



# Indian Institute of Space Science and Technology

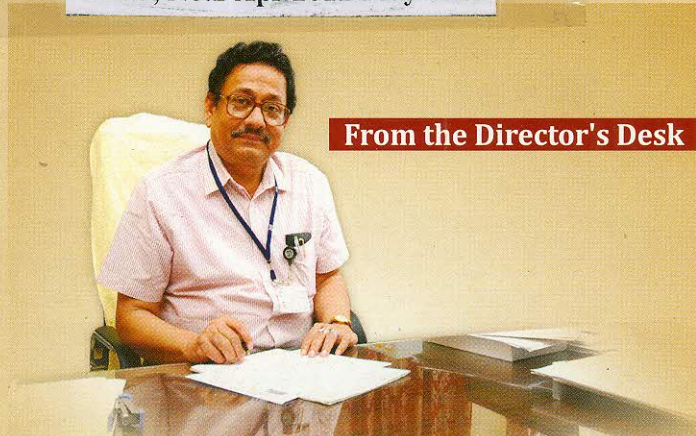
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Valiamala, Thiruvananthapuram 695 547

Newsletter April 2011-May 2012

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## From the Director's Desk

I am happy to release the 5th volume of IIST Newsletter after a short gap of time. This issue of Newsletter is brimming with reports related to academics and research since the last issue. IIST's first batch of students are placed at various centers of Department of Space, and it has achieved many more milestones in its journey onward, in the field of research, and teaching; including the student sounding rocket-Vyom.

I would like to place on record all my wishes to IIST family for bringing out this newsletter in this shape.

**Dr. KS. Dasgupta**

Director, IIST

## IIST shines.....

- IIST honours Satish Dhawan Professor and Dean, R & D, Dr. V. Adimurthy, for having received this year's Padmasri Award.
- ISRO Performance Excellence Award-2009, is awarded to Dr. K. S. Dasgupta (Director, IIST) and Dr. K. N. Ninan (Emeritus Professor) for their significant contributions to the Indian Space Science Programme. The Award comprising Certificate and Cash Prize was given away by the President of India at SDSC, SHAR centre on January 2nd 2012.

## Adieu to Sri.N.Vasudevan IFS and Dr. Krishnan

IIST offers its special gratitude and best wishes to our former Registrar Sri. N.Vasudevan IFS and Dean Academics, and HOD Humanities Department, Dr. Krishnan who recently left IIST after their selfless and sincere service.

Indian Institute of Space Science and Technology (IIST), started in 2007, saw the realization of its major mission of quality man power supply to ISRO, with its first batch of graduated students being placed in the various ISRO centres. 117 of the first batch of 138 students who graduated from IIST in May 2011 have been absorbed into various ISRO centres / units.

The construction work in the campus is progressing in a rapid pace. In addition to the Aerospace Engineering block, the Physical Science block is also completed and is functional.

## Completed Works

- Aerospace Block
- Physical Sciences Block
- Ten hostel blocks

## Works in Progress

- Interdisciplinary Block
- Avionics Block
- Administrative block and the library
- Students Activity Centre

## Works expected to be taken up at a later stage

- Sports facilities
- Guest house facilities
- Faculty housing and staff quarters

## ADMISSIONS 2010-11

### B Tech Programme

Admissions to the B Tech programmes of IIST for the academic session 2010-11 was done through an All India Admission Test "ISAT-2011", conducted in 22 cities across India on 16th April 2011. 80335 candidates appeared in the Test. 138 students were allotted confirmed seats after counselling sessions held at Bangalore. Academic session for the new batch commenced on 22nd July 2011.

### M Tech Programme

M.Tech programmes are offered in "Soft Computing and Machine Learning", and "Chemical Systems" for





candidates selected from ISRO Centres. Currently there are 29 M.Tech students in IIST.

