2014.
- **Deepak Mishra,** "Neural Networks using MATLAB", Department of ECE, T.K.M College of Engineering, Kollam, March 5,2014

- **Sheeba Rani J., "**Challenges of Face Recognition", IEEE Student Branch Kalasalingam University, Krishnankovil, Tamil Nadu, April 11, 2013.
- **Sheeba Rani J.,** "Discrete Transforms and its application to Image Processing", NIT Calicut for faculty Development Program on Image Computing and Applications, June 11-15, 2013.
- **Sheeba Rani J.,** " VLSI Signal Processing" ***at*** LBS Institute of Technology for Women, Trivandrum ***for t***raining program on VLSI for faculties in Engineering Colleges , (under TEQIP -II), September 2-6, 2013. .
- **Sheeba Rani**., "Virtual Reality and its applications" in the National Conference INCOS '14, kalasilingam University,Tamil Nadu, March 28, 2014.
- **Rajeevan.P.P.**, "Multilevel Inverters", Department of Electrical Engineering, Faculty Development Programme , Government Engineering College, Thrissur ,October 8, 2013.
- **Rajeevan.P.P.**, "Recent Advances in Power Electronics and Drives", Department of Electrical Engineering, TKM College of Engineering, Kollam, December 18, 2013.
- **N. Selvaganesan**, "Conventional Control to Fractional control", KSR Institute of Engineering and Technology, AICTE sponsored FDP", Tiruchengode, May 11, 2013.
- **N. Selvaganesan**, "Control System Design Conventional to Fuzzy", FDP Program, TKM Engineering College, Kollam, June 22, 2013.
- **N. Selvaganesan**, "Advanced controller structure for power electrics circuits and drives", NIT, Trichy, November 9, 2013.
- **N. Selvaganesan**, "Fractional Control of Precision Modular Servo Setup for Better Limit Cycle Suppression", FDP Program, CET, Trivandrum, December 7, 2013.
- **N. Selvaganesan**, "Certain Topics in Control System" FDP program, KLN College of Engineering, December 14, 2013.
- **N. Selvaganesan**, "Introduction to System Modeling", Student Chapter, Mechanical Engineering Department, CET, Trivandrum, January 21, 2014.
- **N. Selvaganesan**, "Fractional Control of Precision Modular Servo Setup for Better Limit Cycle Suppression", Faculty Development Program On SIGNAL PROCESSING AND CONTROL SYSTEMS, February 1, 2014.
- **N. Selvaganesan**, "Advanced controller structure for power electrics circuits", IEEE Conference, ICGCCEE'14, March 8, 2014.
- **N. Selvaganesan**, "Fuzzy Observer For Chaotic Based Cryptography" National Conference, Marian Engineering College, March 18, 2014.

- **N. Selvaganesan**, "Frequency Domain Analysis" Technological Advancements in Electronics and Communication, Lourdes Matha College of Science & Technology, March 21, 2014.
- **Rajesh Joseph Abraham** , UK-India Bilateral Workshop on Sustainable Energy and Smart Grid, University of Bradford, UK, March 27-28, 2014.
- **J. Cyriac**, "Mass Spectrometry" National Seminar on Instrumental Methods of Chemical Analysis, Department of Chemistry, Govt. Brennen College, Dharmadam, Thalassery, November 22, 2013.
- **J. Cyriac**, National Science Day Lecture. B.K College, Amalagiri, Kottayam, February 28, 2014.
- **J. Mary Gladis**, Invited lecture on "Advanced materials for electrochemical energy storage systems" in the Rasathanthra - *2013* organized by Department of Chemistry, University of Kerala, Kariavattom , August 14, 2013.
- **J. Mary Gladis,** Invited lecture on "Multielemental Analysis using Inductively Coupled Plasma Atomic Emission Spectrometer" during National level workshop on "Characterization of Advanced Materials" (HEAM-CAM 2013), Mar Ivanios College, Trivandrum, November 6-8, 2013.
- **K.G. Sreejalekshmi**, "**Combinatorial Chemistry Lecture Series",** XXVI Refresher Course in Chemistry, ASC, University of Kerala, Kariavattom, March 7, 2014.
- **K.G. Sreejalekshmi**, "Combinatorial Chemistry- Principle and Design Strategies" UGC sponsored Two Day National Seminar on Trends in Combinatorial Chemistry and Chemoinformatics, TKM College of Arts and Science, Kollam, March 20-21, 2014.
- **K.G. Sreejalekshmi**, "**Concepts in Supramolecular Chemistry",** National Conference on Supramolecular Chemistry and Nanomaterials (SUPRANO 13). MSM College, Kayamkulam, December 11, 2013.
- **K.G. Sreejalekshmi**, "**Supramolecular Materials Chemistry: Application in Materials Design",** National Conference on Supramolecular Chemistry and Nanomaterials (SUPRANO 13). MSM College, Kayamkulam, December 11, 2013.
- **K.G. Sreejalekshmi**., Delivered Key Note Adress on "Trends in Combinatorial Chemistry and Chemoinformatics", UGC sponsored Two Day National Seminar, TKM College of Arts and Science, Kollam, March, 20-21 , 2014.
- **K. Joseph**, "Key to Success in Teaching: Role of Research.", S B College, Channganassery, May 3, 2013.
- **K. Joseph**, "Nano Materials for Medical and Space Applications."Kerala University,Trivandrum, May 13, 2013.

- **K. Joseph**, "Advanced Materials,Characterization and Applications in Material science and Engineering", Sardar Vallabhbhai National Institute of Technology, Surat, September 2-6, 2013.

- **K. Joseph**, "E-Waste Management: Green Materials and its Composition."National Seminar on Environmental Conservation and Susainable Living, September 12, 2013.

- **K. Joseph**, "NanoMaterials and Nanocomposites", UGC Academic Staff College Karyavattom, University of Kerala, Trivandrum, October 23, 2013.

- **K. Joseph**, "Scope of Scientific Research" Resource Person for the National Workshop on Research Methodology in Science, UGC Academic Staff College, Calicut, November 5, 2013.

- **K. Joseph**,"Emerging Trends in Nanoscience and Technology", Rev.Dr.Mathew Thottiyil Memorial Endowment lecture,2013,organized by PG Department of Chemistry, Nirmala College,Muvattupuzha, November 9,2013.

- **K. Joseph**, National Seminar on Emerging Trends in Polymeric Materials (EPSM-2014),Christian College, Chengannur,January 23,2014.

- **K. Joseph**,"Nano Materials For Space Applications." Resource Person for the National Conference on Advanced Materials-NCAM-2014, PGP College of Arts and Science, Namakkal, February 07, 2014.

- **K. Joseph**, "Fostering Scientific Temper-Trends and Opportunities in Chemistry",at the Prof.Chacko Ramacha Memorial lecture and National Science day celebration, St. Berchamans College, Changanassery, February 28,2014.

- **K. Joseph**, "Emerging Trends in Nano Science and Technology", National science day lecture, Sponsored by KSCSTE, Newman College, Thodupuzha, February 28,2014.

- **K. Joseph**, "Recent Advances in Nanomaterials" Resource Person for the UGC Sponsored National Conference on New Paradigms in Chemistry, Ab initio-Ad Futurum, St.Marys College, Sulthan Bathery,March 10,2014.

- **K. Joseph**, "Advanced functional Materials", Third National Conference on "Advanced Functional Materials and Applications (NCAFMA-2014),DRDO Sponsored, Kalasalingam University, Tamil Nadu, March 21, 2014.

- **K. Joseph**, "Material Science and Modern Analytical Techniques", UGC Sponsored National Seminar, organized by the Department of Chemistry, MPMMSN Trusts College, Shornur, Palakkad, Kerala, March 27,2014.

- **K. Prabhakaran, "**Porous carbon Materials for Energy and Environmental Applications", National Conference on Recent Trends in Materials Science and Technology (NCMST), IIST, Thiruvananthapuram, July 10-12, 2013.
- **K.Y. Sandhya**,"Titanium dioxide based Solar Energy Conversion materials", National Conference on Recent Trends in Materials Science & Technology,IIST, Thiruvananthapuram July, 2013.
- **N.R. James**, "Polysaccharides, Natures' gift to mankind" UGC Sponsored Seminar at St. Cyril's College, Adoor, Kerala, August 27, 2013.
- **S. Mahesh**, "Transforming Soft Structures with Light: Ostwald Ripening of Organic Nanodots to Rods", Indian Institute of Science (IISc), May15-18, 2013**.**
- **Jagadheep D**., "The early phases of high-mass star formation", Mar Athanasios College for Advanced Studies, Tiruvalla (MACFAST), August 12, 2013
- **Jagadheep D**., "The early phases of high-mass star formation", Mar Athanasios College for Advanced Studies, Tiruvalla (MACFAST), August 12, 2013
- **Jagadheep D.,** "High-mass star formation in its early phases", National Centre for Radio Astronomy (NCRA), January 27, 2014
- **Narayanan A**., "The Search for Missing Baryons", Mar Athanasios College for Advanced Studies Tiruvalla (MACFAST), August 12, 2013
- **Resmi L.,** "Reverse shock emission in GRBs", High Energy Emission from AGN, Kashmir University, October 9, 2013
- **Resmi L.,** "Reverse shock emission in GRBs",32nd Annual Conference of the Astronomical Society of India, IISER Mohali, March 20, 2014.
- **Babitha Justin**, "*Women in Contemporary Kerala*", St. John the Baptist Church. Pallom, Kottayam, October 14, 2013.
- **Babitha Justin**, "Women Travellers in Independent India -Travel Writing Through the Ages" Sadakkathulla Appa College. Thirunelveli , February 12, 2014.
- **Ravi, V.,** "Quality Function Deployment and its usage in manufacturing industry", National Institute of Technology, Trichy, April 25, 2013.
- **Lekshmi V Nair**, "PRA methods", Loyola College of Social Sciences, September 6-8, 2013
- **Lekshmi V Nair**, "International Womens Day", BCM College, Kottayam, October 10, 2013.
- **Lekshmi V Nair,** "Indian Sociology- Issues and Challenges", Sacred Hearts College, Thevara, December 7-10, 2013
- **Deepak. T.G.,** "Stochasic Differential Equations", Government College, Chittur, Palakkad, May 21, 2013.

