



Indian Institute of Space Science and Technology (IIST) NEWSLETTER

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Director's Message



I have great pleasure in presenting the second issue of reactivated biannual newsletter of IIST. It covers the activities during January to June of 2019. The previous issue covering the July to December 2018 period was well received by stakeholder community outside the IIST; It had captured the varied dimensions of IIST activity spectrum successfully. This is itself a commendation to the editorial team led by Prof C S Narayanamurthy. Even from inside IIST community the reactions ranged from "I never knew so many activities were happening inside the campus" to "my activity is not captured". This reinforces the very requirement to continue this newsletter as well as enhance its coverage, a challenge squarely handled by the editorial team.

This issue describes the maiden space mission of IIST, namely ARIS (Advanced Retarding Potential Analyzer for Ionospheric Studies) which flew onboard PSLV-C45 PS4-Operational Platform (OP) on 1st April 2019. A personal account of this 49 day roller coaster ride is provided by the research team in IIST in house journal Surubhi. As you learn about this very tiny step of IIST, also keep following the large leap of technology and science which has been undertaken by ISRO in its second mission to moon, the Chandrayaan-2, now on course to its landing on moon on September 7, 2019.

Also during this period, National Institutional Ranking Framework (NIRF 2019) was released by Ministry of Human Resource Development (MHRD) and IIST was ranked a very creditable 30 amongst all engineering institutions in the country. It is simultaneously an outcome of the large effort made by entire IIST community as well as the challenge before the community to reach the rank which does justice to our potential. I am sure the Newsletter itself through a process of informing and sharing as well as acknowledging and celebrating every small achievement would act as a catalyst in our growth. Our team and I are eager to hear from you your suggestions and thoughts. A happy reading indeed !.

Dr. Vinay Kumar Dadhwal
Director



1st April 2019 was a very important day for Indian institute of Space Science and Technology, Thiruvananthapuram. It was on this day that the first space mission by IIST was realised. An ionospheric probe called Advanced Retarding potential analyser for Ionospheric Studies (ARIS), which measures the prevailing plasma parameters in the ionosphere was launched on the PS4 operational platform on PSLV C45. ARIS was realised under active inter-department R&D team comprising of

Dr. Umesh R Kadhane (Physics), Dr C S Anoop, Dr R Sudharshan Karthik (Avionics) and Dr V S Sooraj (Aerospace). Research on this probe for laboratory-based research was going on for several years at IIST in Dr. Umesh's laboratory. With that experience, IIST is actively working on making payloads for future Mars and Venus missions by ISRO. On the basis of home grown know-how, IIST built a probe specifically configured for earth's ionospheric conditions. The payload was realised and qualified in a very short time of

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just 49 days. This was possible only due to the combined efforts and generous support of many faculty, scientists and engineers from IIST, IISU and VSSC. Swift and coordinated actions were taken under the guidance of Prof. Dhekane, Satish Dhawan Professor, IIST and every procedure was expedited by Dr. Y. V. N. Krishna Murthy, Registrar, IIST.

Four faculty members and four project fellows from IIST directly contributed in the design, simulations, realisation and testing of the payload. The electronics team designed a very efficient COTS based electronics main board with open architecture. The front end circuits were built to handle sensor current as low as 10 pA. A very innovative combination of analog electronics and digital logic unit was used to achieve high sensitivity and at the same time very large dynamic range. IISU and VSSC teams played a significant role in getting the PCB design made and qualified swiftly. Due to the experience of these teams there was no repetition of any process and the work could be completed in a single stretch. The preliminary mechanical design and vibration simulations were done at IIST. But due to the time constraint, a multi prototype development was not feasible. Hence the mechanical design team at IISU was roped in and with their help a design was finalised in one step and within the required weight limit. IISU workshop took up expeditious fabrication and in a short span of just 4 days, the payload chassis and the internal hardware were ready and received the clearance for quality control. The payload reached its destined orbit of 485 km and was turned on at 12.27 pm on 1st April 2019. The analysis of the data received showed the probe is in perfect condition and performing the scientific experiments exactly as programmed. The data received was analysed for the in situ ionospheric conditions and the measured values were found to be in agreement with the expected

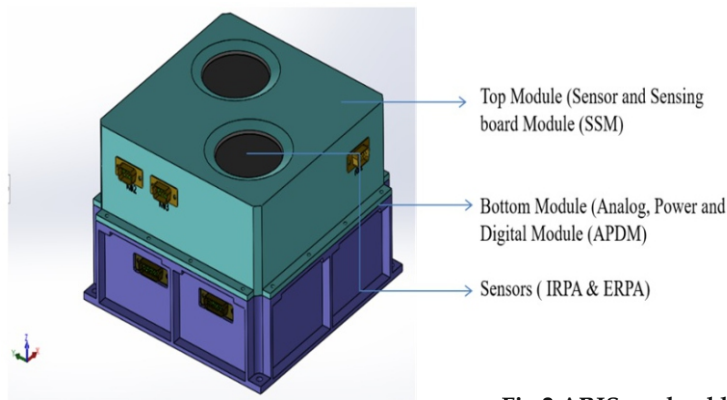


Fig.1 Schematic of ARIS

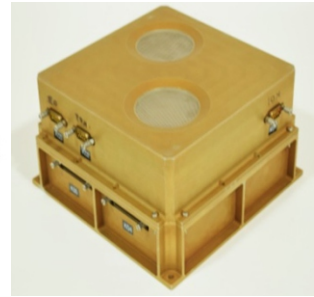


Fig.2 ARIS payload launched in PSLV C-45 flight

results. The probe remained active till the PS4 OP was functional and we have received data worth more than 300 orbits out of total 843 orbits. Due to lack of on-board storage, the data was received only during to be used thus resulting in the difference in the quantity of data vis a vis number of orbits.

The ARIS probe is akin to a weather station. Such space weather stations provide us continuous real time information about the ionospheric health around the earth. This information is useful in understanding the effects of the ionospheric plasma on our space assets as well as the dynamics of our

atmosphere. It also sheds light on how the earth's atmosphere reacts to the high energy radiation received from the sun. IIST plans to continue the developmental work to reduce the mass and size of such probes and to test more challenging technologies. To this end, the next hardware of ARIS is ready for the upcoming PS4 OP mission in PSLV, thus facilitating the monitoring of the global ionospheric activity with similar probes. IIST plans to have an open source approach wherein the full know how of the technology and science will be shared openly with the national and global students and researchers.



From Left: Dr. Anoop C.S (Faculty), Aarathi Sathi Nair, Dr. Sooraj V.S (Faculty), Prof. M.V. Dhekane (Prof. Satish Dhawan Professor, IIST), Dr. Umesh R. Kadhane (Faculty), Dr. B.N. Suresh (Chancellor, IIST), Dr. K. Sivan (Chairman, ISRO & Secretary, DOS), Dr. Y. V. N. Krishna Murthy (Registrar, IIST), Dr. V. K. Dadhwal (Director, IIST), Dr. R. Sudharshan Kaarthik (Faculty), Pranjal Gupta, Naveen S. and Sreehari B. Nair.

ARIS Team with ISRO Chairman at SHAR

Important highlights of the mission:

- 1) First ever space mission of IIST and achieved better than expected performance
- 2) Complete in house knowhow and development
- 3) Realisation of full hardware in just 49 days
- 4) Excellent team work across multiple ISRO centres and IIST
- 5) Multiple innovations in the electronics:
 - (a) Current measurement for a high dynamic range (10^4) for very low currents of 100 nA to 10 pA
 - (b) Bias current offset correction for improving accuracy of low current measurement
 - (c) High frequency noise/interference rejection implemented in measurement scheme
 - (d) Dynamic ranging and scaling of the data acquisition unit
 - (e) Hardware was qualified for -20 degrees to +60 degrees Celsius operation

The hardware was made using COTS components

Republic Day Celebrations

IIST celebrated India's 70th Republic Day on Friday, 26 January 2019, by organising various programmes in the campus. The celebration was started by hoisting the National Flag by the Director, IIST. Director addressed the students, faculty, staff and their family members on this occasion. Following the address, various events were held for IIST students, employees and children of employees. A talent show contest for children of employees was held where children displayed their flair for oratory, song, mimicry, dance and fancy dress. Director, IIST in the library entrance, unveiled the Photograph of 'Members of the Constituent Assembly': members who were responsible for India's Constitution. A game of tug-of-war between employees and students were conducted and the game was won by the employees.