New M. Tech programmes initiated by the institute are

- M. Tech in RF and Microwave Engineering
- M. Tech in Digital Signal Processing
- M. Tech in Propulsion
- M. Tech in Optical Engineering

## PhD Programmes

The institute currently has 52 students pursuing PhD in various areas under the seven disciplines such as Aerospace Engineering, Avionics, Chemistry, Earth and Space Sciences, Humanities, Mathematics and Physics.

## ACADEMICS

### Faculty Strength

The faculty strength of the institute increased to 83 during the year. Several new faculty members joined us from institutions within the country and abroad.

### Research in Departments

Every department has initiated projects and research works. Collaborative research works are also undertaken by faculty with the involvement of students, which is used by faculty as a resource for teaching – learning. The faculty members have to their credit publications in books and journals of both national and international repute and have also presented papers and lectures in universities / academic institutions within the country and abroad.

### Academic Activities



- VYOM, the IIST Sounding Rocket was successfully launched from TERLS, VSSC on May 11th 2012 at 1925 hrs. VYOM ('sky' in Sanskrit) is the sounding rocket designed and realized by 26 B. Tech students

of IIST, along with 10 alumni (Indian Institute of Space Science and Technology, Trivandrum). The team was able to achieve this in a short time with the able guidance and supervision of the VSSC experts and the faculty members of IIST. The project was initiated by 18 under-graduate students of IIST about 2 years ago and nurtured by the IIST faculty, as it is the best platform for the students to 'learn by doing' the science, technology and management of rocketry and also to experiment their ideas. In his interaction meeting with the VYOM Project students and the IIST-VSSC mentors of the project on May 14th, 2012, Dr. K Radhakrishnan, Chairman, Board of Management, IIST/ Chairman, ISRO expressed his appreciation for the excellent efforts of the students, the able guidance provided by VSSC/ IIST mentors and the immense facilities and expertise of VSSC made available to the project. The VYOM project will continue with a Mark-II version with certain modification for improvement in performance and reliability.

- The UGC Review committee visited IIST during 16-17th January 2012. The eight member committee was drawn from various IITs/Universities. The committee inspected the facilities of IIST and held detailed discussion with the faculty and the students. A detailed report was also submitted before the committee revealing the efforts the institute has taken in the last 4 years for building a centre of eminence in Space Science and technology.
- A research team from The University of Sheffield, UK, visited IIST on May 30th 2012. The team included Prof. Peter Fleming, Prof. Visakan Kadirkamanathan, Dr. Simon Pope, Dr. Zi-Qiang Lang, Dr. Jun Liu and Mr. Andrew Mills, from the Department of Automatic Control and Systems Engineering at the University. The purpose of their visit was to explore research collaboration opportunities between the University of Sheffield and IIST. In this connection, there was an interactive session between the group from Sheffield and the IIST faculty.
- IIST Library is subscribing to 16 electronic resources and few individual e-journals. They have planned to conduct 'Resources Awareness Programme' (REAP - 1) on each resource subscribed by the library so that users can understand and use the 'special features' of each resource and set personal options and alerts. This will also help one to understand the advanced features offered by the publisher from time to time. The first 'Resource Awareness Programme' on





Science Direct was conducted on March 15th 2012. Representatives from Elsevier Publishers made special presentation specifically addressing the needs of the Faculty, Research Scholars and PG Students.

## SEMINARS AND INVITED LECTURES

**Prof. Davide Bonifazi**, Department of Chemistry, University of Namur, Belgium delivered a lecture on "Supramolecular and Covalent Derivatization of CNTs: Challenges and Promises for Advanced Materials and Biomedical Applications" on December 21st 2011.

**Dr. Ruta Kale** from the Inter-University Center for Astronomy & Astrophysics (IUCAA) gave a talk on "Non-thermal Phenomena in Clusters of Galaxies" on, October 14th, 2011.

**Dr. Sai Gorthi**, Assistant Professor, Department of Earth & Space Sciences, IIST gave a special lecture on September 29th 2011 on "Recursive image estimation and inpainting in noise using non-Gaussian Markov Random Field Priors."

**Shri. S Gopala Krishnan**, CEO Pune Instrumentation Pvt Limited, Pune talked on "Robotics and Control" on August 24th 2011.