- **Deepak. T.G.,** "Measure Theoretic Approach to Probability", KKTM Government College, Kodungaloor, Cochin, November 18, 2013.
- **Deepak. T.G.,** "Conditional Expectation and its Role in Theory of Estimation", Mohandas College of Engineering and Technology, Nedumangad, Thiruvananthapuram, December 17, 2013.
- **Deepak. T.G.,** "Modelling and Simulation", Assumption College, Changanassery, January 18, 2014.
- **Deepak. T.G.,** "Banach Fixed Point Theorem and Its Applications", Aquinas College, Edacochin, Cochin, January 23, 2014.
- **Deepak. T.G.,** "Several Variable Calculus", DB Pampa College, Parumala, February 14, 2014.
- **K.Mukherjee**, "YOUNG TALENT NURTURE 2013" programme held in the Department of Mathematics at IIST, Thiruvananthapuram, May 28 June 8, 2013.
- **K.Mukherjee**, "Uniformly convergent numerical method for 2D singularly perturbed problems" in the International conference on Emerging Trends in Applied Mathematics, Department of Applied Mathematics at University of Calcutta , February 12-14, 2014.
- **K.S.S.Moosath**, "Foundations of Mathematics",Intiation to Mathematics , S D College, Alappuzha, April 29 -May 11, 2013.
- **K.S.S.Moosath**, "Linear Algebra", IISc Mathematics Initiative workshop on Differential Equations at Government College, Chittur, May 15 - 21 ,2013.
- **K.S.S.Moosath**, "Real Analysis", DB College Parumala, June 20 ,2013.
- **K.S.S.Moosath**, "Hyperbolic Geometry", Academic Staff College, University of Kerala, August 29 - 30, 2013.
- **K.S.S.Moosath**, "Curves and Surfaces", Government College, Tirur, October 11, 2013.2013.
- **K.S.S.Moosath**, "On basics of Differential Geometry", Government College, Chalakudy, October 8 , 2013.
- **K.S.S.Moosath**, "Linear Algebra", Government Engineering College, Sreekrishnapuram, October 31 -November 2, 2013.
- **K.S.S.Moosath**, "Banach Tarski Paradox Measure theoretic implications", K.K.T.M College, Kodungallur , November 19, 2013.
- **K.S.S.Moosath**, "Linear Algebra", Government Engineering College, Trissur, November 21, 2013.
- **K.S.S.Moosath**, "Method of Least Squares and its Geometry", Mohandas College of Engineering, Trivandrum, December 18, 2013.

- **K.S.S.Moosath**, "Hyperbolic Geometry The Disc Model", Aquinas College, Cochin, January 24, 2014.
- **K.S.S.Moosath**, "Several Variable Calculus", D. B. Pampa College, February 14, 2014.
- **K.S.S.Moosath**, "Inverse and Implicit Function Theorems and certain Applications", P M G College, Chalakudy, March 14, 2014.
- **K.S.S.Moosath**, "Differential Geometry", Little Flower College, Guruvayoor ,March 21- 22, 2014.
- **K. Sakthivel**, A Little Journey to the Land of Mathematics, DST Inspire Camp, Noorul Islam University, Kumaracovil, July 18, 2013.
- **K. Sakthivel**, On the Solvability of Stochastic Navier-Stokes Equations with Levy Noise, National Conference on Partial Differential Equations and Applications, Bharathiar University, Coimbatore, January 30-31, 2014.
- **Raju K. George**, Lecture on Octave and Machine Learning , May 25, 2013.
- **Raju K. George**, Talk on "Linear Algebra and Applications" at Palakkad Engineering College November 1, 2013.
- **Raju K. George**, MATLAB lecture at Attingal Engineering College , November 23, 2013.
- **Raju K. George,** As a resource person for the Faculty Development Programme at Govt. Engineering College, Sreekrishnapuram, Palakkad , January 9- 10, 2014.
- **Raju K. George**, Delivered Lectures in the three day workshop on "Research Methodology, Writing Practice, Language and Soft Skills" at SasthraBhavan, Pattom , February 4, 2014.
- **Raju K. George**, Delivered Lectures on "Basics of Analysis and Calculus" in the All Kerala three day Workshop on Foundations of Mathematics for UG/PG students , Devaswom Board Pampa College, Parumala ,February 11- 14, 2014.
- **Raju K. George**, NPTEL lectures , IISc Bangalore ,March 2- 9, 2014.
- **Sarvesh Kumar**: "Discontinuous finite volume element methods and its application to miscible displacement problems in porous media", in the second international Conference "Supercomputer Technologies of Mathematical Modeling", Yakutsk, Russia, July 8-11, 2013.
- **Sarvesh Kumar**, "Discontinuous finite volume methods" in the international conference on "Emerging trends in applied Mathematics", University of Calcutta, Kolkata, February 12-14, 2014.
- **Sarvesh Kumar,** "On finite volume element methods", International conference on "Mathematics and Engineering Sciences" Chitkara University, Himachal Pradesh, March 20-22, 2014.
- **Sumitra S. Nair,** Algorithms for Mining the Web, National Seminar on Computing and Communication, School of Computer Sciences, Mahatma Gandhi University, December 13, 2013.

- **Sumitra S. Nair**, Methods for Knowledge Extraction, Faculty Development Programme on Soft Computing, Department of Computer Science, Government Engineering College, Sreekrishnapuram, January 9- 11, 2014.
- **Apoorva Nagar**, "mRNA Translation: Traffic on Decaying Roads", International Centre for Theoretical Sciences, Bangalore, February 2, 2014.
- **J Solomon Ivan**, "Nonclassicality breaking is the same as entanglement breaking for bosonic Gaussian channels", AQIS conference, IMSc Chennai, August 25-30, 2013.
- **Kadhane U.,** "Probing electronic and vibrational structure of PAH using Photoelectron Spectroscopy: comparison between theory and experiment " 1st VAMDC India meeting at IPR, Ahmedabad, 2013.
- **Kadhane U.,** "Design, Fabrication and Test results of ESI-Mass Spectrometer at IIST, AMP Lab" SPARC workshop at TIFR, Mumbai , January 2014.
- **Murugesh S.**, Set of six lectures at the UGC refresher course for college teachers on Quantum Mechanics, Kannur University, Kannur, April 3-23, 2013.
- **Murugesh S.**, "SPINTRONICS: Spin-current induced data storage and manipulation", at INPHYNITT'14, NIT-Trichy, Tiruchirappalli, March 14, 2014.
- **Naveen Surendran**, "Kitaev Models", Workshop on Transport in Topological Insulators, Harish-Chandra Research Institute, Allahabad, July 9-13, 2013.
- **Naveen Surendran**, Set of six lectures at the UGC refresher course for college teachers on Quantum Mechanics, Kannur University, Kannur, April 3-23, 2013.
- **Pramod Gopinath**, "Hybrids with Graphene for Optical Limiting Applications", Annual Photonics Workshop on Nanophotonics, Cochin University of Science and Technology, Cochin, February 27-28, 2014.
- **Sudheesh Chethil**, Set of six lectures at the UGC refresher course for college teachers on Quantum Mechanics, Kannur University, Kannur, April 3-23, 2013.
- **Sudheesh Chethil**, "Postulates of Quantum Mechanics", Kannur University, April 10-12, 2013.
- **Rakesh Kumar Singh**, "Characterization of scattering using polarization fluctuations", Indian School of Mines, Dhanbad, November 18, 2013.

STUDENT ACTIVITIES

DHANAK 2013

The fifth edition of Dhanak, the annual cultural festival, organized from September 20-23, 2013 was inaugurated by Sri. Resul Pookutty, an Oscar awardee. Dhanak has come a long way from an intra collegiate cultural event to a nationwide fest. Dhanak 2013 brought together the students from leading institutes like IITs, NITs, ISERs and other universities and colleges to IIST to celebrate the arts- music, theatre, dance, poetry, film, painting, sculpture and more. Hundreds of students all over the country thronged the campus to experience the fun, excitement and camaraderie of Dhanak.

IIST organized the **Model United Nations** (MUN) along with Dhanak 2013 on the following agenda:

1. Space Militarization: Control and Management
2. Non-Proliferation Treaty: Future Prospects and Implementation

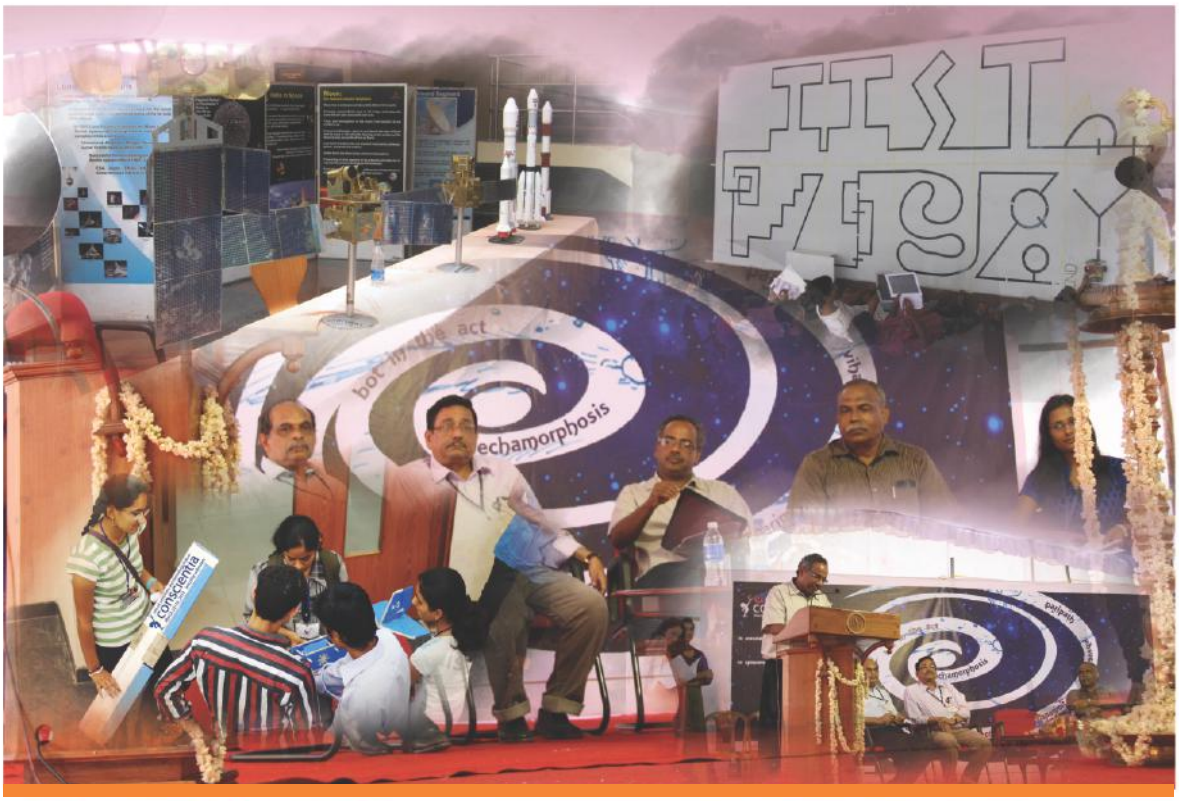
MUN is an academic endeavour initiated by the United Nations, and it aims to educate students about current events, topics in international relations, diplomacy and the agenda of United Nations. The event was judged by Prof. G. Gopakumar and Dr. C. A Josekutty from, University of Kerala.

CONSCIENTIA 2014

The fifth edition of Conscientia, the annual technical festival, was organized in IIST from February 28 to March 3, 2014. It hosted students from more than 400 colleges across the country. Conscientia also holds the distinction of being India's first Astronomy and Technical student festival. Conscientia 2014 was inaugurated by Mr. S Ramakrishnan, Director, Vikram Sarabhai Space Centre, Thiruvananthapuram in the IIST campus.

Conscientia 2014 comprised of various competitions related to the fields of mechanical engineering, electrical engineering, astronomy, and computer science that are not only educative but also compel the students to rack their brains and have fun doing it. Online events that have already started offer an exciting opportunity to win prizes from the comfort of the homes of the participants.

This time, there were three workshops during Conscientia, viz. Raspberry Pi, Quadcopter and Ethical Hacking as well as the Aerotrix Super Challenge, a National Remote Controlled Aircraft making competition conducted by Limca Book of Records record holder Aerotrix.