Glimpses of Republic Day Celebration

Fourth Dr. A P J Abdul Kalam Lecture

Connecting Academic R&D with Product Innovation: A few case studies and a way forward

Prof. V. Ramgopal Rao, Director IIT Delhi delivered the 4th Dr. APJ Abdul Kalam Lecture titled "Connecting Academic R&D with Product Innovation: A few case studies and a way forward" at IIST on 1st May 2019. The lecture started by mentioning our nation's great contribution to the world's R&D, especially in areas like Nanotechnology where, India is among the top 3 countries in the world in terms of research publications and patent filings which seems to make the researchers in the country proud. Prof. Rao remarked that researchers in India are contributing well to fundamental R&D and are publishing in good journals for the amount of money invested in the country for the research. He cautioned that these findings have hardly resulted in any major technological breakthrough of significant commercial value. Prof. Rao further elaborated about the case studies of translational research conducted in his research group at Centre of Excellence in Nano



Prof. V. Ramgopal Rao, Director, IIT Delhi delivering the 4th Dr. APJ Abdul Kalam Lecture

electronics at IIT Bombay which ultimately resulted in incubation of two companies catering to societal needs in the country. He presented the MEMS and Nanotechnology based sensor platforms for applications in homeland security and agriculture and stressed upon the need for product innovation. Finally, he concluded the talk by discussing the multitude of initiatives contemplated and launched by Govt. of India at the national level in order to make the Indian research competitive and sustainable in terms of innovation and product development.

International Women's Day Celebration 2019

The Gender Sensitization Committee of the Institute organized, the International Women's Day celebrations on March 20th, 2019. Prof. Nirmala Rachel James, the Chairperson of Gender Sensitization Committee, IIST welcomed the gathering and Dr. V. K Dadhwal, Director, IIST inaugurated the function and addressed the gathering.

Dr. Lalithambika V. R, Director, Human in Space Programme, ISRO was the chief guest of the function. Her talk was very inspiring to the students and staff members as she recounted her experiences not as a woman but as a Scientist in ISRO. IIST has honored **Padma Shri Awardee**



Professor Nirmala R James (Left) welcoming the gathering



Director, IIST delivering his inaugural address at the International Women's Day celebrations



Dr. Lalithambika V R, Chief Guest delivering the speech

Smt. Lakshmikutty Amma (Traditional medical practitioner) during the function. The poetry rendered by her though in malayalam captured the attention of all.

Prizes for winners of photography and painting competitions which were organised in connection with International Women's day celebration were distributed by the Chief Guest. IIST students displayed their talent by participating in cultural programmes and the meeting ended with vote of thanks by Dr. Sheeba Rani, who is currently Chairperson of Internal Complaints Committee (ICC) of IIST.



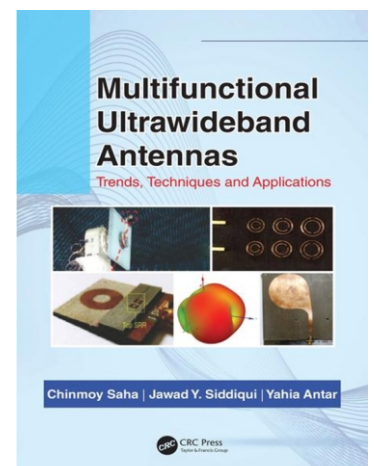
Dr. V K Dadhwal felicitating Padmashree awardee Ms. Lakshmikutty Amma at International women's Day on 20th March 2019

NIRF Ranking 2019



Books Published

Dr. Chinmoy Saha, Associate Professor, Dept. of Avionics has published a book along with Dr. Jawad Y. Siddiqui and Dr. Yahia M. M. Antar, entitled "Multifunctional Ultrawideband Antennas: Trends, Techniques and Applications", Taylor and Francis, 6000 Broken Sound Parkway, NW, Suite 300, Boca Raton, Florida 33487, USA (April 2019, ISBN: 9781138553545). (April, 2019)



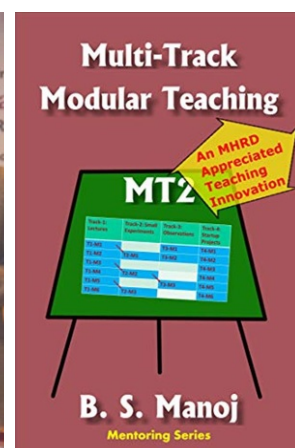
National and International Awards

Prof. B. S. Manoj, Head of Avionics Department, IIST was recognized as a Teaching Innovator by MHRD through its Pandit Madan Mohan Malavia National Program on Teachers and Teaching (PMMMNTT) on 4th January 2019, for developing and using the Multi-Track Modular Teaching (MT2) method. MT2 is a multi-modal technique meant for accomplishing deeper and all-round learning in class-room pedagogy. In a function conducted in New Delhi, the then MHRD minister, Shri. Prakash Javadekar handed over the certificate (see photo).



Prof. B S Manoj receiving Teaching Innovator Award from then HRD Minister Shri Prakash Javadekar in a function at New Delhi (Right)

Dr. B. S. Manoj also published a paperback and e-book titled "Multi-Track Modular Teaching Method: An Advanced Teaching-Learning Method" describing the MT2 method with examples through Amazon KDP Paperback.



Dr. Rajesh Joseph Abraham receiving Prof. V K M John Award

Dr Rajesh Joseph Abraham, Associate Professor, from Department of Avionics was awarded the 2018 Prof VKM John Award for the Best Engineering College Teacher of Kerala State instituted by the Indian Society for Technical Education (ISTE) in recognition of his outstanding contribution to the academic community and students. The award was presented to him on 20th March 2019 during the 48th ISTE Annual Faculty Convention at Viswesvaraya Technical University(VTU), Belgaum.

IIST-Industry Applications Society (IAS) Student Branch Chapter has been awarded the Outstanding Student Branch Award for 2018 (Gold prize). IIST could achieve this award in the inception year of the Student Branch in IIST.

Patent granted

Indian Patent 314287 granted on 19.06.2019: Process for the preparation of high density carbon foams. This patent is granted to *Dr. K. Prabhakaran and R. Narasimman, Dept. of Chemistry, IIST*



IIST - IAS Outstanding Student Branch Award 2018

Short Term Courses organized by IIST

Short Term Course for Armed Force Officers

A short term course 'Introduction to Space Technology' was conducted by Department of Aerospace Engineering, IIST. The course was conducted for two weeks during June 10th, 2019 to June 21st, 2019. The participants were the armed force officers (Army, Air Force and Navy) deputed to Defence Satellite Control centre (DSCC) of Bhopal and to Defence Image Processing and Analysis Centre (DIPAC) of New Delhi. The course covered the topics related to satellite in-orbit operations, propulsion system, structures and materials and aerodynamics. Dr. R V . Ramanan coordinated the course and also was the main resource person. The other resource persons were : Dr. P Raveendranath, Dr. Manoj T Nair, Dr. V. Aravind, Dr. P. Chakravarthy, Mr. N. Rithwik, Research Scholar and Mr. Varshith Reddy B. Tech, Fourth Year Aerospace. Dr. Dadhwal , Director, IIST interacted with the participants on the final day and distributed the certificates of participation.



Dr. Ramanan and Director, IIST are flanked by armed forces officers who attended the short term course on "Introduction to Space Technology" from 10.06.2019 to 21.06.2019

Young Talent Nurture Programme

The Department of Mathematics has been conducting "Young Talent Nurture (YTN)" programme in different levels since 2013, as a part of outreach programme of IIST. This is a two week programme, which is usually conducted during summer vacation in every year. This intensive training programme aims to nurture young mathematical talents through the promotion of pathological questioning, logical and critical thinking and problem-solving, in order to strengthen their mathematical ability and encourage them for understanding the higher aspects of Mathematics. Through this programme, many graduate and post graduate students having Mathematics as one of their subjects participate from various Indian colleges/universities/institutes.