**Dr B. S. Manoj**, Associate Professor, Department of Avionics, gave a talk on the "Importance of Space and Time in Future Network Design" on November 9th, 2011.

A talk was held on December 15th, 2011 at the Department of Mathematics, IIST by **Prof. M. Sitaramayya** (Central University, Hyderabad) on the "Differential Geometry and Applications."

A special seminar was conducted on "Use of Mathematics in Education and Research" on September 16th 2011. The speakers were **Dr. Anshu Manik**, Technical Services, Wolfram Research and Sonali DeSouza, International Training Executive, Wolfram Research.

**Prof R. V. G. Menon**, Former Director, ANERT and retired faculty from the College of Engineering, Trivandrum, also a popular figure in science programmes in media and Dr C G Ramachandran gave lectures on "the History of Science," on October 10th and the first week of November, 2011.

A seminar was given on October 5th 2011 by **Dr. N. Padmanabhan** on "Mathematical modeling for satellite data processing".

**Shri. Gopinath Pai**, Visiting Scientist, VSSC spoke on "Materials for Space Programme" by on August 17th 2011.

**Dr. Sanjay Limaye**, Space Science and Engineering Centre, University of Wisconsin, Madison, USA gave a talk on "Exploring the Venus – Current Status of Venus Exploration" on 30th November 2011.

**Shri. Shyamaprasad. R**, the internationally acclaimed Director of movies like Agnisakshi, Akaale, Ore Kadaal and Kerala Café, interacted with the students of the Visual Communication course on October 24th 2011. The history, development and changes of Indian film industry were covered in his talk.

As part of the Institute Elective Course on 'Macroeconomics of India and the World', Dept. of Humanities has organized a lecture on "Financial Planning and Wealth Management" by **Dr. V K Vijayakumar**, Investment Strategist, Geojit BNP Paribas on September 28th 2011.

As part of the Institute Elective on Macro Economics of India and the world, **Sri Sasidhar**, Chief General Manager, NABARD took a class on "How scientists can make use of NABARD" on October 14th 2011.

Department of Chemistry in association with the materials club "Voxmateria" has organized a special lecture on "Nanotechnology and Periodic Table" by **Prof Vijayamohanan Pillai**, Director, Central Electrochemical Research Institute, CSIR, Govt. of India, Karaikudi on 28th December 2011 as part of the International Year of Chemistry, 2011 celebrations.

**Prof. Peter J. Fleming**, Professor of Industrial Systems and Control, Dept. of Automatic Control and Systems Engineering, The University of Sheffield, UK, delivered a talk on "Multicriteria Optimization in Control and Systems Design"

A seminar on "Basic properties of waves and the wave equation" by **Prof. Phoolan Prasad** from IISC, Bangalore was held in IIST on January 30th and 31st 2012.

**Dr. Som R. Soni** Associate Professor of Systems Engineering, Air Force Institute of Technology (AFIT), Wright Patterson Air Force Base, Ohio, US, delivered a talk on "Research in Structural Health Monitoring of Aging Aircrafts" on February 3rd, 2012.

A one day workshop on "Navigation systems and sensors" by **Mr. Amitava Bose**, Former Director ISRO Inertial Systems Unit was conducted on Feb 4th, 2012.





**Dr. Solomon Ivan**, Raman Research Institute, Bangalore visited IIST for a few days and delivered two talks. The first talk was on "Introduction to Quantum Information", and the second talk on "Operator sum representation of Bosonic Gaussian Channels".

A two day lecture series on selected topics in atomic and molecular physics was conducted in IIST on April 2nd and 3rd 2012. Eminent researchers gave lectures on different areas such as Modern atomic and molecular physics (AMP), AMP in space science: Astronomy and related areas, AMP in space technology: Payloads, propulsion and usage of space assets, Novel instrumentation development in AMP: Modern experimental techniques, DAQs, Detectors, etc.