QC Fixion

QC Fixion is IIST's annual general quizzing extravaganza. It was held on 15th February 2014 at Mascot Hotel, with Prof. P Vijaya Kumar as the quiz master. With participants from Trivandram and Kochi, it was a success and a great curtain raiser for Conscientia 2014. The first place was bagged by the team of Harris A and Sreenathan from University College Kariavattom. The team of Ashad S. Nath and Nithin Vasanth from CET and CUSAT respectively were the runners up, followed by the team of Ananthu Ravi and Bunny Raju of CET, who were the second runners up.

RESEARCH SCHOLARS DAY

The third IIST Research Scholars' Day was held during December 16-17, 2013. Sri G Ravindranath, Director, IISU inaugurated the program. Dr. K S Dasgupta delivered the directors remarks. 'Surabhi', a journal of the Humanities department was released during the function.

The paper presentations were held under three categories, Engineering, Sciences and Humanities. Prof. G. Gopakumar, Vice Chancellor, Central University of Kerala, Kasargod gave the valedictory address. This year's research scholars' day had great response from the student community. Research scholars from various universities and IITs, and IIST research scholars participated in this three-day intellectual fiesta. Based on oral and poster presentations, best papers were chosen from each category by a panel of judges.

FRESHER'S DAY AT IIST

The second year IISTians organized a Fresher's Day to welcome the first year students to the campus on August 20, 2014. An orientation about the various clubs and an ice-breaking session followed.

CLUBS AT IIST

The major clubs functioning at IIST are

- Music club
- Dance club
- Quiz club
- Photography club
- Performance and digital arts club
- Food for Thought Forum
- Panacea – Club for Outreach Activities
- Aero Club
- Robotic club
- Eco club
- Astronomy Club

The different clubs meet regularly. Different programs are organized for the students under the auspice of these clubs.

Aeroclub Activities

Aeroclub Activities Considering the pan Indian and composite nature of the institute Independence day, Republic Day, Onam, Holi, Dusshera, RakshaBandan, Ganeeshotsav, Christmas, Id and Diwali were celebrated with all its zeal in IIST.

The Aeroclub is the newest addition in IIST formed on 4th November, 2013 with mentors Dr. Pradeep Kumar P and Dr. Praveen Krishna I R and 21 student members.

This club is intended to enrich the technical knowledge and expose them with practical applications especially in the field of aerospace engineering.

This club envisaged conducive platform to explore student's latent talents and also to enable them to come out with their innovative ideas and models.

Through organizing competitions under this club, it helps them to develop a sense of motivation and achievement as well as experience of teamwork.

- Workshop and competition held: Making & flying an Ornithopter
- Demonstrations: Boomerang, Water Rocket, RC helicopter, line follower, hydraulic arm
- Seminars: 2 sessions on Matlab introduction and image processing, F1 cars, IC engines, Basics of aerodynamics, working principles of helicopter, space fantasy (Mars one mission & space elevator). Moreover, 1 quiz session was also held.

Seeing the interests of the students and their intensive involvement, Aeroclub summer 2014 projects were proposed and students enthusiastically participated in it such as Glider fabrication, Solar absorption refrigeration, Stability of aircraft with ardu-pilot, design of 2-stage water rocket etc. An interaction of Aeroclub with our former Director Dr. B N Suresh was also organized.

ANNUAL SPORTS MEET

The Sports Council of IIST, where students will get ample opportunities to exhibit their prowess in athletics, sports and games. has organized the 7th Annual Sports Meet on 22nd February 2014 at LNCPE, Kariyavattom. Dr Pukazhenthi IFS, Director, Sports and youth Affairs inaugurated the program. There were events for students, faculty members, staff members and kids.

INDUCTION (ORIENTATION) PROGRAMME

A six day intensive induction program offered for the first semester students by the Department of Humanities. The objective of this workshop was to foster dynamic thinking essential in the current

global scenario. Some of the topics covered include Self Esteem and Motivation, Positive Attitude, Goal Setting, and Creativity. The program had classroom sessions and outdoor training activities.

NEURO-LINGUISTIC PROGRAMME (NLP)

The Department of Humanities organizes an NLP programme for the first semester students. It will be a three day orientation programme for individual groups of students. Last years, the session was handled by the "Mind Masters" fame Dr. Abraham Abraham. This programme is structured in such a way as to guide them properly through proper mind mapping, to identify their talents and hidden potentials, to understand their positives and negatives, and to improve their mental abilities and skills.

OTHER ACTIVITIES

CULTURAL AND NATIONAL FESTIVALS

Considering the pan Indian and composite nature of the institute Independence day, Republic Day, Onam, Holi, Dusshera, RakshaBandan, Ganeeshotsav, Christmas, Id and Diwali were celebrated with all its zeal in IIST.

ONAM CELEBRATIONS

The Vibrant and joyous festival of Onam was celebrated in IIST on September 13, 2013. It ensures a get together of students , faculty members and staff of IIST as a family and tries to inculcate a spirit of harmony and brotherhood. Her Highness Maharani Lakshmi Bhai, Princess of Travancore was the chief guest for the Onam celebrations. The program took off with the competition of intricately decorated athapookalam, followed by onam procession, onam message, exotic and traditional cultural programs, sumptuous onam feast and onam games.

WOMEN'S DAY

Women Cell of IIST celebrated the Women's day at 2.00 pm on Wednesday, 26th March, 2014. Dr. Tessy Thomas, Outstanding Scientist, Defence Research and Development Organization [DRDO] known as 'Missile Woman of India' interacted with the students about her life and work in DRDO.

OUTREACH ACTIVITIES

'Panacea' is the official committee for social outreach activities at IIST. The students of IIST have been regularly visiting orphanages such as "Nirmala Shishu Bhavan", "Divine Children's Home, Poojapura" and helping the students out there in their studies. Arranging blood donation campaign, visiting old age homes, donating clothes and food for the needy and poor in the society are also part of their activity. All festivals are being celebrated with the orphans and the elderly who are left alone in the old age homes. The students of IIST have been donating generously for these social cause and have also been arranging dresses, toys, bags and books for the kids in the orphanages and for the elderly in the different old age homes.

District Bala Shastra Congress

A two day workshop was conducted for the students of the different schools of Kerala on April 6-7, 2013. This was a joint initiative along with Kerala Shastra Sahitya Parishad with an objective of introducing the school students to the marvels behind great scientific achievements. The students were divided into different groups and each group was asked to work on a project guided by a faculty member. The programme was inaugurated by Prof K.N. Ninan, Emeritus Professor, IIST.

INFRASTRUCTURE

LABORATORY FACILITIES

Department of Aerospace Engineering

The following well equipped laboratories have been established which accommodates various student projects, internships, inter disciplinary projects etc.

- Advanced Propulsion, Laser Diagnostics & High Speed Flow Lab
- Aerodynamics Lab
- Aerospace Structures lab
- Computer Aided Design and Analysis Lab
- Engineering Drawing Lab
- Engineering Workshopb
- Flight Mechanics Lab
- Fluid Mechanics lab
- Heat transfer Lab
- Manufacturing Processes lab
- Metrology and Computer Aided Inspection lab
- Physical Metallurgy Lab
- Propulsion lab
- Strength of Materials lab
- Thermal Engineering lab

Major inclusions are, a Micro Raman Spectrometer to study stress-strain distribution at microscopic levels in composites. A Scanning Laser Doppler Vibrometer for typical wave propagation studies and modal analysis has been added in aerospace structures lab. High speed CMOS monochrome camera Phantom V-1210 capable of 12,000 frames per second at 1Mega pixels, mass flow meters of corioli and thermal type , HART compatible pressure transducers cum transmitters of various ranges , high speed data acquisition units have been added to the existing facilities of Thermal and propulsion laboratories. A separate facility have been set for calibration of temperature and pressure sensors. Currently a fluke- 150°C to 1200°C dry block calibrator and a low temperature Ametek dry block calibrator -90°C to 125°C with appropriate master RTD and Thermocouple are in place. A dewar flask for cryogenic fluid storage and transfer has been procured in the heat transfer lab. A shock tube having an operating pressure of 200 bar having a length of 12.8 m and inner diameter of 12.8 mm with associated pressure sensors and high speed data acquisition system have a set up and also a Dantec streamline pro constant temperature hot wire anemometer has been added in the aerodynamics laboratory. A deep drawing hydraulic press 100 T capacity have been installed and made operational in the Machine shop.

Department of Avionics

The department has excellent lab facilities and state-of -the-art software tools in various disciplines of electrical and electronics engineering. The following are the consolidated list of various teaching and research laboratories in the department:

- Analog Electronics Lab
- Basic Electrical Lab
- Basic Electronics Lab
- Computer Networks Lab
- Control System Lab
- Digital Communication Lab
- Digital Electronics Lab
- Digital Signal Processing Lab
- ECAD Lab
- Instrumentation and Measurement Lab
- Micro Processor Lab
- Navigation Systems and Sensor Lab
- Power Electronics Lab
- RF and Microwave Lab
- VLSI Lab
- Satellite Lab

Many of the Labs were further appended with many new equipments in the budget year:

Image processing and Computer Vision lab was developed with ten entry level workstation, thermal imaging camera, stereo vision camera, and 4 GigE vision high speed camera for various image processing related activities. This lab uses both open source platform as well as licensed application software such as MATLAB, visual studio profession 2012 for various lab related activities. Students use this facility to do their labs for courses like Digital image processing, Video processing, Pattern recognition, and computer vision. UG and PG students use this facility to do their final year projects in various areas like, image retrieval, speech processing, computer vision, image and video processing , soft computing and machine learning etc.

The RF and microwave laboratory was upgraded with Spectrum analyzer (10 Hz to 44 GHz), Microwave Signal Generator (10 MHz to 40 GHz), Vector Network Analyzer PNA-X (10 MHz to 43.5 GHz). Recently, a MITS FP21 Precision PCB Prototyping Machine has been procured which is capable of making minimum line separation of the order of 50 micron. The lab is also equipped with most of the leading 3D electromagnetic simulators like ANSYS HFSS, ANSYS Designer, Agilent ADS, CST Microwave Studio, FEKO.

Control Lab was upgraded with magnetic levitation, torsional system, mass-spring system and double inverted pendulum system during current budget year. This will help UG and PG students as well as research scholars of the department to design a controller and test the controller in loop studies.

Department of Chemistry

Laboratories in the Chemistry department include:

- General Chemistry Lab
- Organic and Inorganic Chemistry Lab
- Physical Chemistry Lab
- Material Characterisation Lab
- Polymer Processing Lab
- Chemical Engineering Lab
- Nano Science Lab

In the current academic year the laboratories were further expanded by including facilities like LOI analyser, High speed centrifuges, Inert atmosphere furnace, Contact angle goniometer, Two-probe electrical conductivity meter, Shore D hardness tester etc.

Department of Earth and Space Sciences

Currently the department has the following labs with state-of the-art facilities.

- Astronomy Lab
- Atmospheric Science Lab
- Geology Lab
- Remote Sensing Lab

Department of Humanities

Lab facilities of the department includes

- Audio Visual Lab is intended to
  - Enhance Communication Skills
  - Creating Content for various ISRO centres
  - Content Development and Materials Development for lectures
  - Recording of Interviews, talks of Dignitaries, etc
- Language lab: Developed an English language Software 'Huani' for IIST students

Department of Mathematics

Lab facilities include

- Programming lab
- High Performance Computing Lab equipped with 10 high-end work stations, Quad Core processor with 72 GB RAM, 4 GB NVIDIA Graphic Card Memory and 30 inch, LCD Monitor

Department of Physics

Currently the department has the following labs with state-of the-art facilities.