Participants with faculty of Dept. of Mathematics and Registrar Dr. Y V N Krishna Murthy

This programme is financially supported by IIST. In the year 2019, YTN-programme was conducted from 20th May to 1st June at IIST targeting the students who have completed their 3rd Year/6th semester of B.Sc./B.Tech/ integrated M.Sc with Mathematics as one of the courses of their study. The topics covered in YTN-2019 consisted of Abstract Algebra, Complex Analysis, Differential Equations, and Metric Spaces.

Seminars / Colloquia organized by IIST

1. Colloquium on System Engineering and Institutions Building Inauguration

A one day colloquium on "System Engineering and Institution Building" was organised jointly by IIST and VSSC in association with *Aeronautical Society of India*, *Indian Society for System Science and Engineering* and *System Society of India* on 9th February 2019 at Dr. Srinivasan Auditorium, VSSC, Thiruvananthapuram. The colloquium was organised to honor and felicitate **Dr. B N Suresh**, Chancellor and Founding Director, IIST, who has completed 75 years of age and has served ISRO / IIST for about 50 years since 1969. *Dr. Suresh*, is known for his expertise on System Engineering and building of a world class institute IIST at Trivandrum. The symposium was inaugurated by **Dr. K Radhakrishnan**, former Chairman, ISRO and former Director VSSC. **Dr. G Ayyappan**, Project Director, VSSC and Chairman organizing committee welcomed the gathering. He elaborated about the importance of systems engineering and institution building and how they have played important role in ISRO. **Shri S Somanath**, Director, VSSC in his presidential address talked about system engineering and why? he considers *Dr. Suresh* as his guru. **Shri. Somanath** spoke about the effectiveness of system engineering and its importance in making efficient systems with reduced cost and risks. He further talked about the need for effective system engineering for reusable launch vehicles, air breathing propulsion and other important ISRO's missions. **Dr. K Radhakrishnan** in his inaugural address spoke about his association with *Dr. Suresh* and his contributions to system engineering and institution building. He described *Dr. Suresh* as his friend, philosopher and guide and how he inspired him and guiding him even today. He further spoke about what is system engineering and its



Dr. YVN Krishna Murthy, Shri. S Somanath, Dr. B N Suresh, Dr. V K Dadhwal and Dr. G Ayyappan on the stage

importance in ISRO's program. He also talked about the importance of ISRO's Mission Readiness Review(MRR) process before every launch and in that even today why "*Dr. Suresh's* view is important etc in elegant manner.

Chairman ISRO and Secretary DOS *Dr. K Sivan* addressed the gathering

through audio mode from Bangalore (could not come due to cancellation of flight) spoke about the importance of this meeting especially to felicitate *Dr. Suresh* for his contributions to system engineering and institution building. A citation on *Dr. B N Suresh's* contributions to system engineering was read out by *Dr. V K Dadhwal*, Director, IIST. *Dr. Suresh*



Dr. B N Suresh receiving felicitation (Left to Right) Dr. V K Dadhwal, Dr. G Ayyappan, Shri. S Somanath and Dr. B N Suresh

released the souvenir and spoke about his experience with ISRO colleagues mainly about system engineering which he learnt from *Dr. S C Gupta* former Director VSSC. He told youngsters how? important system engineering is and to achieve success in that one has to learn to work as a team. *Shri. Narayanan Namboodiripad*, President, Trivandrum chapter of System Society of India and *Shri. Paramasivam* also spoke about the importance of Colloquium. *Dr. Y V N Krishna Murthy*, Registrar, IIST delivered vote of thanks.



Invited Talks

Dr. Kota Harinarayana, Satish Dhawan Distinguished Professor, INAE, Bangalore talked about unmanned air vehicles, also called drones, which were used initially by military and now used for various scientific purposes, public safety and in commercial industries. He mentioned how these vehicles uses in health care industry and benefit substantially from their technical capabilities and ease of use. He further elaborated on common UAV applications for delivering blood, medical supplies to road accident victims; providing rapid access to Automated External Defibrillators (AED) for Out of Hospital Cardiac Arrests (OHCA); transportation of vital organs from one hospital to the other hospital in the congested metro cities. Another important UAV application is delivery of aid packages, medicines, vaccines, blood and other medical supplies to remote areas during floods and natural

calamities. He ended by saying that future, UAVs with diagnostic imaging capabilities may have a role in assessing health in remote communities using telemedicine. Brigadier Rajan Minocha, Executive Director, INAE spoke on role of INAE (Indian National Academy of Engineering) in shaping researches and innovations in engineering disciplines. He spoke about INAE's annual flagship programs like i) Engineer's Conclave ii) Frugal Innovation Technologies for Rural Development iii) Annual National Frontiers of Engineering (NatFOE) Symposium. He added that INAE is actively participating in nation building exercises by collaborating with DST / Niti Aayog / TIFAC / AICTE wherever engineering solutions are required. Next talk was by Professor Sudhakar who has retired from IIT Bombay and is also closely associated with ISRO.

He talked about the creation of complex engineering systems and explained that it requires more than mere depth & width in technical knowledge. Professor Sudhakar spoke about creation of AR&DB Centre of Excellence in Aerospace Systems Design & Engineering (CASDE) at IIT Bombay in 1998 and explained how? *Dr Kota Harinarayana* was instrumental in setting up CASDE and the role of *Dr BN Suresh* in defining activities of CASDE and sustaining it over next decade and a half. He elaborated further about activities of CASDE which spanned over several areas such as MDO, MAV Systems, Professional Development Courses in System Engineering, a specialized M.Tech programme, etc. He acknowledged the immense role played by *Dr BN Suresh* in making his journey in system engineering through CASDE at IIT Bombay. Second session started with





Dr. K. Sivan, Chairman ISRO / Secretary DoS, felicitating Dr. B. N. Suresh through audio mode

the talk of Professor, Indranil Manna, J C Bose Fellow, IIT Kharagpur and former Director, IIT Kanpur on " System Engineering and Institution Building :Perspectives on the Role of Translational Research". Professor Indranil Manna is currently working as, J C Bose fellow and Institute Chair Professor at IIT Kharagpur who is also former Director IIT Kanpur. Prof. Manna talked about efforts taken by IIT's and INAE and possible roadmap for developing complete end to end solution using Systems Engineering and emphasised the need for multi-disciplinary and multi-institutional efforts with effective synergy among science-engineering technology as a closed loop centered on societal need and aspiration. He talked about success

stories of CSIR's Central Glass Ceramic Research Institute at kolkatta and about Prime Minister's initiative on in calculating innovative tempers among engineering community. He also talked about IMPRINT (IMPacting Research Innovation and Technology) aimed to promote translational research and accelerate economic growth and societal benefits by Govt. of India. Finally Prof. M Seetharama Bhat, from Indian Institute of Science, Bangalore talked about "Attitude & Rate Estimation from Star sensor data alone". Professor Bhat talked about gyro-less attitude and attitude rate estimation using data from star trackers alone. He spoke about incremental angles and absolute angles which are estimated using a

new Spacecraft Incremental angle angular velocity estimation (SIAVE) method. This estimate is further refined by the Kalman filter where, Satellite motion is represented by integrated rate parameter model. Further Professor Bhat explained about the alternate method of estimation using second order sliding mode observer. He also talked about briefly an algorithm to determine star camera parameters in real time along with precision attitude estimates at regular intervals of time during a long period of operation. Further, he talked about the possibility of further development of technology that uses star tracker data. Prof Bhat showed that such applications include Relative Attitude determination of satellite information flying and SLAM for robots on Moon & Mars in Sun shadow.