A lecture on "Aberrated Imaging and Analysis" was delivered by **Dr. Virendra Mahajan**, from the Aerospace Corporation, El Segundo, USA on March 9th 2012.

Department of Mathematics, IIST organized a workshop on "Adaptive finite element methods" during March 16-25, 2012.

**Prof. R. Shankar**, Institute of Mathematical Sciences, Chennai gave a seminar talk on "Quasiparticles with fractional charge and statistics".

**Prof. Prasanta K. Panigrahi** from IISER Kolkata delivered a talk on March 19th 2012 on "PT-symmetric systems : Scattering and bound state properties."

**Prof. A. K. Pani** from IIT Mumbai spoke on the topic "On Industrial mathematics with a case study from finance". His research interest is primarily in the area of numerical approximations of partial differential equations.

**Prof. Toshiyuki Azuma** from RIKEN, Japan visited us on March 26, 27th 2012. He gave a seminar on the 26th afternoon on "Expanding atomic physics of highly charged ions: from slow collisions in the solar wind to high-energy irradiation for cancer therapy".

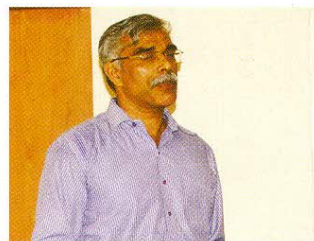
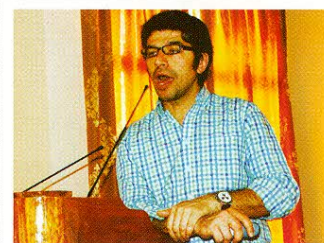
**Prof. Steen Brondsted Nielsen** from Dept. of Physics and Astronomy, Aarhus University, Denmark visited IIST on April 2, 3rd 2012. He gave a seminar on "Quantum effects in DNA."

**Prof. Sethumadhavan** from Amrita University, Coimbatore delivered a lecture on "Visual Cryptography" on April 16th 2012.

**Prof. Krishnan** from University of Kerala gave a seminar on "A paradigm shift from Riemann integral to Lebesgue integral" on April 16th 2012.

**Prof. Pranawa C. Deshmukh** from Dept. of Physics, IIT Madras visited IIST on April 30th 2012. He gave a lecture on "Quantum Mechanics & Symmetry of the Hydrogen Atom".

**Dr. Linda Casson Nudell**, Senior Application Scientist, Horiba Instruments Inc., USA visited IIST and gave presentation on "Spectroscopic applications of monochromators and optical imaging systems".



## WORKSHOPS

- Department of Humanities offered a two day





workshop for young scientists of ISRO, "Ignite" on Self Development and Successful Communication on July 17, 18 2011. The objectives of the workshop were to unleash the hidden potential, overcoming the past conditioning and limiting belief, enhancing confidence, enthusiasm and human relationships and to develop an overall winning personality.

- Department of Avionics organized a short-term course on "Soft and Evolutionary Computing" on December 19-21, 2011. The course was based on multi objective optimization problems which involve multiple variables and linear/nonlinear constraints. These optimization tools can be single objective or multi-objective types. The potential application areas include active noise control, radar signal processing, speech/image processing, forecasting of future events, channel equalization, mobile communication, cognitive radio, VLSI signal processing etc. The resource persons for this course was Prof. G. Panda, IIT Bhubaneswar, Prof. Thomas Kurian, IIST, Prof. Raju K. George, IIST, Dr. Sumitra Nair, IIST, Dr. N. Selvagesan, IIST, Dr. Deepak Mishra, IIST. This course was open to the undergraduate and research scholars of IIST and scientist from ISRO centers.
- A workshop has been arranged by the Department of Mathematics on "Biologically Inspired Computing" from July 4th-7th 2011. A series of talks were delivered to the participants to give them an appreciation of biological intelligence in nature and detailing on how non-conventional methods of computing inspired by these biological systems can be used to solve interesting and challenging problems. The participants were exposed to several fascinating new components, Genetic Algorithms (GA), Genetic Programming (GP), Gene Expression Programming (GEP) and Swarm Intelligence (specifically Particle Swarm Optimization (PSO) and Ant Colony Optimization (ACO) algorithms with their applications in a variety of fields.
- The Department of Earth & Space Sciences jointly with ISAC, Bangalore hosted a four day workshop on "Multi-Wavelength Astronomy with ASTROSAT" at IIST from January 9 - 12, 2012. The objective of this workshop was to broaden the user-base for ASTROSAT data when it becomes available. ASTROSAT will be India's first satellite dedicated

for astronomy. It will carry payloads sampling optical/UV to hard X-ray energy bands.