- Applied and Adaptive Optics
- Atomic and Molecular Physics
- Computational Physics
- General Physics
- Lasers and Photonics
- Modern Physics
- Optics
- Solid State Technology

The Labs acquired the following facilities :

Applied and Adaptive Optics:

CW Diode Pumped Laser, Autocorrelator for measuring pulse width of Femtosecond Laser system, High power He-Ne Laser systems, 1' Mounted Lens Arrays, Fiber Coupler.

Atomic and Molecular Physics: High resolution molecular ion mass spectrometer with energy analyzer, Pulsed OPO nanosecond laser with wavelength range between 220 and 2400 nm.

Computational Physics: Red Hat Workstation license and five Red Hat Desktop licenses for computers.

Solid State Technology: Thermal evaporator, High-temperature vacuum oven, Probe-station with Agilent parameter analyzer systems, X-ray fluorescence system, Superconductivity setup.

LIBRARY

The IIST Library has continued its support to teaching, learning and research by providing information resources through a carefully developed and balanced collection of books, journals and non-conventional resources and providing access to journals, data bases and documents.

During the report year, library started functioning in its permanent building in the campus. Library collection was organised in the area earmarked for the purpose. The reprographic facility along with binding facility was also shifted to the new building. With a view to develop a quality collection, a series of book exhibitions were arranged and a good number of books selected by faculty were added to collection. Compared to the previous year the book collection grew by 30% with newly added reference books, text books, and supplementary reading materials.

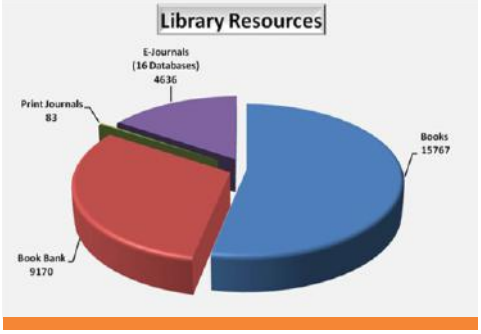
Throughout the year uninterrupted connectivity to 16 e-resources, 15 full text and one bibliographic, was maintained. These resources include ACM Digital Library, AIAA, AIP, American Meteorological Society, APS, Annual Reviews, ASME, Cambridge Online, IEEEXplore Digital Library, IOP, JSTOR, MathSciNet, Optic Infobase, Oxford Journals, Royal Society of Chemistry, and Science Direct. The usage of online resources has registered 20% increase in the report year.

In addition to the regular Library and Information services, Book Bank service was also being provided since 2011 to ensure basic study materials to IIST students on long term loan basis. The book bank system successfully continued in the report year with 19% increase in book collection compared to the previous year. The collection was enriched by more titles recommended by faculty. Students borrowed 7500 volumes from Book Bank during the year.

The library operations are fully computerised by using open source library application software KOHA. Online Public Access Catalogue (OPAC) and e-resources are accessible from anywhere in the campus 24 hours a day and 7 days a week. The library portal developed by using Drupal software enriched with new electronic resources. Subscription to web scale discovery tool Summon continued to facilitate usage of electronic resources.

All the print journals were renewed except 3 and 21 journals were subscribed newly making the total number of print journals 83.

The resource status of the Library is given in table .



The reprographic Facility, equipped with heavy duty high speed digital printers caters to the reprographic needs of students, faculty and others. More than 8.5 lakh copies were taken in the report year. Binding facility is another heavily used facility in IIST where 6437 volumes were bound in the report year. The Reprographic Facility and the Binding Facility together with the newly set up Graphic Design Facility cater to the publishing needs of the Institute making library the publishing hub of the Institute. In the report year major designing, printing and binding works realised in library includes annual report of the Institute, Surabhi - journal of arts and literature published by IIST, news letter, conference proceedings, materials for short term courses and workshops, and PhD theses. The last three issues of *Sounding Rocket: students' newspaper* were also printed in this Facility.

In order to promote the use of online resources, a series of Resource Awareness Programmes (REAP) were organised in the Library.

COMPUTER SYSTEMS GROUP (CSG)

Computer Systems Group manages the IT, computing, networking, telecommunication, multimedia and security-surveillance infrastructures of IIST. During the year 2013-14, IT services of CSG have expanded to 20 buildings that hosts more than 1800 computer terminals and mobile devices in the campus.

The **3TFLOPS high-performance computing (HPC) infrastructure** maintained by CSG as a common facility in IIST has been made available round-the-clock through remote-access within the campus network. Resident scholars have been facilitated physical-access to the work-stations by implementing fingerprint based access-control and surveillance systems. HPC system utilization in IIST has exceeded hardware limits, and proposal to procure latest processors, work-stations and storage to enhance these facilities to 30TFLOPS, is being prepared for technical and administrative approvals.

Server infrastructure consists of 60 hardware servers maintained by CSG, and has been expanded by setting up several additional virtual server-platforms to host new academic and scientific software. Proposal for procurement of additional server-hardware is being submitted for administrative approvals.

COWAA, the software for management information systems hosted at IIST, has been upgraded by replacing legacy Solaris Sybase Database server with the latest Linux version, as per guidelines issued by INSES, ISRO HQ

Canteen Material Management System, the software for canteen stock management, has been hosted in IIST and made operational.

iCampus, the software for academic management, is under in-house development at IIST, and its preliminary modules have been hosted and made operational at "*academics.iist.ac.in*".

Online-application portal for MTech 2014 Admissions have also been developed and hosted in the Internet at IIST.

Campus Network infrastructure has been expanded, and now has more than 90 network-switches linking all academic and administrative offices and facilities. The new Administration building was uplinked to the Campus Network, and network services were made available by CSG overnight.

COWAA network has been extended to include additional terminals in the new Administration building, and offices of the Heads of Academic departments.. Work to lay underground optical fiber cables (OFC) to replace existing wireless-links, and provisioning wired-LANs in all academic/research labs in the campus are also in progress.

Internet services using 1000Mbps high-speed link from National Knowledge Network (NKN) of the MHRD, Government of India, and other intranet web and eMail services have been made available round-the-clock for academic and administrative purposes through several LANs and wireless-networks maintained at all these locations. 10 Mbps Internet link from BSNL facilitates web-hosting and also backs-up the 1000Mbps link in case of network-outages.

Roaming wireless internet services have been introduced within the campus for use by about 1200 students and members of faculty. A six proxy-server bank has been implemented to manage daily internet data usage that peaks upto 126 Mbps.

Departmental Network Printing has been successfully implemented in few offices in IIST to share printers and reduce consumable costs.

Multi-centre online-counseling for BTech 2013 Admissions was facilitated by CSG, by setting up ad-hoc computer-networks at Ahmedabad, Bengaluru, Kolkata and Delhi, and linking each of these to IIST's server-facility in Thiruvananthapuram.

Network Surveillance Camera systems have been extended to all hostel buildings in IIST for improving security.

SOFTWARE SUPPORT GROUP (SSG)

Software Support Group (SSG) provides various software services and technical assistance in the institute.

a. Current Software Development:

Analysis, Design, Coding, Integration and Testing

1. ***i*-Campus**
2. **Campus Portal**

b. Additional Services:

Analysis, Design, Coding, Implementation, Maintenance and Enhancements

1. IIST Admission Software (M.Tech. and B.Tech.)
2. IIST Multi-center Counselling Software
3. ID Card Generation System
4. Hostel Management System
5. Online Student Feedback System
6. Grading System
7. ISRO Absorption Counselling Software
8. B.Tech. Result Publishing
9. Student Profile
10. Payment Information System
11. Student/Staff Directory
12. Student Payment Information System

c. Customized Applications:

Implementation, Maintenance and Enhancements

1. Canteen Management System
2. COWAA IIST MIS
3. Personal Information System

d. Software Support:

Technical and User support

1. COWAA Implementation in Administrative areas
2. COWAA Database support, backup and trouble shooting

e. Other Activities:

1. Website design for seminars/workshops
2. Record keeping and document preparation
3. Analyze and provide various reports and charts based on requirement
4. Help desk handling, email monitoring and sending sms as part of B.Tech. Admission
5. Uploading and version control of applications in server

HINDI SECTION AND OFFICIAL LANGUAGE IMPLEMENTATION COMMITTEE

IIST has a full fledged Hindi Section with a Hindi Officer, Junior Hindi Translator and Hindi Typist catering to the Constitutional and Statutory requirements regarding the Official Language, Hindi, but also create a conducive environment for the officials of the Institute to learn Hindi and work in Hindi. Official Language Implementation Committee has been constituted in the year 2012.

Major activities related to Policy Implementation

- Check Points have been established in order to ensure the compliance of Official Languages Act, 1963, Official Languages Rules, 1976 and relevant orders issued by the Dept. of Official Language time to time.
- Hindi language training has been started for the Employees and Officers who do not have working knowledge in Hindi . Hindi Stenography training has been started.
- Procured enough copies of the Compilation of Orders regarding the Use of Hindi, Hindi-English- Hindi Dictionaries and Scientific and Technical Glossaries for reference.
- The Institute has been enrolled as a Member Office of the Town Official Language Implementation Committee of Thiruvananthapuram.
- Incentive Scheme for doing Official work in Hindi has been introduced in the Institute.
- Degree Certificates and all other certificates such as certificate of participation/ certificate of merit are issued by the Institute in bilingual format (both Hindi and English) only.
- Four Hindi Workshops were conducted : on June 28, 2013 (for the Employees of Technical area), September 4, 2013(for the Officers of the Administrative areas), December 23-24, 2013(for the Employees of Administrative areas)and on March 14, 2014(for the Employees of Technical area)
- Four Quarterly meetings of the OLIC were conducted and four Quarterly Progress Reports regarding progressive use of Hindi in the Institute were sent to the Department of Official Language. Annual Report 2012-2013 was printed in Hindi.
- Standard forms (71 numbers) used in various Administrative and other Departments were bilingualised, visiting cards of 113 Officers, 182 name boards and 118 rubberstamps were prepared in bilingual format . Course Record, Answer Books, Grade Sheet and Provisional Certificate have been printed in bilingual form.
- Hindi Fortnight was organized in the first half of September, 2013 with competitions for both Students and Staff of IIST. World Hindi Day was also observed in 08 and 09 January, 2014.
- Two Jr. PAs were trained in Hindi Stenography
- Purchased 283 Hindi books worth Rs.25,064/- during the year.
- Prize distribution function were organized on October 18, 2013 to award merit certificates and cash awards to the winners of various Hindi Competitions. Certificates were also awarded in this function to the participants of the Hindi Workshops conducted during the year.
- Check Points have been established in order to ensure the compliance of Official Languages Act, 1963, Official Languages Rules, 1976 and relevant orders issued by the Dept. of Official Language time to time.
- Hindi language training has been started for the Employees and Officers who do not have working knowledge in Hindi .

CAMPUS DEVELOPMENT

The institute is functional in its new campus from August 2010 is planned in nearly 100 acres of land, which at the final stage of its completion will have four academic blocks, administrative block, library, hostels, student activity centre and dining areas.