Participants of Colloquium on System Engineering and Institution Building

Felicitation to Dr. B N Suresh, Chancellor, IIST



Dr. B N Suresh - Acceptance speech to felicitation

The felicitation function to honor Dr. B N Suresh started with welcome speech by Dr. Y V N Krishna Murthy who started with a brief introduction about Dr. B N Suresh's humble beginning as son of a farmer from a small village near Sringeri in Karnataka. He talked about further how ? Dr Suresh after studying in vernacular medium (Kannada), rose to become one of India's best system engineer and educator par excellence. Shri. S Somanath, Director, VSSC spoke about how Dr. Suresh's reviews encouraged them to develop their system, without imposing his ideas on them and instead asking them to work for their goal. He attributed this attitude of Dr. Suresh as best hall mark for a Guru. Shri. V Perumal, Former Director, LPSC spoke about how his and Dr. Suresh's humble beginnings helped them to achieve great heights and praised his contributions to ISRO. Shri.P Veeraragavan, Former Director VSSC, spoke about four E's, namely Energy, Energize, Edge and Execution, which he read from a book and how all these exactly fitting to Dr. Suresh. He spoke that Dr Suresh has abundant energy and he energizes people around him to excel, then cutting edge technology he develops and finally executing

many things thus having all four E's. Dr. V Narayanan, Director, LPSC, talked about Dr Suresh's leadership and guidance in Systems Engineering and how they all benefitted when he was a young engineer. Dr. Sam Dayala Dev, Director, IISU also spoke about his contributions to system engineering. Dr. Chandra Dattan, Former Director, VSSC explained how Dr. Suresh convinced him to take up Directorship of SHAR at Sriharikota even though he was reluctant to go. He also told that how? Dr. Suresh convinced then Chairman ISRO Shri. Madhavan Nair, to allow Dr. Chandra Dattan's team to develop solid propellant in ISRO than to give it to private companies. Thus he spoke about how such timely interventions and advices by Dr. Suresh helped him to achieve many things in ISRO. Dr. V Adimurthy Former Dean R & D, IIST, Dr. K N Ninan, Former DD RPP, VSSC spoke about their experiences with Dr. Suresh at IIST and ISRO. From IIST student side, Shri. Prakhar Agarwal, Scientist/Engineer SD LPSC, ISRO and alumnus of IIST(1st Batch) spoke about how students at IIST used to love him and his affections towards them. He promised that ultimate gratitude to Guru

Dr. Suresh is to achieve something in ISRO and someday IIST alumnus will surely prove that. In his acceptance speech, Dr Suresh thanked all those who spoke about him and told that he was fortunate to have excellent bosses like Dr. S C Gupta, a doyen of system engineering and former Director, VSSC with whom he joined ISRO as young engineer in 1969. He praised Dr. Gupta for his guidance and told the audience that he was lucky to have not only excellent bosses but also outstanding colleagues and sub-ordinates throughout his career and he owed his success to all of them. He later explained how Prof. U R Rao, the then ISRO Chairman put faith in him even after first failure of one of his control designs. Dr. Suresh also briefly touched upon the starting up of IIST in a short notice with the help of ISRO colleagues.

From this colloquium it was clear that Dr. Suresh is loved by all his bosses, colleagues, sub-ordinates at ISRO, faculty and students of IIST as he never showed his anger to any of them even though he could at many times. IIST Newsletter team wishes Dr. Suresh a very long and productive life as he was responsible for starting it in 2008 for the first time.



2. National Conference on Stochastic Differential Equations and Applications

Department of Mathematics, IIST jointly with Indian Institute of Technology, Roorkee conducted a National Conference on Stochastic Differential Equations and Applications at IIST during June 6-7, 2019. The National Board for Higher Mathematics (NBHM/DAE) and SERB/DST generously supported this conference along with IIST for all local facilities. The research area of stochastic differential equations (SDEs) has been one of the primary areas of applied mathematics for the last several decades, providing the fundamental tools for understanding the complex physical systems arising, for instance in, fluid dynamics, mathematical physics, statistical mechanics, finance, etc., whose dynamics are subject to random fluctuations. One has to come up with most sophisticated tools from probability theory, functional analysis, partial differential equations, etc., to understand the dynamical behavior of these systems. This conference covered various areas of SDEs including solvability of SDEs, control and stability analysis, ergodic theory, large deviation theory and numerical analysis of SDEs. Out of 120 students and faculty registered 40 participants were selected from different institutes and universities based on their background and interest. Nine eminent speakers on the theme of the conference were invited from IITs, IISERs, TIFR, and universities. Prof. Raju K. George, Dean R&D, IIST welcomed the gathering and Dr. V.K.Dadhwal, Director, IIST inaugurated the conference. In the keynote address, Prof.S.S.Sritharan, Vice-Chancellor, M.S.Ramaiah University of Applied Sciences, Bangalore emphasized the synergy between the applied mathematicians and R&D institutions in government and private sector and finally, Dr.K.Sakthivel, Convenor of the



(Left to Right) Dr. V. K. Dadhwal, Prof. Raju K George, Prof. S. S. Sritharan (Vice-Chancellor, M.S.Ramaiah University of Applied Sciences, Bangalore), Dr. K. Sakthivel



Participants of National Conference

local organizing committee expressed the vote of thanks. The participants of this conference including the research scholars and faculty members of the institute were benefitted from 9 invited talks and 15 contributed talks on various aspects of SDEs and applications to different fields of science and engineering. We received very good feedback in valedictory function and Dr.Manil T.Mohan, the co-convenor of this conference, IIT-Roorkee also expressed his views on the future plan of conducting this conference in different institutes of the country to introduce the importance of SDEs to graduate students and state-of-the-art methods and new results to research scholars on this field in a timely manner.

3. NuMATS @ IIST

IIST and SCERT Kerala jointly organised NuMATS, a five-days Mathematics residential camp for higher secondary students, during 14th - 18th June 2019 in IIST campus. NuMATS is an innovative programme designed to identify and nurture mathematical talents in students. Around sixty students, who were given training in Mathematics right from their sixth standard, were participated in this camp. These students were the first and second batches who attended the NuMATS camp in its initial years. The present camp was aimed to hone the mathematical skills of the young talents who are going to step out of the school system and venture out into the world of challenges and opportunities. Cross sections of the children from all the fourteen districts of the Kerala State were selected through various levels of tests at the age of 11. The programme was designed in such a way that a cycle of the camp will be completed in 7 years. The first cycle of the program was started in 2012 and will be completed in 2019, along with completion of 10+2 course of the students.

4. Colloquia

- i) **Dr. Vijayamohanan Pillai**, Ex-Director, CSIR-Central Electrochemical Research Institute (CSIR-CECRI), Karaikudi delivered a talk on Usefulness of Periodic Table for the Design of Materials on 28.02.2019 in Dept. of Chemistry.
- ii) **Prof C Retna Raj**, Dept. of Chemistry, IIT, Kharagpur, delivered a talk on Functional materials for Electrochemical energy Conversion and Storage on 25.04.2019 in Dept. of Chemistry.



NuMATS Batch-I Students, Faculties and Staffs

The camp was inaugurated by Dr YVN Krishna Murthy, Senior Professor & Registrar, IIST. He spoke about the relevance of Mathematics in the present scenario, spanning a broad spectrum of fields ranging from space research to smart economy. He remarked that as young researchers, students should develop skills for observation and process various data. Dr J Prasad, Director, SCERT, presided over the inaugural ceremony. In the presidential address, he underlined the relevance of such camps in bringing out the best from children in general schools. Dr E Krishnan, Retd. Professor, Dept. of Mathematics, University of Kerala, Prof. Raju K George, Dean (R & D), IIST, Prof. Kuruvilla Joseph, Dean (Student Activities & Welfare and Outreach Programme), IIST, Prof. Sabu N, Head, Dept. of Mathematics, IIST and Dr S Raveendran Nair, Head, Dept. of Curriculum, SCERT, offered felicitations. Dr Anil Kumar, Professor, Dept. of Mathematics, IIST welcomed the gathering. Dr Siva Kumar K S, Co-ordinator, NuMATS, proposed the vote of thanks.