- Indian Institute of Space Science and Technology conducted a two day workshop on "Geospatial Technologies for Coastal Resources Management" during May 28 - 29, 2012 at IIST campus. The objective of the workshop was to provide a platform for scholars pursuing research in coastal ecosystems and processes to learn from the research experience of eminent people across the country in the field.



## OTHER ACTIVITIES AND EVENTS

### Induction Programme

An intensive induction programme was offered for the first semester students by the Department of Humanities over three weekends in the month of August, 2011. The programme was very unconventional, experiential and participative. 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. There were classroom sessions, activities and outdoor training sessions which made the campus more students friendly. A file was opened for each student to record all the events from their date of joining the institute till the date of completion of their course.

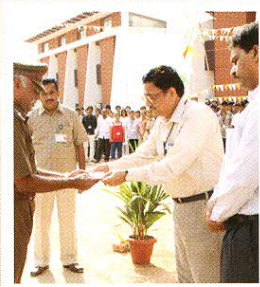
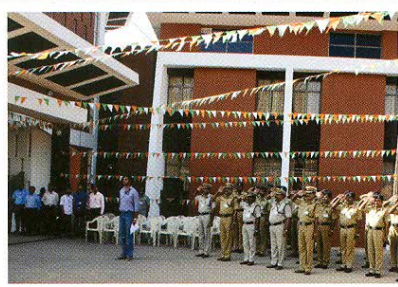
### Independence and Republic Day Celebrations

Independence and Republic Day were celebrated on August 15th, 2011 and January 26th, 2012 respectively





at IIST. Dr KS Das Gupta, Director, IIST, hoisted the national flag. Awards were given to supporting staff for their contributions to the institute.



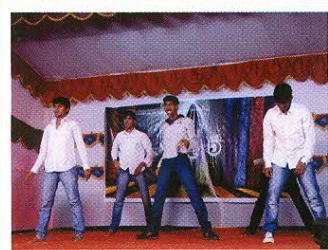
## IIST Day

Institute day was celebrated on September 14th, 2011 at its own newly acquired premises of the Indian Institute of Space Science and Technology (IIST) at Valiamala. The programme was inaugurated by Hon'ble Speaker, Kerala Legislative Assembly, Sri G Karthikeyan. Sri Palode Ravi, MLA delivered the presidential address. Smt. Lekha Suresh, Municipal Chairperson, Nedumangad Municipality released the student magazine 'Drishtikone' on the occasion. Felicitations were made by Sri PS Veeraraghavan, Director, VSSC/ISRO, Dr Suresh Das, Director, NIIST, Sri G Ravindranath, Director, IISU /ISRO) and Sri S. Ramakrishnan, Director, LPSC/ISRO. The meeting was followed by a cultural programme staged by the students, faculty and staff of IIST.



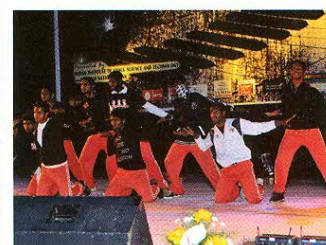
## Fresher's Welcome Party

An ice breaking session for IIST's fourth batch of students was organized on September 7th 2011 and also a Fresher's Welcome Party by their predecessors, soon after the former joined the Institute. The IIST community was treated to a spirited performance by students from both the batches.