Aerospace building, Physical Sciences block, 10 hostels, Administrative block and Library building are fully functional. Avionics block and Inter Disciplinary block are nearing completion.

OTHER FACILITIES

A fully residential institute, the campus is equipped to meet the needs of the students with all necessary amenities.

IIST Hostels: Eleven hostels functioning in the campus, built based on contemporary architecture cater to the residential accommodation of students. There are separate hostels for B.Tech, M.Tech. and Research Scholars and around 800 students reside in the campus .

Two well equipped canteens giving prime importance to health and hygiene provide food to the students. There are separate canteens for faculty members and staff.

A private run cafeteria provides vegetarian and non vegetarian food to all .

A stationery shop with essential commodities for students also functions as part of the cafeteria.

Medical facilities consists of a well equipped and twenty four hour functional Medical Centre with doctors and paramedical staff within the campus. A tie up also exists with one of the leading hospitals in the vicinity to provide medical services to the students. Accident Insurance coverage is available to all the students through this hospital. A well equipped ambulance is always available in the campus.

Health facilities in the form of most modern equipments have been provided in the gymnasium along with the services of trained instructors.

Sports facilities include indoor and out door badminton courts, volley ball and basket ball courts and cricket practice nets within the campus. A playground has been set up in the Institute property earmarked for residential complex well within the reach of the students. Two Physical Education Instructors have been engaged to support the students with training. The students are also supported to represent the institute in outside sports meets .

A private run book store functioning in the campus meets the needs of the students in utilizing the book grant of B. Tech. students along with their regular needs.

Banking facilities are provided by a branch of Union Bank of India with ATM facility in the campus.

Transport Division provides conveyance for faculty members and staff to and from the Institute. Students are provided transport to the city and back during holidays.

Vigilance and Security Division provides security support throughout the campus.

Civil and Maintenance Division meets the day to day maintenance work in IIST.

Audit Report
2013-2014

INDEPENDENT AUDITOR'S REPORT

We have audited the accompaning financial statements of M/S **INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY** (**Society**), **Valiamala PO, Trivandrum-695547** which comprise the Balance Sheet as at 31 March 2013, & the Income and Expenditure Statement for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation of these financial statements that give a true and fair view of the financial position & financial performance of the Institute in accordance with the Accounting Standards issued by The ICAI. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Institute's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Basis of Qualified Opinion:

1. *The balances in personal accounts are subject to confirmation by respective parties.*

2. *No provision for gratuity, pension and leave encashment has been provided in the accounts as specified in 6.d of Notes forming part of accounts.*

Qualified Opinion

In our opinion and to the best of our information and according to the explanations given to us, *subject to the above mentioned opinion*, the financial statements give the information required by the Act in the manner so required and give a true and fair view in conformity with the accounting principles generally accepted in India:

i. in the case of the balance sheet, of the state of affairs of the Institute as at 31 March 2013;
ii. in the case of the Income and Expenditure statement, of the deficit for the year ended on that date;

for ARSB & Associates
Chartered Accountants
(FRN: 009803S)

CA. P. Ananthakrishnan
Partner
Membership No: 201711

Date: October 8, 2014
Place: Trivandrum

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM

BALANCE SHEET AS AT 31ST MARCH, 2014

(Amount in Rs.)

	Schedule	As at 31.03.2014	As at 31.03.2013
CORPUS/CAPITAL FUND AND LIABILITIES			
Corpus / Capital Fund	1	2,322,181,547	2,161,668,507
Reserves and Surplus	2	2	0
Earmarked Funds / Endowment Funds	3	5,941,114	6,957,274
Long Term Liabilities and Provisions	4	25,815,086	20,538,011
Current Liabilities and Provisions	5	75,766,153	87,212,871
TOTAL		**2,429,703,902**	**2,276,376,663**
ASSETS			
Fixed Assets	6	2,076,607,597	1,797,666,737
Long Term Assets, Loans, Advances etc	7	93,363,171	165,391,057
Current Assets, Loans, Advances etc	8	259,733,134	313,318,869
TOTAL		**2,429,703,902**	**2,276,376,663**

Significant Accounting Policies & Notes on Accounts 19

As per our report of even date attached.

For ARSB & Associates
Chartered Accountants
FRN : 009803S

For and on behalf of
Indian Institute of Space Science and Technology (IIST)

CA. P.Ananthakrishnan
(Partner, Mem No. 201711)

Dr. K. S. Dasgupta
Director

R. Hari Prasad
Finance Officer

Place : Thiruvananthapuram
Date : 8th October, 2014

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2014

(Amount in Rs.)

	Schedule	2013-2014	2012-2013
INCOME			
Grants / Subsidies	9	260,000,000	190,081,560
Fees / Subscriptions	10	31,266,779	65,461,313
Interest Earned	11	11,921,605	526,809
Other Income	12	1,934,029	712,874
TOTAL (A)		**305,122,413**	**256,782,556**
EXPENDITURE			
Establishment Expenses - Regular	13	116,561,284	97,211,687
Establishment Expenses - Support Services	14	99,483,456	83,509,907
Academic & Other Student Expenses	15	112,513,623	92,049,359
Other Administrative Expenses	16	86,903,214	83,793,730
Depreciation	6	212,809,726	178,954,970
Deficit of Canteen Accounting Committee	17	2,071,547	1,150,336
Deficit of Student Activities Account	18	3,301	0
TOTAL (B)		**630,346,151**	**536,669,989**
Excess of Income over Expenditure (A-B)		(325,223,739)	(279,887,432)
Less : Prior period items		555,494	347,399,851
Extraordinary Item		3,707,727	0
Balance being Surplus/(Deficit) carried over to Corpus/Capital Fund		**(329,486,960)**	**(627,287,284)**
Significant Accounting Policies & Notes on Accounts	19		

As per our report of even date attached.

For ARSB & Associates
Chartered Accountants
FRN : 009803S

CA. P.Ananthakrishnan
(Partner, Mem No. 201711)

Place : Thiruvananthapuram
Date : 8th October, 2014

For and on behalf of
Indian Institute of Space Science and Technology (IIST)

Dr. K. S. Dasgupta
Director

R. Hari Prasad
Finance Officer

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM

SCHEDULES TO BALANCE SHEET AS AT 31ST MARCH, 2014

(Amount in Rs.)

	As at 31.03.2014	As at 31.03.2013
Schedule 1 :: CORPUS / CAPITAL FUND		
Total Grant Received - Capital and Revenue (A)		
Opening Balance of Total Grant Received	3,597,724,987	2,949,424,987
Add : Grant received during the year	750,000,000	648,300,000
	4,347,724,987	3,597,724,987
Total transfer to Revenue Grant (B)		
Opening Balance of amount transferred to Revenue Grant	584,672,442	394,590,882
Add : Transfer to Revenue Grant during the year	260,000,000	190,081,560
	844,672,442	584,672,442
Surplus / Deficit transferred from Income & Expenditure Account (C)		
Opening Balance of net income / (expenditure)	(851,384,038)	(224,096,754)
Add/Deduct : - Current Year Surplus / (Deficit)	(329,486,960)	(627,287,284)
	(1,180,870,998)	(851,384,038)
Balance at the year end (A - B + C)	**2,322,181,547**	**2,161,668,507**

Schedule 2 :: RESERVES AND SURPLUS		
Opening Balance	0	0
Additions during the year		
a) Land at Ponmudi - 20 acres	1	0
(nominal value assigned to land transferred by Government of Kerala free of cost)		
b) Land at Valiamala - 44.18928 acres	1	0
(nominal value assigned to land transferred by Government of Kerala free of cost)		
TOTAL	**2**	**0**

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM

SCHEDULES TO BALANCE SHEET AS AT 31ST MARCH, 2014

(Amount in Rs.)

	As at 31.03.2014	As at 31.03.2013
Schedule 4 :: LONG TERM LIABILITIES AND PROVISIONS		
a) Employee Provident Funds and Retirement Benefits		
- General Provident Fund	14,516,238	12,330,666
- Contributory Provident Fund	925,241	1,669,793
- New Pension Scheme	0	120,294
- Other Retirement Benefits	7,595,607	5,613,258
Sub Total (a)	**23,037,086**	**19,734,011**
b) Caution Deposit	2,778,000	804,000
- Caution Deposit from Students	**2,778,000**	804,000
Sub Total (b)		
TOTAL	**25,815,086**	**20,538,011**

Schedule 5 :: CURRENT LIABILITIES AND PROVISIONS		
a) Current Liabilities		
1 Sundry Creditors		
- For Goods		
Capital Goods	28,486,286	9,132,733
Revenue Expenditure	58,297	0
- For Services	15,954,070	6,239,806
2. Statutory Liabilities		
- Overdue	0	0
- Others	436,528	440,028
3. Other Current Liabilities		
- Interest refundable to DOS (received)	22,149,749	59,772,556
- Interest refundable to DOS (accrued)	1,545,544	7,485,128
- Others	7,135,679	4,142,620
Sub Total (a)	**75,766,153**	**87,212,871**
TOTAL	**75,766,153**	**87,212,871**

Schedule 7 :: LONG TERM ASSETS, LOANS, ADVANCES ETC		
a) Loans		
- Staff	1,830,342	1,779,146
b) Advances and other amounts on capital account recoverable in cash or in kind or for value to be received		
- Mobilisation Advance to SPCL	35,014,537	108,051,791
- Interim Advance to SPCL	54,300,000	54,300,000
c) Security Deposits	2,218,292	1,260,120
TOTAL	**93,363,171**	**165,391,057**

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM

SCHEDULES TO BALANCE SHEET AS AT 31ST MARCH, 2014

(Amount in Rs.)