Human Space Programme @ IIST

There list of activities under HSP@IIST relate to discussion on formulation of academic programs, submission of research proposals, and announcement of innovation challenge and student presentations in response to the posted challenge.

In response to the Announcement of Opportunity (AO) for Low Earth Orbit based Microgravity Experiments, 8 proposals were submitted by IIST faculty among which a proposal 'Spaceflight-induced changes in kidney stone formation in *Drosophila Melanogaster*' in the space life sciences category jointly submitted by **Dr. K G Sreejalekshmi** and **Dr. Ravikumar Hosamani** (UASD, Dharwad) got recommended for the first development flight of Gaganyaan. As part of the activities related to HSP@IIST, **Dr. Sharmila Bhattacharya**, Chief Scientist for Astrobionics and Director, Biomodel Performance and Behavior Laboratory at NASA Ames Research Center, California visited the campus on 23.05.2019, delivered a lecture on using Brewer's yeast as a 'canary in the coal mine' to prepare for long term human exploration of deep space and interacted with faculty and students of IIST.



Dr. Sharmila Bhattacharya, NASA Ames Research Centre delivering lecture

Hindi Events @ IIST

आईआईएसटी में आयोजित विविध हिंदी कार्यक्रम

संस्थान में जनवरी से जून 2019 तक निम्नलिखित कार्यक्रम आयोजित किए गए।

1. विश्व हिंदी दिवस समारोह 2019

विश्व हिंदी दिवस समारोह - 2019 के उपलक्ष्य में कर्मचारियों के लिए जनवरी 17 व 18, 2019 को तथा संस्थान के छात्रों के लिए जनवरी 16, 17 व 21, 2019 को हिंदी में विविध प्रतियोगिताएं चलाई गईं। संस्थान के छात्रों तथा कर्मचारियों ने अलग अलग वर्गों के लिए निर्धारित प्रतियोगिताओं में भाग लिया। जनवरी 26 को इससे संबंधित पुरस्कार वितरण समारोह का आयोजन किया गया। प्रतियोगिताओं के विजेताओं को निदेशक महोदय द्वारा नकद पुरस्कार एवं प्रमाण पत्र वितरित किए गए।



पुरस्कार वितरण समारोह

2. आईआईआईटी हिंदी गृह पत्रिका 'अंतरिक्ष धाराएं' - दूसरा अंक

आईआईआईटी हिंदी गृह पत्रिका 'अंतरिक्ष धाराएं' के दूसरा अंक का विमोचन जनवरी 26, 2019 को विश्व हिंदी दिवस समारोह - 2019 के उपलक्ष्य में आयोजित पुरस्कार वितरण समारोह में किया गया। इस अंक में छात्रों एवं कर्मिकों के लेख, कहानियां, कविताएं और विविधता भरे रोचक कृतियों का समावेश किया गया है।



हिंदी गृह पत्रिका 'अंतरिक्ष धाराएं' के दूसरा अंक का विमोचन

3. पुस्तकालय कर्मिकों के लिए हिंदी में बोलचाल की कक्षाएं

पुस्तकालय कर्मिकों के लिए मई 28 और 29 को हिंदी वार्तालाप (मौखिक हिंदी) की कक्षाओं का संचालन किया गया। श्री. आर. जयपाल, वरिष्ठ हिंदी अधिकारी, आईआईएसटी और श्री. ए. सोमदत्तन, सहायक निदेशक राजभाषा, (सेवानिवृत्त), आयकर विभाग ने दो दो घंटों की कक्षाएं चलाईं।



श्री. ए. सोमदत्तन, सहायक निदेशक राजभाषा, (सेवानिवृत्त), कक्षा संचालन करते हुए

4. हिंदी कार्यशालाओं का आयोजन

i) कार्यपालकों के लिए हिंदी कार्यशाला

आईआईएसटी में राजभाषा कार्यान्वयन की गतिविधियों के भाग के रूप में, संस्थान के कार्यपालकों (सभी डीन, विभागाध्यक्ष, प्रभाग प्रधान एवं प्रशासनिक क्षेत्र के अधिकारी) के लिए मार्च 18, 2019 को एक अर्ध दिवसीय हिंदी कार्यशाला का आयोजन किया गया जिसमें 16 कार्यपालकों ने सक्रिय रूप से भाग लिया। इस कार्यशाला का औपचारिक उद्घाटन डॉ. विनय कुमार डढ़वाल, निदेशक महोदय द्वारा किया गया। इस सत्र का संचालन श्रीमती के. एन. सरस्वती, नियंत्रक, एलपीएससी ने किया। उन्होंने राजभाषा नीति का प्रभावी कार्यान्वयन विषय पर विस्तृत व्याख्यान दिया।



श्रीमती के. एन. सरस्वती, नियंत्रक, एलपीएससी, कक्षा संचालन करते हुए

ii) तकनीकी क्षेत्र के कर्मचारियों के लिए हिंदी कार्यशाला

तकनीकी क्षेत्र के कर्मचारियों के लिए 13 व 14, जून 2019 को हिंदी कार्यशाला का आयोजन किया गया। श्री. आर. जयपाल, वरिष्ठ हिंदी अधिकारी, आईआईएसटी ने राजभाषा नीति कार्यान्वयन- अद्यतन आदेश / निर्धारित लक्ष्य विषय पर विस्तृत व्याख्यान दिया तथा श्री. एम. जी सोम शेखरन नायर, वरिष्ठ हिंदी अधिकारी, वीएसएससी ने हिंदी की तकनीकी शब्दावली एवं उसका सरकारी काम काज में प्रयोग विषय पर अभ्यास कराया। तीसरे सत्र में श्री. आर. जयपाल, वरिष्ठ हिंदी अधिकारी ने तकनीकी शब्दावली पर अभ्यास कराया। चौथे सत्र में उन्होंने कंप्यूटर के सहारे राजभाषा हिंदी में कार्य विषय पर कक्षा का संचालन किया। उन्होंने प्रतिभागियों को कंप्यूटर पर टंकण का अभ्यास भी कराया तथा विविध ई - टूल्स का परिचय भी दिया। सभी प्रतिभागियों ने इस कार्यशाला के आयोजन पर अपना संतोष व्यक्त किया और सत्रांत में हुए विचार - विमर्श में प्रतिभागियों ने बड़े उत्साह के साथ भाग लिया।

5. हिंदी शब्द संसाधन प्रशिक्षण कार्यक्रम

नगर राजभाषा कार्यान्वयन समिति तिरुवनंतपुरम (कार्यालय - 2) के तत्वावधान में नराकास के सदस्य कार्यालयों के अधिकारियों / कर्मचारियों के लिए 12 जून 2019 को पूर्वाह्न 10.00 बजे से संस्थान के कैड लैब में हिंदी शब्द संसाधन प्रशिक्षण आयोजित करने की व्यवस्था की गई। प्रशिक्षण केंद्र तक और प्रशिक्षण के उपरांत वापस पहुंचाने के लिए एल पी एस सी वलियमला की सहयोग से गाड़ी की व्यवस्था की गई। इस प्रशिक्षण कार्यक्रम का औपचारिक उद्घाटन डॉ. विनय कुमार डढ़वाल, निदेशक आईआईएसटी द्वारा किया गया। कक्षा का संचालन श्री. आर. जयपाल, वरिष्ठ हिंदी अधिकारी, आईआईएसटी ने किया। मध्याह्न भोजन के बाद पुस्तकालय भवन का दौरा करके 02.30 बजे सारे प्रतिभागी संस्थान परिसर से वापस गए। इस प्रशिक्षण में विविध कार्यालयों से कुल 30 नामांकन प्राप्त हुआ। संस्थान से श्रीमती मिनी कुमारी, वरिष्ठ सहायक इसमें भाग लिया।