## Dhanak

The Annual Cultural Festival of IIST, Dhanak-2011 was held in IIST campus from September 30th to 3rd October 2011. There were competitions in literature, arts, music and dance. The festival was inaugurated by the renowned playback singer Dr K J Yesudas. Sri. Soorya Krishnamoorthy was the guest of honour. Students from a number of institutions across the country participated in the festival.



## IIST Research Scholars' Day

The Indian Institute of Space Science and Technology celebrated the first ever IIST Research Scholars' Day from 16th -17th December, 2011. Even though the institute organized a programme of such dimension for the first time in its history, it turned out to be a grand success. There were in-house participants as well as participants from external institutions like IITs, NITs, IISERs and other reputed institutions. The two day programme was formally inaugurated by our Chancellor Dr. A. P. J. Abdul Kalam. The technical session comprised of paper presentation and poster exhibition.



## Women's Day Celebrations

Women Cell of IIST celebrated Women's day, on Wednesday, March 14th, 2012. Prof. Dr. Jameela Begum (Professor, Institute of English and Director, UGC





Area Study Centre for Canadian Studies, University of Kerala) was the Chief Guest. A debate on the topic "Women Empowerment: A myth?" was held as part of the programme. There was an 'exhibition cum sale' by women of Kudumbasree and SISP (Sebastian Indian Social Project). An essay competition on the topic "The most influential woman in your life" was also held on the same day.



## Sports Day

The 5th Annual Sports Meet of IIST was held on March 10th 2012, at the University Stadium, Palayam, in Thiruvananthapuram. The meet was inaugurated at 9.30 AM by Shri Amit Malik, IFS, Director, Youth and Sports Affairs, Govt. of Kerala. The competitions were conducted under various categories, for men and women, and for faculty. There were separate sessions for athletics and games. The competitions were judged by the experts from Kerala Sports Council Authority.



## Festivals

Onam, Holi and Diwali were celebrated in its true spirit in IIST. The whole IIST family participated in it. Sri. TP Sreenivasan, IFS, Former Ambassador was the chief guest for the Onam celebrations. Competitions and cultural programmes followed by a traditional lunch were the charm of the Onam celebrations.



## Conscientia 2012

The annual technical festival of IIST, Conscientia 2012 was held in IIST from March 3 – 6, 2012. The festival was inaugurated by Shri. N. Viswanathan, founder – director of Mitraniketan, an NGO based out of Trivandrum. The event saw the convergence of talent in both science and technology. Glider making, robo-wars, ethical computer hacking, and night sky observing were some of the unique events. The event had participants from all over the country.



## Photography Exhibition

A photography exhibition was organized by a set of students which tried to capture the bountiful nature around us.

## Model Airship

Three IIST students, Sattwik, Shashank and Tanveer made a model airship as part of their B. Tech project. They also made a 5 minute video clip from the 4 flight tests carried out to characterize it.

## Quiz Competition

IIST Students Quiz Club organized an Inter-Collegiate (Trivandrum Colleges only) Quiz Competition for undergraduate students on February 11th in YMCA Hall, Trivandrum. It was attended by students from various colleges of Trivandrum.





## Model United Nations

IIST conducted a Model United Nations for our students on March 15th 2012. Students participated in this intra collegiate competition with great enthusiasm. Dr. Gopakumar, former Dean of Social Sciences, University of Kerala judged the competition. The agenda of this year's IIST MUN 2012 included "Space Militarization: Control and Management and Non-Proliferation Treaty: Future Prospects and Implementation."



## Study Tour

- Visit to Waynad from October 5th-9th 2011 was organized by Department of Humanities as part of their study of technological development on rural economy and the impact of village resource centres in the region.
- A geological field survey in Sittampudi and Salem areas of Tamilnadu from October 13th-16th 2011 was organised by Department of Earth and Space Sciences.
- A trip to study the Toda community in Ooty was organized by the Department of Humanities from October 28th-31st October 2011.
- A visit to the Vainu Bappu Observatory (VBO) in Kavalur which houses the largest telescope in India was organized by Department of Earth and Space Sciences from November 4th-7th 2011.



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