	As at 31.03.2014	As at 31.03.2013
Schedule 8 :: CURRENT ASSETS, LOANS, ADVANCES ETC		
a) CURRENT ASSETS		
1. Inventories		
- Canteen inventories	635,636	574,288
2. Sundry Debtors		
- Debtors outstanding for a period exceeding six months	0	0
- Others	0	36,000
3. Cash Balances in hand	21,492	6,871
(including cheques/drafts and imprest)		
4. Bank Balances		
a) With Scheduled Banks		
- On Current Accounts	(5,186,822)	(35,588,728)
- On Deposit Accounts	213,046,043	294,916,060
- On Earmarked & Retirement Benefits Accounts	29,257,012	25,884,722
Sub Total (a)	**237,773,361**	**285,829,213**
b) Loans, Advances and Other Assets		
1. Advances and other amounts recoverable in cash or in kind or for value to be received		
- On Capital Account	377,889	2,919,278
- Prepayments	11,098,111	12,668,984
- Others	6,181,014	4,416,266
2. Income Accrued		
- On Bank Deposits	4,212,724	7,485,128
- On Other Deposits	90,035	0
Sub Total (b)	21,959,773	27,489,656
TOTAL (a+b)	**259,733,134**	**313,318,869**

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM

SCHEDULES TO BALANCE SHEET AS AT 31ST MARCH, 2014

Schedule 3 :: EARMARKED/ENDOWMENT FUNDS	FUND-WISE BREAK UP							TOTAL	
	Ministry of Earth & Space Science	ISRO-GBP - ABLN & C Project	DST Inspire - Dr.Sakthivel	DST Inspire - Dr. Mahesh	KSCSTE - Prathibha 2013	NCM - 2014	TIFR - 2014	2013-14	2012-13
a) Opening balance of the funds	(415,225)	4,500,000	1,144,877	1,312,397	0	0	0	6,542,049	10,033,826
b) Additions to the Fund									
i) Donation/Grants	0	0	0	1,691,680	284,625	373,375	250,000	2,599,680	3,800,000
ii) Income from Investment made on account of Funds	249,138	0	0	0	0	0	0	249,138	0
iii) Other additions (Specify Nature)	0	0	0	0	0	0	0	0	0
Total (a + b)	(166,087)	4,500,000	1,144,877	3,004,077	284,625	373,375	250,000	9,390,867	13,833,826
c) Utilisation/Expenditure towards objective of funds									
i) Capital Expenditure									
- Fixed Assets	2,970	0	69,200	216,568	0	0	0	288,738	5,791,745
- Others	0,	0	0	0	0	0	0	0	0
Sub Total	2,970	0	69,200	216,568	0	0	0	288,738	5,791,745
ii) Revenue Expenditure									
- Salaries, Wages & Allowance	0	0	980,439	1,109,680	0	0	0	2,090,119	1,179,355
- Rent/Consumables	0	0	35,787	158,451	0	0	0	194,238	0
- Other Administrative Expenses	5,123	0	35,000	147,029	338,694	363,595	215,466	1,104,907	77,277
Sub Total	5,123	0	1,051,226	1,415,160	338,694	363,595	215,466	3,389,264	1,256,632
iii) Fund Returned to the Principal Investigator	0	0	0	0	0	0	0	0	243,400
Total (c)	8,093	0	1,120,426	1,631,728	338,694	363,595	215,466	3,678,002	7,291,777
Net Balance payable as at the year-end (a+b-c)	**0**	**4,500,000**	**24,451**	**1,372,349**	**0**	**9,780**	**34,534**	**5,941,114**	**6,957,274**
Net Balance receivable as at the year-end (c-a-b)	**174,180**	**0**	**0**	**0**	**54,069**	**0**	**0**	**228,249**	**415,225**

Note :Classified under Current Assets under Sch 8

Schedule 6 :: FIXED ASSETS (Amount in Rs.)

Particulars	Gross Block (at cost) as at 01.4.2013	Additions		Transfer to Installed from Uninstalled	Impairments	Deletions	Gross Block (at cost) as at 31.03.2014	Rate of Depreciation					Net Block as at 31.3.2014	Net Block as at 01.04.2013
		Installed	Under Installation						As at	For the year	Deletions / Impairments	As at 31.3.2014		
Land	33,252,000	2	0	0	0	0	33,252,002	0.00%	0	0	0	0	33,252,002	33,252,000
Building	938,085,153	296,225,302	0	0	0	0	1,234,310,455	10.00%	179,580,496	105,472,998	0	285,053,494	949,256,961	758,504,657
Plant & Machinery	411,983,363	120,385,186	0	0	0	91,790	532,276,759	15.00%	119,739,000	61,887,247	43,876	181,582,369	350,694,390	292,244,363
Furniture & Fittings	129,554,832	15,436,958	0	0	0	0	144,991,790	10.00%	35,467,251	10,952,454	0	46,419,705	98,572,085	94,087,581
Ambulance	880,644	0	0	0	0	0	880,644	15.00%	132,097	112,282	0	244,379	636,265	748,547
Motor Cars & Bikes	11,262,430	0	0	0	0	0	11,262,430	15.00%	5,005,220	938,582	0	5,943,802	5,318,628	6,257,210
Motor Buses & Truck	6,129,906	0	0	0	0	0	6,129,906	15.00%	2,459,484	550,563	0	3,010,047	3,119,859	3,670,422
Computers	77,878,789	310,662	0	0	0	0	78,189,451	60.00%	70,333,157	4,713,776	0	75,046,933	3,142,518	7,545,632
Software	30,089,401	16,758,540	0	0	540,000	0	46,307,941	60.00%	26,943,245	11,922,081	505,440	38,359,886	7,948,055	3,146,156
Library Books	33,258,406	12,793,924	0	0	0	0	46,052,330	60.00%	27,295,286	11,254,226	0	38,549,512	7,502,818	5,963,120
Campus networking	23,210,541	3,015,595	0	0	0	0	26,226,136	60.00%	20,469,446	3,454,014	0	23,923,460	2,302,676	2,741,095
Canteen Equipments	15,228,933	869,114	0	0	0	0	16,098,047	15.00%	5,754,681	1,551,505	0	7,306,186	8,791,861	9,474,252
Soft Furnishing	1,043,023	0	0	0	0	0	1,043,023	100.00%	1,043,023	0		1,043,023	0	0
Uninstalled Assets									0					
Plant & Machinery	24,847,553	0	13,577,635	20,149,314	0	0	18,275,874	0.00%	0	0	0	0	18,275,874	24,847,553
Furniture & Fittings	1,549,329	0	0	1,549,329	0	0	0	0.00%	494,222,386	0	0	0	0	1,549,329
TOTAL	**1,738,254,303**	**465,795,283**	**13,577,635**	**21,698,643**	**540,000**	**91,790**	**2,195,296,788**		**315,267,416**	**212,809,72**	**549,316**	**706,482,796**	**1,488,813,992**	**1,244,031,917**
Previous Year		**598,621,43**	**26,396,882**	**0**	**0**	**0**			**0**		**0**	**494,222,386**		**797,968,570**
Capital Work in			**339,162,18**	**305,003,39**		**0**							**1,244,031,917**	

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT
FOR THE YEAR ENDED 31ST MARCH, 2014

(Amount in Rs.)

	2013-14	2012-13
Schedule 9 :: GRANTS / SUBSIDIES (irrevocable Grants & Subsidies Recovered)		
1. Central Government	260,000,000	190,081,560
TOTAL	**260,000,000**	**190,081,560**
Schedule 10 :: FEES / SUBSCRIPTIONS		
1. Entrance Fees	6,942,392	59,298,186
2. Annual Fees/Subscriptions	24,324,387	6,163,127
TOTAL	**31,266,779**	**65,461,313**
Schedule 11 :: INTEREST EARNED		
1. On Term Deposit		
a) With Scheduled Banks	11,831,570	526,809
b) Others	90,035	0
2. On Loans / Advances		
a) Employee/Staff	0	0
TOTAL	**11,921,605**	**526,809**
Schedule 12 :: OTHER INCOME		
1. Rent Receipts	546,937	488,167
2. Sale of Tender Forms	139,013	104,902
3. Miscellaneous Income	1,248,079	119,805
TOTAL	**1,934,029**	**712,874**
Schedule 13 :: ESTABLISHMENT EXPENSES - REGULAR		
1. Salaries & Allowances	106,070,031	89,237,715
2. Contribution to NPS	5,896,929	4,364,809
3. Contribution to CPF	87,424	167,658
4. Medical Expense- Staff	2,572,275	1,679,368
5. Expense on Employees Retirement & Terminal Benefits	706,400	628,000
6. Interest on PF Contribution	1,198,355	1,027,067
7. Staff Welfare Expense	0	3,659
8. Staff Training Expense	29,870	103,411
TOTAL	**116,561,284**	**97,211,687**

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2014

(Amount in Rs.)

	2013-14	2012-13
Schedule 14 :: ESTABLISHMENT EXPENSES - SUPPORT SERVICES		
1. Consultancy & Manpower Charges	73,757,637	63,147,728
2. Remuneration to Contract Employees	25,725,819	20,362,179
TOTAL	**99,483,456**	**83,509,907**
Schedule 15 :: ACADEMIC & OTHER STUDENT EXPENSES		
1. Admission Expense	15,997,560	22,328,293
2. Assistanceship to Students	31,199,991	15,963,919
3. Library Services	24,850,070	23,230,407
4. Academic Expense	29,960,150	22,936,726
5.Supplies & Materials	9,156,916	6,688,542
6.Student Activities Expense	1,348,936	895,472
TOTAL	**85,360,817**	**92,049,359**
Schedule 16 :: OTHER ADMINISTRATIVE EXPENSES		
1. Maintenance & Upkeep		
Repairs & Maintenance	3,082,449	11,197,917
Repairs & Maintenance - CMD	16,049,212	0
House Keeping Expense	899,083	1,285,489
Sub Total (a)	**12,483,406**	**12,483,406**
2. Professional Charges		
Audit Fees	183,146	44,943
Legal Expense	107,219	240,636
Sub Total (b)	**290,365**	**285,579**
3. Administrative Expenses - Others		
Vehicle Operating Expense	22,436,023	25,258,042
Electricity & Water Charges	17,744,087	15,925,290
Travelling Expense	5,647,437	6,357,470
Research & Development Expense	2,942,422	1,796,055
Printing & Stationery	3,873,354	4,669,539
Advertisement & Publicity	1,074,197	1,407,754
Hospitality Expense	4,754,131	4,082,770
Telephone & Internet Expense	2,899,985	3,165,585
Office Expense	2,880,007	1,960,779
Recruitment Expense	2,301,627	6,229,807
Security Expense - Others	13,711	53,505
Bank Charges	15,124	18,149
Compensation Paid	0	100,000
Sub Total (c)	**66,582,105**	**71,024,745**
TOTAL	**86,903,214**	**83,793,730**

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2014

(Amount in Rs.)

	2013-14	2012-13
Schedule 17 :: Income and Expenditure Account of the Canteen Accounting Committee		
INCOME		
Students Assistanceship (BTech)	10,037,145	12,111,520
Canteen Mess Collection (Contract)	1,765,175	1,377,875
Canteen Mess Collection (Misc)	3,635,088	2,521,166
Canteen Mess Collection (MTech Students)	1,267,200	465,600
Canteen Mess collection (Staff)	629,355	350,042
Canteen Mess Collection (Students)	881,740	834,860
Interest on Deposit	45,873	34,171
Increase in Closing Stock	61,348	29,502
TOTAL (A)	**18,322,924**	**17,724,736**
EXPENDITURE		
Canteen Expenses-Material	20,394,471	18,875,072
TOTAL (B)	**20,394,471**	**18,875,072**
Excess of Income over Expenditure (A-B)	(2,071,547)	(1,150,336)
Less : Prior period items	0	-544,786
Balance being Surplus/(Deficit) carried over to Income and Expenditure Account	**-2,071,547**	**-605,550**

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2014

(Amount in Rs.)

	2013-14
Schedule 18 :: Income and Expenditure Account of the Canteen Accounting Committee	
INCOME	
Workshop Income	504,700
Sponsorship Received	679,620
Accomodation Fees	152,600
Sale of Tshirts	77,000
Miscellaneous Income	11,000
TOTAL (A)	**1,424,920**
EXPENDITURE	
Logistics and Other Expenses	558,070
Workshop Payments	399,999
Prize Money	302,000
Publicity	111,608
Travel Expenses	56,544
TOTAL (B)	**1,428,221**
Excess of Income over Expenditure (A-B)	(3,301)
Less : Prior period items	0
Balance being Surplus/(Deficit) carried over to Income and Expenditure Account	**-3,301**

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM
RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31ST MARCH, 2014

(Amount in Rs.)