नराकास के सदस्य कार्यालयों के अधिकारिगण / कर्मचारिगण

6. नगर राजभाषा कार्यान्वयन समिति की गतिविधियों में भागीदारी

आईआईएसटी, वलियमला नगर राजभाषा कार्यान्वयन समिति, तिरुवनंतपुरम के सदस्य कार्यालय है और इसके क्रियाकलापों में सक्रिय रूप से भाग लेता है। इसके तत्वावधान में आयोजित संयुक्त हिंदी पखवाड़ा समारोह में संस्थान के कर्मचारियों ने भाग लिया और 'हिंदी कविता पाठ' में डॉ. सरिता विग, सह आचार्य, पृथ्वी एवं अंतरिक्ष विज्ञान विभाग को प्रथम पुरस्कार, श्रीमती रेनी थोमस, वरिष्ठ लेखा अधिकारी को 'हिंदी कविता पाठ' में द्वितीय पुरस्कार तथा 'आशुभाषण' में प्रथम पुरस्कार, 'तस्वीर क्या बोलती है' में डॉ. वी. रवि, सह आचार्य, मानविकी विभाग को प्रोत्साहन पुरस्कार, 'प्रश्नोत्तरी प्रतियोगिता' में श्री. हरि प्रसाद आर. उप कुल सचिव ग्रेड - II वित्त एवं श्री. राकेश आर. मेनन, वरिष्ठ क्रय एवं भंडार अधिकारी को प्रोत्साहन पुरस्कार, 'टिप्पण एवं आलेखन' में श्रीमती श्रीजा जे. जे., वरिष्ठ तकनीकी सहायक को तृतीय पुरस्कार, 'अनुवाद' में श्रीमती आन्सी ओस्टिन, पुस्तकालय सहायक को प्रोत्साहन पुरस्कार मिले। तिरुवनंतपुरम के चार नगर राजभाषा कार्यान्वयन समितियों के बीच में आयोजित अंतर नराकास देश भक्ति गान प्रतियोगिता में भी हमारे संस्थान के कर्मिकों ने भाग लिया।

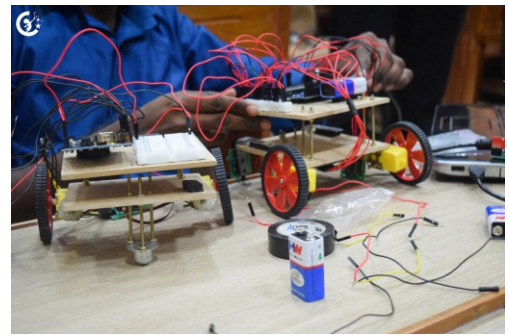
Conscientia 2019

Conscientia 2019 was successfully organized during March 1st to March 4th, 2019. In total, there were about 591 students participated from all over India which is about 25% increase compared to previous edition of *Conscientia*. In Conscientia 2019, 40 events were conducted in areas like, Aerospace, Robotics, Mechanical Engineering, Astronomy, Physics, Mathematics, and Programming. Also, special workshops were conducted on topics like Robotics Operating System, Ethical Hacking, Sphere Drone, Swarm Robotics, Big Data Hadoop, Model Rocketry etc. In addition to these events, lecture series were also conducted in which, Shri D K Das, Director, SAC, Ahmedabad, Astrophysicist Dr. Abhas Mitra, Prof Rana Adhikari, Caltech, Senior Scientist Dr. R Aileen Yingst, Dr. Umesh Kadane of IIST, and Mr. Siddhart Ojha, student from University of Petroleum and Energy Studies delivered series of lectures. This year an exhibition by various organizations called as Tech-Expo was organized in the campus as part of Conscientia-19 where, ISRO centers like VSSC, Trivandrum, NRSC, Hyderabad, NARL, Gadanki, IIRS, Dehradun, IPRC, Mahendragiri, and LPSC, Valiamala, put up their exhibits along with Kudankulam Nuclear Power plant, Centum Electronics, Bangalore, LIGO, India, New Space Research and Technologies, Bangalore, OSA, SPIE student chapter and IIST Ph.D student's startup company. This was a new initiative in this edition of Conscientia. Also, IIST's social outreach wing NIRMAL brought around 160 school students drawn from in and around Trivandrum to visit this Tech-Expo. Apart from these visitors, students, parents, faculty and ISRO employees actively participated in Conscientia-19. External visitors include college students from 72 colleges from 8 States and 2 Union Territories.



Inauguration of Conscientia 2019 - Mr. Jesal Kotak, Dr. V. K. Dadhwal, Shri. D K Das (Director, SAC), Dr. YVN Krishna Murthy and Prof. Kuruvilla Joseph

Conscientia 2019 received sponsorships from, Bellatrix Aerospace Pvt. Ltd, IISc Bangalore, Aeron systems Pvt. Ltd, Pune, Maharashtra, TDI International India (Pvt. Ltd), New Delhi, Newspace Research and Technologies Pvt. Ltd, Bangalore, Nopo Technologies Pvt. Ltd, Bangalore, Malarwadi digital printers, Nedumangadu, Trivandrum, Space Kidz, India, Chennai, Analytics labs, Bangalore, Range Enterprises, Trivandrum and STS Tours and travels, Trivandrum.



Cultural Events

1. Kudiyaattam programme at IIST

The cultural committee of IIST hosted a lecture-demonstration and performance of Kutiyattam on March 6, 2019. This was an outreach initiative from the Sangeeta Nataka Academy (SNA) Kutiyattam Kendra, Thiruvananthapuram. The artists who performed were from Margi, Thiruvananthapuram. The program was attended by many students, faculty and staff of IIST. The program started by 6:30 PM in the open-air stage at IIST with an introduction to Kutiyattom, its history, demonstration of certain key elements of the art-form for about half an hour. The story chosen for the performance was Toranayuddham from Bhasa's Abhishekhanatakam. As majority of the audience were new to the art-form and not conversant with Sanskrit language, a scene-by-scene narrative was



projected on either sides of the stage to help to understand what was being enacted on stage. The program concluded by 8:45 PM and the artists were felicitated by Prof C. S. Narayanamurthy and Prof. Kurien Issac.

2. Report on Krav – Maga Self Defense Workshop

The Cultural Committee, IIST has organised a 2 hour hands-on workshop and training session on Krav – Maga, a self-defense martial art form, originally developed by Israeli Defense Forces. The workshop was held on March 9, 2019 from 7:30 AM to 9:30 AM in the basketball court. The workshop was attended by about 50 students. A team of 9 instructors from the International Krav Maga Federation's branch, Thiruvananthapuram conducted the session.

IIST QC-Fixion

QC Fixion, the annual inter-collegiate general quiz competition of IIST by the Quiz Club was held on 30th March, 2019 in the IIST campus. The event saw participation from over 9 teams, with 5 teams from outside colleges. Mr. Snehaj Srinivas, Director of Qfactory was the quizmaster. Seven teams made it to the finals which had 5 rounds of quizzing. The 1st, 2nd and 3rd positions went to the following teams:

1st position: Jameer K B (University College, Trivandrum), Akhil Ghosh (CASC)





2nd position: Sarath V R (TKM College), Jithu Johny (University College)

3rd position: Aravind MJ (University of Kerala), Akshay B Vinayak (University of Kerala)

The winners received cash prizes worth Rs. 8000, Rs. 4000 and Rs. 3000 respectively. They were felicitated by the quizmaster and Dr. C.S. Shaijumon, faculty-in-charge of Quiz Club of IIST. QCFixion 2019 was organized by Niharika Rajan and Bharath Saiguhan, on behalf of Quiz Club of IIST

IIST Model United Nations 2019

IIST Model United Nations is an academic simulation of the largest international organization, the United Nations, which aims to educate students about the current events and topics with the subjects being international relations, diplomacy, space technological advancements and the United Nations agendas. The 9th edition of IIST MUN, IIST MUN 2019 was held during the dates April 6-7 and has simulated the Committees – UNCOPUOS (United Nations Council on the Peaceful Uses of Outer Space) and UNHRC (United Nations Human Rights Council). This edition witnessed large and enthusiastic participation from both outside as well as IIST students. The event was inaugurated by Dr. V K Dadhwal, Director IIST. Secretary General, Mr. Karthik Ramachandran welcomed the gathering and Dr. C S Shaijumon, IIST MUN Chairperson felicitated the inaugural function. The Director of Delegate Affairs, Shreya Mishra has delivered the Vote of Thanks. The delegates then had the opportunity to interact with Dr. V K Dadhwal, former chairman of UNCOPUOS. About 50 delegates were participated in the event, of