Receipt	2013-14	2012-13
I. Opening Balance		
a.Cash and DD's in hand	6,871	6,625
b.Bank Balances		
In current accounts	35,588,728	54,406,747
In deposit accounts	294,916,060	782,904,075
In earmarked/retirement benefits accounts	25,884,722	13,776,232
II.Grants Received		
a.From Government of India	750,000,000	648,300,000
III. Interest Received		
a.On Bank Deposits	9,164,390	526,809
b. On Other Deposits	0	0
c. Loans, Advances etc.	0	0
IV. Other Income		
a.Entrance Fees	6,942,392	127,250
b.Annual Fees/Subscriptions	24,879,712	6,456,252
c.Other Income	1,822,610	898,876
V. Any other receipts		
a.Scholarship Received	0	12,000
b.Security Deposits received	1,561,099	1,789,650
c.Earnest Money Deposits received	1,313,766	1,269,120
d.Performance Guarantee	2,089,537	1,203,364
e.Advance for Research & Seminars	2,599,680	3,800,000
f. Interest (CTCZ funds)	249,138	0
g.Caution Deposit from Students	1,974,000	390,000
h.Security Deposit (Asset)	7,898	0
i. Stale cheques	197,088	1,080
j. Bond Amount - Payable to DOS	1,000,000	48,463
k.Canteen Accounting Committee	18,103,176	17,853,634
i. Vaccine Recovery	1,245	4,980
m.Interest received and payable to DOS	22,149,749	0
n.Contingency advance	65,801	0
o.Mediclaim recovery	241,200	0
p.Student Activities Account	1,286,100	0

Payments	2013-14	2012-13
I. Expenses		
a.Establishment Expenses - Regular		
Salaries & Allowances (admin & faculty)	104,111,284	82,794,976
Contribution to NPS	5,896,929	4,364,809
Contribution to CPF	87,424	167,658
Medical Expense- Staff	2,285,099	1,699,123
Employees Retirement Benefits	706,400	628,000
Interest on PF Contribution	124,338	0
Staff Welfare Expense	0	3,659
Staff Training Expenses	19,970	113,311
b.Establishment Expenses - Support Services		
Consultancy & Manpower Charges	69,243,357	61,860,783
Remuneration to Contract Employees	25,729,326	20,358,672
c. Academic & Other Student Expenses		
Admission Expense	16,023,214	22,997,254
Assistanceship to Students	29,955,042	15,823,526
Library Services	25,096,599	17,092,893
Academic Expense	29,411,298	24,565,205
Supplies & Materials	8,721,392	6,896,494
Student Activities Expense	1,377,736	933,306
d. Other Administrative Expenses		
Repairs & Maintenance	2,990,591	11,812,308
Repairs & Maintenance - CMD	15,779,586	0
House Keeping Expense	916,684	1,341,817
Audit Fees	183,146	95,505
Legal Expense	117,219	230,636
Vehicle Operating Expense	19,792,961	25,722,383
Electricity & Water Charges	18,189,265	16,020,726
Travelling Expense	5,055,688	6,203,684
Research & Development Expense	2,830,826	2,288,375
Printing & Stationery	3,805,981	4,942,223
Advertisement & Publicity	1,210,316	2,304,005
Hospitality Expense	4,651,721	4,576,414
Telephone & Internet Expense	2,994,886	3,013,923
Office Expense	2,646,136	2,220,020
Recruitment Expense	2,311,941	6,220,198
Security Expense - Others	13,711	66,825
Bank Charges	15,124	18,149
Compensation Paid	0	100,000
II. Payments made against funds for various projects		
Ministry of Earth & Space Science (CTCZ)	8,968	5,704,776
DST Inspire - Dr. Sakthivel	1,120,426	755,123
DST Inspire - Dr. Mahesh	1,632,638	586,693
KSCSTE - Prathibha 2013	338,694	0
NCM - 2014	363,595	0
TIFR - 2014	215,466	0
III. Expenditure on Fixed Assets & Capital Work-in-Progress		
a.Purchase of Fixed Assets	143,132,208	226,579,520
b.Expenditure on Capital Work-in-progress	257,587,043	380,124,787

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM
RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31ST MARCH, 2014

(Amount in Rs.)

Receipt	2013-14	2012-13
Total	**1,130,867,506**	**1,533,775,157**

Payments	2013-14	2012-13
IV. Other Payments		
Research fund refunded	0	243,400
Scholarship paid to students	2,000	34,000
Security Deposits (Asset) paid	966,070	1,000
Security Deposits repaid to Contractors	1,221,549	391,356
Earnest Money Deposits repaid	1,197,611	1,141,097
Performance Guarantee	1,143,794	1,358,138
Decrease in TDS & VAT Payable	3,500	676,768
Contingency Advance to Staff	0	109,731
Advances - Branches	296,342	0
Loans to staff	51,196	745,279
Canteen Accounting Committee	20,946,869	17,961,494
Sundry debtors	160,046	52,773
Interest repayment to DOS	59,772,556	264,613,437
Stale Cheques - paid	5,000	0
Student Activities Account	1,269,020	0
V. Closing Balances		
a.Cash in hand	21,492	6,871
b.Bank Balances		
In current accounts	(5,186,822)	(35,588,728)
In deposit accounts	213,046,043	294,916,060
In earmarked/retirement benefits account	29,257,012	25,884,722
Total	**1,130,867,506**	**1,533,775,157**

Significant Accounting Policies & Notes on Accounts 19

As per our report of even date attached.

For ARSB & Associates
Chartered Accountants
FRN : 009803S

CA. P.Ananthakrishnan
(Partner, Mem No. 201711)

Place : Thiruvananthapuram
Date : 8th October, 2014

For and on behalf of
Indian Institute of Space Science and Technology (IIST)

Dr. K. S. Dasgupta
Director

R. Hari Prasad
Finance Officer

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM

Schedule 19 :: SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS FOR THE YEAR ENDED 31ST MARCH, 2014

A. Significant Accounting Policies

1. Basis of Accounting

The financial statements have been prepared in accordance with the Generally Accepted Accounting Principles in India (Indian GAAP) and are prepared on accrual basis under the historical cost convention except those referred to in point no. 5b of accounting policies. The accounting policies adopted in the preparation of the financial statements are consistent with those followed in the previous year.

2. Use of estimates

The preparation of the financial statements in conformity with Indian GAAP requires the Management to make estimates and assumptions considered in the reported amounts of assets and liabilities (including contingent liabilities) and the reported income and expenses during the year. The Management believes that the estimates used in preparation of the financial statements are prudent and reasonable. Future results could differ due to these estimates and the differences between the actual results and the estimates are recognized in the periods in which the results are known / materialize.

3. Inventories

The inventories represents canteen inventories and is valued at lower of cost or net realizable value as certified by the Canteen Manager.

4. Depreciation

a. Depreciation has been provided on the written down value method as per the rates prescribed in the Income Tax Act, 1961.
b. Depreciation on assets acquired in a particular year is provided for the whole year irrespective of date of addition.
c. Depreciation has not been charged on capital work in progress and on those assets under installation as on 31.03.2013.

5. Revenue Recognition

a. Grant in aid received from the Department of Space, is accounted on accrual basis. Out of the total grant received, the amount provided in the budget towards revenue is treated as Revenue Grant / income over the period necessary to match them with the costs for which they are intended to compensate, on a systematic basis. The remaining grant forms part of the Corpus Fund along with other grant received.
b. Tuition fees, fines and other recoveries from underperforming students (as per the policy of the institute) are accounted on cash basis.
c. Interest income is accounted on accrual basis. Interest on deposits created out of grant received is not recognized as income and is shown as a liability payable to Department to Space.

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM

Schedule 19 :: SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS FOR THE YEAR ENDED 31ST MARCH, 2014

6. Fixed Assets

a. Land - Land at Ponmudi has been valued at cost of acquisition. The present activity of the Institute is in the Valiamala campus which has been handed over by LPSC vide letter no. VSSC/CMG/2010 dated 05.08.2010, and has been measured at 53.43 acres. No value has been provided in the books. Land received free of cost from Government of Kerala has been shown at a nominal value of Re. 1/- (*for each property*) in the books.

b. Building Construction of buildings is still in progress. Buildings, the construction of which are more than 90% complete, certified by the Construction and Maintenance Division and which have been put into use have been transferred from Capital Work-in-Progress to Buildings based on actual payments made.

c. Plant and Machinery It mainly constitutes Laboratory equipment, Office Equipment, Electricals & Electronics and other Machinery.

d. Buildings and other Fixed Assets are carried at cost less accumulated depreciation. Cost comprises the purchase price or acquisition cost, installation charges and any attributable cost of bringing the assets to working condition for its intended use. Exchange differences arising on restatement / settlement of foreign currency payables relating to acquisition of depreciable fixed assets are adjusted to the cost of the respective assets and depreciated over the remaining useful life of such assets.

e. Capital Work-in-Progress pertains to construction in progress at Valiamala and Ponmudi.

f. Assets that have been delivered to IIST up to 31.03.2013 have been recognized as assets but depreciation has not been charged on Assets under installation.

7. Foreign currency transactions

Foreign currency monetary items outstanding at the Balance Sheet date are restated at the year-end rates. Non-monetary items are carried at historical cost. The exchange differences arising on restatement / settlement of long-term foreign currency monetary items are capitalised as part of the depreciable fixed assets to which the monetary item relates and depreciated over the remaining useful life of such assets.

8. Earmarked / Endowment Funds

Earmarked / Endowment Funds mainly include external agency funding received for research & development purpose and conduct of seminars & workshops. Value of assets procured out of such funds for the purpose specified have gone to reduce the value of Fund in hand and have not been treated as an asset of the Institute as the ownership of the same vests with the funding agency. From 2013-14, Earmarked / Endowment Funds are held in a separate Current Account linked to Term Deposits. The interest received in the account during the year has been taken as the Institutes Income. Interest claims in the future, if any, from the disbursing parties of such Earmarked / Endowment Funds will be met at the time of the claim based on the deposit rates prevailing during the period of holding of the particular Fund.

9. Employee Benefits

Employee benefits include General Provident Fund (GPF), Contributory Provident Fund (CPF), New Pension Scheme (NPS), and Group Insurance Scheme (GIS). The Institute's contribution to CPF and NPS are considered as defined contribution plans and are charged as an expense as they fall due based on the amount of contribution required to be made.

Schedule 19 :: SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS FOR THE YEAR ENDED 31ST MARCH, 2014

GPF and CPF funds are maintained separately by the Institute in Savings Bank Account and Flexi deposits. Retirement Benefits consisting of pension fund, gratuity and leave encashment received from previous employers of employees joining from other Government organizations have been maintained separately in a Current Account and linked Term Deposits.

10. Taxes on income

Being a non-profit institution existing solely for education purposes and being wholly financed by the Government of India, the income of the Institute is exempt under section 10[(23C)][iiiab] of the Income Tax Act, 1961.

11. Research and Development Expenses

Revenue expenditure pertaining to research is charged to the Income and Expenditure Account. Fixed assets utilized for research and development are capitalized and depreciated in accordance with the policies stated for Fixed Assets.

12. Provisions and Contingencies

A provision is recognised when the Institute has a present obligation as a result of past events and it is probable that an outflow of resources will be required to settle the obligation in respect of which a reliable estimate can be made. Provisions (excluding retirement benefits) are not discounted to their present value and are determined based on the best estimate required to settle the obligation at the Balance Sheet date. These are reviewed at each Balance Sheet date and adjusted to reflect the current best estimates.

13. Impairment of Assets

The carrying values of assets / cash generating units at each Balance Sheet date are reviewed for impairment. If any indication of impairment exists, the recoverable amount of such assets is estimated and impairment is recognised, if the carrying amount of these assets exceeds their recoverable amount. The recoverable amount is the greater of the net selling price and their value in use. Value in use is arrived at by discounting the future cash flows to their present value based on an appropriate discount factor. When there is indication that an impairment loss recognised for an asset in earlier accounting periods no longer exists or may have decreased, such reversal of impairment loss is recognised in the Statement of Income and Expenditure, except in case of revalued assets.

B. Notes to the Accounts

1. Depreciation

Assets are depreciated at written down value method as per rates prescribed in the Income Tax Act, 1961 as recommended by the Office of the Principal Director of Audit, Scientific Departments, Bangalore.

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM

Schedule 19 :: SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS FOR THE YEAR ENDED 31ST MARCH, 2014

2. Revenue

a. Out of Grant of Rs. 75,00,00,000/- received during 2013-14, Rs. 26,00,00,000/- received specifically towards revenue expenditure has been transferred to Revenue Grant.

b. Interest earned (actually received) on funds from grant-in-aid maintained in fixed deposits is refundable to DOS. Interest of Rs. 2,21,49,749/- (excluding the interest received on the Provident Fund Accounts and Earmarked Funds) has been actually received during 2013-14 and the same has been shown as refundable to DOS.

c. Provision for interest accrued as on 31.03.2014 on deposits maintained with SBI, Valiamala has not been made due to lack of information from SBI, Valiamala.

d. Canteen Accounting Committee accounts is maintained separately and the deficit is recognised in the Income and Expenditure Account.

e. The Institute maintains a separate account exclusively for students' activities which was operated by the Dean (Students Activities) and the Registrar. This account did not form part of the Institutes accounts and amounts transferred to this account were treated as revenue expenditure of the Institute. From February 2014, the Student Activities Account has been made a part of the Institutes Account and the deficit is recognised in the Income and Expenditure Account.

3. Fixed Assets

a. Land There is a stay by the Honorable High Court of Kerala on carrying out construction activities on a part of land (approximately 80 acres) purchased at Ponmudi in Trivandrum District for setting up the Institute. Over and above this 80 acres, approximately 20 acres of land at Ponmudi and 44.18928 acres at Valiamala has been transferred by the Government of Kerala free of cost in December 2007 and April 2009 respectively. These two properties have been brought into the books of accounts in 2013-14 by assigning a nominal value of Re. 1/- each.

b. Capital Work-in-Progress includes a sum of Rs. 2,92,10,277/- towards project management and consultancy charges and service tax of Rs. 6,02,47,147/-, both pending for appropriation to fixed assets on final completion of all buildings.

c. An amount of Rs. 37,07,727/- incurred towards partial construction of a helipad at Ponmudi during 2011-12 was accounted under Capital Work-in-Progress till 31.03.2013. As the project has not been completed and has subsequently been terminated, the amount incurred has been written off during 2013-14 and has been disclosed under Extraordinary Items in the Income and Expenditure Account.

d. Academic Software worth Rs. 5,40,000/-, purchased in 2010-11, is no longer in use and the same has been written off during 2013-14.

e. An amount of Rs. 1,82,75,874/- pertaining to assets that have been delivered to IIST before 31.03.2014 but under installation as on 31.03.2014 have been accounted as fixed assets & depreciation has not been charged on the same.

4. Employee Benefits

a. Employer and Employee contribution to New Pension Scheme is being transferred to NSDL. Interest earned till date of transfer has also been deposited to the respective employee NPS

b. The Institute has entered into a Group Insurance Scheme (GIS) agreement with Life Insurance Corporation of India from 2011-12 onwards.

c. Provision for interest on PF Contribution at the rates prescribed have been made. Interest earned on GPF and CPF funds parked in Savings Accounts (linked to flexi deposits) have been accounted as income. An amount of Rs. 15,178/- being interest received over and above the interest liability on GPF accounts and Rs. 2,330/- towards interest liability on CPF accounts is being retained in the respective PF accounts. An additional amount of Rs. 1,07,486/- received as interest in the CPF Bank Account pertains to the CPF balance of Dr. N. Padmanabhan transferred to SAC, Ahmedabad in 2013-14. The transfer was effected from the funds held in IIST's routine Curent Account linked to CLTD's. Thus, the amount of Rs. 1,07,486/- forms part of the Interest Income refundable to DOS and has been accounted as such. Rs.1,07,486/- is to be transferred from the CPF Bank Account to IIST's routine Current Account and the same is being done in 2014-15.

d. Provision for liability in respect of gratuity, pension and leave encashment has not been made. Permission from DOS for creation & maintenance of a separate pension fund has been received during 2013-14. An amount of Rs. 590.61 lakhs has been estimated by Life Insurance Corporation as the liability on 31.03.2014 towards the gratuity, pension and leave encashment of the 21 members of the General Provident Fund. The actuarial valuation amount of LIC will be brought into the books of accounts on obtaining necessary approval for the same from the Board of Management. In addition, the retirement benefits from the previous employers for the members governed under the GPF has not been received in all cases

5. Interest on Earmarked / Endowment Funds

During 2013-14, the Ministry of Earth and Space Sciences (MOES) has claimed interest for the period that the Fund allocated by the Ministry for the CTCZ project was held at IIST. An amount of Rs. 2,49,138/- has been allocated as interest based on deposit rates for the respective years. As interest income in the years prior to 2013-14 was transferred to DOS, the amount of Rs. 2,49,138/- allocated to MOES has gone to reduce the interest income refundable to DOS for 2013-14.

6. Prior Period Item

Details of prior period items are as given below :-

Details	Prior period income
EJournals	1,91,399.00
Seminar expenses	25,654.00
Group Insurance Scheme	360.00
Repairs & Maintenance (CMD)	5,59,586.00
Office Expense	1,535.00
Supplies & Materials	2,102.00
Total (A)	**7,80,636.00**

Schedule 19 :: SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS FOR THE YEAR ENDED 31ST MARCH, 2014

Details	Prior period income
Advertising charge (DST)	9,354.00
Electricity Charges (SD)	11,000.00
Seminar Expense	26,130.00
Salaries & Allowances	1,78,658.00
Total (B)	**2,25,142.00**

Net prior period item (A-B) = Rs. 5,55,494.00

7. Academic Expenses

Academic Expenses mainly include expenses towards Lectures for students, Project & Internship expenses, stipend paid to Ph.D students and expenses incurred on Seminars, Symposiums and Conferences.

8. Admission Expenses

Admission expenses include expenses incurred towards B.Tech, M.Tech and PhD admissions. The same have been accounted on accrual basis and date of conduct of exam has not been considered for accounting of the same as has been adopted for accounting of admission revenue.

9. Assistanceship to Students

As per the approval of The Chairman, Board of Management-IIST / Secretary, DOS vide Letter No. PP & PM : IIST : 09-10 dated July 17th, 2009, the B. Tech students of the Institute are entitled for an assistanceship of Rs. 49,000/- for each semester towards Statutory Semester Fee, Student Amenity Fee, Hostel & Dining, Establishment charges and Medical cover. Though this amount is not directly disbursed to the students, expenditure is incurred on their behalf under these heads by the Institute. From the academic year 2013-14, the assistanceship amount of Rs. 46,000/- (exclusive of book grant) for one semester has been disbursed to eligible students based on the performance of the previous semester. The assistanceship amount disbursed has been remitted back by the students to the Institute and expenditure corresponding to the assistanceship so received (under Hostel, Dining & Medical cover) has been set off against the assistanceship amount.

10. Supplies and Materials

Supplies and Materials mostly consist of lab consumables.

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM
Schedule 19 :: SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS FOR THE YEAR ENDED 31ST MARCH, 2014

11. Bank balances

The negative balance in the SBI and UBI Current Accounts represents the cheques issued on the closing date of the financial year which are not presented for payment. The Institute has sufficient balance to cover these cheques issued in the linked deposit accounts maintained with SBI and the flexi deposits maintained with UBI. Hence, the negative balance does not represent any Overdraft.

12. Format of accounts

The accounts of the Institute are prepared as per proforma suggested by the Office of the Principal Director of Audit, Scientific Departments, Bangalore.

13. Insurance

The Institute being an autonomous body under the Department of Space (DOS), it is governed by the rules and regulations as applicable to DOS. As per the "Book of Financial Powers" prescribed by DOS "No Government property whether movable or immovable shall be insured. No liability shall be incurred in connection with the insurance of such property without the prior approval of the Department of Space in consultation with the Member for Finance." The matter was taken up for consultation with the Department of Space during 2012-13 and it was decided in the Seventh Finance Committee meeting of IIST dated 3rd June, 2013 not to insure the assets of the institute.

14. Balances in personal accounts

Balances in personal accounts are subject to confirmation from respective parties.

15. Contingent Liabilities

a. The unexecuted portion of the contracts entered into by the Institute will form part of the current liability of the Institute. However, the same could not be quantified.

b. Interest earned on Earmarked / Endowment Funds held in a separate Current Account linked to Term Deposits has been taken as the Institutes Income. Interest claims in the future, if any, from the disbursing parties of such Earmarked / Endowment Funds will be met at the time of the claim based on the deposit rates prevailing during the period of holding of the particular Fund.

c. In the case of buildings / structures completed by SPCL, only 90% has been billed by SPCL and subsequently paid by IIST. The balance 10% (approximately Rs. 8.18 crores) has not been billed and the same will be paid only on completion of the project. In case of all other works completed by SPCL and not billed as on 31.03.2014, provision has not been made in the books of accounts since the same is not quantifiable.

16. Building Construction

The institute entered into a contract with SPCL, Mumbai on 27.08.2008 for Rs. 278.60 crores with a completion period of 18 months for setting up building and infrastructure at its campus in Valiamala on turnkey basis. As per the note provided by the CMD office the project was delayed due to various unforeseen reasons and the extension of the contract was given up to 04.11.2014 without prejudice to the right of the institute to impose the levy of compensation for the delay. As per clause 2 of the agreement the institute can levy penalty on the works which will have an impact on the accounts. The same could not be quantified due to want of details. As on 31.03.2014, advance

amount paid to SPCL towards mobilisation and interim advance amounts to Rs. 8.93 crores. The Institute currently holds the following instruments as security with respect to the contract with SPCL.

Nature of security	Amount (in crores)
Security Deposit Bank guarantee	13.93
Performance Bank guarantee	13.93
Bank guarantee against Interim Advance	5.43
Bank guarantee against Mobilisation Advance	4.00

18. Figures for the previous year

Figures for the previous year have been regrouped and/or reclassified wherever considered necessary.

As per our report of even date attached.

For ARSB & Associates
Chartered Accountants
FRN : 009803S

CA. P.Ananthakrishnan
(Partner, Mem No. 201711)

For and on behalf of
Indian Institute of Space Science and Technology (IIST)

Dr. K. S. Dasgupta
Director

R. Hari Prasad
Finance Officer

Place : Thiruvananthapuram
Date : 8th October, 2014

Indian Institute of Space Science and Technology

(Declared as Deemed to be University under Sec.3 of UGC Act 1956)
Valiamala PO, Thiruvananthapuram- 695 547