Director, IIST inaugurating the IIST Model United Nations 2019



which 20 are from other institutions. The Legal Subcommittee of the UNCOPUOS has discussed the agenda of “Defining the accountability of private space enterprises and their role in the space industry”. Its *Scientific and Technical* Subcommittee discussed the agenda of “Potential benefits of nuclear spacecraft propulsion technology and an inquiry into the legalization of its usage”. In UNCOPUOS, Mr. Chrisle Joseph Charles from Mar Athanasius College, Kothamangalam won the Best Delegate award. IIST students Mr. Austin Joe Amalnathan and Sushanth S have received High Commendation and Special Mention respectively. UNHRC has two agenda namely “Human rights of Unaccompanied Migrant children and adolescents” and “Ensuring privacy by imposing regulations on activities of Intelligence Organizations”. Ms. Megha Mary Biju of Muthoot Institute of Technology and Science Cochin has won the Best Delegate award. Mr. Adisankar MG of Govt Barton Engineering College Trivandrum, Ms. Niranjana of Model Engineering College Cochin and Mr. Arun S of IIST have won High commendation, Special Mention and Honourable Mention awards respectively.

Sports @ IIST

The Annual sports meet for the academic year 2018-19 held on 23rd February 2019 at the Magudagiri ground (IIST Plot-2). This was the **first time we are conducting the sports meet on our home ground, which was inaugurated by the Director IIST on 15th February 2019**. Trials of track events have been conducted during the week Feb 16-22.



Dr. V K Dadhwal inaugurating IIST sports ground



(Left to Right) Dr. V K Dadhwal, Dr. Solomon, Ivan, Dr. Y V N Krishna Murthy, Prof. Kuruvilla Joseph

1. IIST ANNUAL SPORTS DAY

Dr. Pradeep Dutta, the First Indian FIFA conditioning instructor and Associate Professor, SAI LNCPE Thiruvananthapuram was the chief guest of the event. Prof. Kuruvilla Joseph, Sr. Professor and Dean (Students Activities), IIST welcomed the gathering and Dr. Y V N Krishna Murthy, Sr Professor and Registrar, IIST felicitated the occasion. Flag of IIST was then hosted by the honourable chief guest, followed by lighting of torch by the chief guest and other dignitaries. After lighting of torch Dr. J Solomon Ivan, Chairman, sports council, IIST requested chief guest to come on podium for saluting the march past of different houses. After March past



honourable chief addressed the gathering and declared annual sports meet 2018-19 opened. With the meet declared open the first event was 100mtrs for boys and girls, followed by various other track and field events. Faculty-Staff and their kids also participated. Prize distribution was also done in between by faculty and heads of departments. There was huge participation in almost all the events and all the events ended at 4.00 pm on 23rd Feb 2019.



Dr. Y V N Krishna Murthy giving memento to the IIST Sports day Chief Guest Dr. Pradeep Dutta



Students participating in a track event

2. REVELS CUP - 2019

Students of IIST participated in a national level Revels cup championship on 04th - 09th March 2019, which is organized by Manipal Institute of Technology, Manipal. From IIST, 51 students participated in various items such as Football, Cricket, Basketball (Boys & Girls), Chess, Badminton (Boys & Girls). In chess Competition IIST has secured THIRD position. We got a successful entry to championship and had a great experience to students.

3. DHWANI FEST - 2019

IIST team comprising of student members namely, Mr. Unnikrishnan S (B.Tech 4th year, Aerospace), Abhishek A (B.Tech 2nd year, Engineering Physics), Shah Fenil Piyush (B.Tech 4th year, Engineering Physics), Shashwat Gupta (B.Tech 1st year, Aerospace), Dakshin Tillo (B.Tech 2nd year, Engineering Physics) participated in Dhawani fest at CET, Trivandrum during 16th March to 17th March, 2019. IIST team bagged the First place and was selected as the 'Best College' in Trivandrum.

4. INTER HOUSE TOURNAMENTS

Annual inter house championships among IIST's houses namely, Akashganga, Devyani, Sharmista, Krithika and Saptarishi were conducted in football, cricket, basketball, badminton, chess, table-tennis, carroms and volleyball. Medals and certificates were issued to winners of this inter house tournaments and in that Krithika house won the overall IIST inter house championship for the year 2018-19.

International Yoga Day



Students and Faculty participating in Yoga Session

On 21st June 2019, the fifth International day of Yoga was celebrated in the Seminar Hall, D4 Building in Indian Institute of Space Science and Technology from 07:15 am onwards, emphasizing the importance of yoga in daily life. The event comprised of various activities such as yoga practice & demonstration sessions and talk on yoga's importance for the students and staff of the college. Dr. V. K.Dadhwal, Director, IIST has inaugurated the International Yoga Day Celebration at 10:00 am. Dr. Y V N Krishna Murthy, Registrar, IIST delivered the welcome speech and Prof. Kuruvilla Joseph, Dean Student Activities delivered the felicitation

speech. The inaugural function ended with the Vote of Thanks by Dr.V.Ravi, Co-ordinator, International Yoga Day, 2019. An interactive session on “Rediscover your potential-The Yogic Way” was delivered by Mrs. Uma Kalyani, Registered Dietitian and Yoga Trainer, Founder and Director of Umas Nutriyoga from 10:30 am to 12:30 pm. In this talk, she emphasized on various aspects of meditation, yoga, importance of kriyas and the long term benefits of practicing yoga in our day to day lives. A number of questions were also asked by the audience. Mrs. Uma Kalyani also gave away prizes to five people who had answered correctly, the questions asked by her during the course of talk. Around 150 people in total participated in this interactive session. At 3 pm, video documentary on “History of Yoga and its benefits” was screened at the Seminar Hall. Around 100 people participated in this session. Tea and snacks were given to people after the session.

ExoWorlds : Proposed Astronomy Mission

The study of extrasolar planets is revolutionizing modern astronomy. Envisaging a giant leap forward, a pioneering ISRO mission, ExoWorlds, is proposed which holds the promise to be the world-leading facility in the next decade for studies of planets beyond the Solar System – the Exoplanets. The efforts towards this future space telescope is led by IIST alongwith other ISRO Centres and the University of Cambridge. The mission will make major scientific breakthroughs in Exoplanet science and catapult India to the forefront of this emerging field. The proposed mission will be:

- >The largest dedicated Exoplanet mission in the world
- >The first astronomy mission of ISRO in L2 orbit

>The largest astronomy mission of ISRO

>The only mission of its kind and capability in the next decade globally



Participants of Team Meet of ExoWorlds

The ExoWorlds Consortium include researchers from the premier institutes like TIFR-Mumbai, ARIES-Nainital, PRL-Ahmedabad, IUCAA-Pune, IIA-Bangalore, IISER-Kolkata, SNBNCBS-Kolkata, St Joseph College-Bangalore, Christ University-Bangalore. IIST hosted the first in-person Team Meet of the ExoWorlds Mission from 4 – 6 January 2019. The meeting was inaugurated by Dr. VK Dadhwal, Director, IIST and was attended by around 40 participants. Several sessions were planned and well executed to address various aspects of the mission. Discussion and brainstorming sessions on Payload Development, Payload Operation Centre, Ancillary Science with the mission, Science Planning and Observing Strategy, Capacity building in Modelling and Theory and Observations, Data Analysis Pipeline and Workshops & Public Outreach were conducted. These sessions witnessed active and focused participation from the team members.

NIRMAAN IIST

NIRMAAN, the social outreach club of IIST was founded primarily to uplift the socially and economically backward sections of the community. This year NIRMAAN has taken the role of spreading knowledge to students studying in various schools around the institution. This semester, NIRMAAN conducted 4 sessions in Government High School, Karipoor with participation of 75 students.

The various sessions which were conducted were :

1. Vihang- Hands on session involving building and flying of water rockers
2. Backyard Science- Workshop displaying the wonders of physics and chemistry on an everyday basis
3. Lumiere- Workshop explaining various optical phenomenon, handled by team SPIE
4. Hakunamatata- Career Guidance, Certificate Distribution

Apart from the school sessions, NIRMAAN also has come up with two new initiatives this semester - “Meet the excellence” and “Meet the alumni” series.

“Meet the excellence” series an initiative brought into action this semester by NIRMAAN. Aimed to inspire the students, NIRMAAN invites eminent dignitaries to give talk and interact with the students. Dr YVN Krishna Murthy, Registrar, IIST delivered the first talk of the session on .

“Meet the alumni” series : Shri Aswin Jacobs, 2013-17 batch, Avionics shared his experiences in IIST and in VSSC and the transition from a student in IIST to a scientist in VSSC. The session was driven by questions from the audience who got to know in detail about the role and responsibilities of a project engineer; the team efforts behind the successful programs in ISRO and IIST.

Students Corner

Optical Society of America (OSA) and Society of Photo Optical Instrumentation Engineers (SPIE), USA student chapter activities @ IIST

SPIE Student Chapter in IIST associated with Applied and Adaptive Optics laboratory is proud to have yet another fruitful year of academic activities including training the undergrads and exposing them to current line of research, conducting several scientific talks, demonstrations, state wide outreach programs especially in the socially backward areas. Using the Quality Lighting Teaching (QLT) Kit from SPIE demonstrations were arranged in schools after taking ideas and suggestions given through hangouts and tutorials. One Student from the chapter got selected for the SPIE officer travel grant for the SPIE Optics + Photonics conference this year.

Awards for students of IIST

- 1) Ms. Haritha H, Res. Scholar, Dept. of Chemistry bagged first prize for her paper entitled "Modified separator performing dual functions to inhibit the shuttle of polysulfides for lithium-sulfur batteries" at the Twelfth International Symposium on Advances in Electrochemical Science and Technology (iSAEST-12) held during January 08-10, 2019 at Hotel Trident, Chennai, Tamil Nadu.
- 2) Ms. Neelima P studying in M.Tech (Material Science and Technology), IIST, got a certificate of appreciation for her oral presentation on the paper entitled "Flux Bounded Tungsten Inert Gas (FBTIG) Welding of Inconel 600" during "Research Scholars Symposium on Materials Science and Engineering" conducted by The Indian Institute of Metals, Trivandrum Chapter on 3 April, 2019.
- 3) Ms. S. Keerthipriya, M.Tech, RF and Microwave Engineering, Avionics under the supervision of Dr. Chinmoy Saha has been awarded best paper award in Technical Session of IEEE IMICPW-2019 (International Conference on Microwave Integrated Circuits, Photonics, and Wireless Networks) held at NIT-Trichy on May 22-24, 2019 for the paper titled "Tunable Multifunctional Reconfigurable Step Profiled Dielectric resonator Antenna for Cognitive Radio Applications" authored by S. Keerthipriya and Dr. Chinmoy Saha



Following students of 2014 batch Dual Degree Programme visited Australia National University, Canberra for three months summer internship between May – July 2019



Ms. D Bhavana (Astronomy & Astrophysics)



Mr. Kannan S (Solid State Physics)



Mr. Naman Jain (Solid State Physics)



Ms. Jigyasa Nigam (Solid State Physics)



Mr. KVNG Vikram (Earth System Science)

Following students visited Caltech / JPL for two months internship during May – July 2019



Ms. Jureddy Chinmai Sai
(Engineering Physics)



Mr. Aalokeparno Dhar
(Aerospace Engineering)



Mr. Subham Saha
(ECE)

MOU Signed by IIST

List of MOUs signed during the period - January to June 2019

Sl. No	Organization	Title/ Purpose of MOU	With effect from
1	California Institute of Technology (Caltech), USA & University of Surrey (UoS), UK	Joint educational activity to design, fabricate, assemble and demonstrate in space the AAReST (Autonomous Assembly of a Reconfigurable Space Telescope)	01.02.2019
2	Laboratory for Analysis and Architecture of Systems (LAAS-CNRS), France under DST-CNRS-Targeted Programme	Collaborative research project "LOC approaches for Separation and analysis of Exosome Derived Biomarkers for Cancer Prognostic"	13.05.2019
3	Indian Institute of Astrophysics(IIA), Bangalore	Development of Solar Physics experiments	06.03.2019

Visitors from abroad

Sl No	Name and affiliation	Purpose of visit	Date of Visits
1	Dr. Parry Ian Robert University of Cambridge, UK	The ExoWorlds Team Meeting at IIST	4 - 6 Jan 2019
2	Dr. Burger Raimund Klaus University of Concepcion, Chile	Research collaboration and interaction with faculty	6 - 16 Jan 2019
4	Prof. Henrik Hasson, Associate Professor Stockholm University	Discussion	28 Jan 2019
5	Mr. Lewine Barry Edward APAC Director, WorldViz, USA	Discussion on virtual reality project proposal	19 Feb 2019
8	Prof. Adhikari Rana Caltech, USA	Conscientia 2019	3 Mar 2019
9	Dr. Virendra Saroha JPL, Caltech	IIST- CalTech / JPL Collaboration	4 - 5 Mar 2019
10	James Larry Dean JPL, Caltech	IIST- CalTech / JPL Collaboration	4 - 5 Mar 2019
11	Prof. De Becker Michael Denis E University of Liege, Belgium	To deliver a lecture and also for collaborative work	14 - 15 Mar 2019
12	Dr. Axisa Duncan, Maita Aerosol Scientist Droplet Mesurement Technique(DMT)	Discussion	20 Mar 2019
13	Dr. Rabin Gilles, France	To establish partnership in the Space Technology domain.	17 May 2019
14	Dr. Fouquet Thomas Valeri Nicolas, France		
15	Weiss Mathieu Joseph, France		

Foreign visits of IIST Faculty (Jan- Jun 2019)

SI No	Name	Country/Organization Visited	Programme/Course/Internship	Period of Conference/ Workshop
1	Dr. Deepak T G,	University of Tasmania, Hobart, Australia	10th Int. conf. on Matrix Analytic Methods (MAM 10)	13 - 15 Feb
2	Dr. Rajesh V J	Japan	Japan-India Forum for advanced study in Earth Sciences,	7 - 16 Mar
3	Dr. E Natarajan	Marseille, France	"Polytopal Element methods in Mathematics and Engineering"	29 Apr - 3 May
4	Dr. Resmi L	United Kingdom	Square Kilometer Array General Science Meeting	8 - 12 Apr
5	Dr. Rajesh Joseph Abraham	University of Bradford, United Kingdom	Honorary Visiting Research Fellow Faculty of Engg. and Info.	4 - 11 Jun
6	Dr. R Sudharshan Kaarthik	Concordia University, Montreal, Canada & Vancouver, Canada	28th IEEE Sympo. on Industrial Electronics (ISIE 2019)	11 - 17 Jun
7	Dr. Rama Rao Nidamanuri	Germany	Univ. of Kassel, Leibniz-Centre for Agricultural Landscape Research, Germany and for taking part in the reviews of the collaborative project.	18 - 25 Jun
8	Dr. E Natarajan	London, United Kingdom	To attend International Conference on : The Mathematics of Finite Elements and Applications (MAFELAP 2019) organized by Brunel University.	18 - 21 Jun
9	Dr. Resmi L	USA	i). Visit University of Nevada Las Vegas (UNLV) ii). "Merging Visions: Exploring Compact –Object Binaries With Gravity and Light" Kavli Institute of Theoretical Physics, Santa Barbara, iii) Visit Pennsylvania State University, USA	21 Jun - 4 Jul



IIST Newsletter Committee

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Indian Institute of Space Science and Technology

Declared as Deemed to be University under Section 3 of the UGC Act, 1956

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