



GURUKUL VĀRTĀ

IIT GOA NEWSLETTER

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MoUs WITH FRANCE & PORTUGAL 2

OUTREACH INITIATIVES 4

INSTI COLLOQUIA 6

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// contents

MoUs with France and Portugal

02

Outreach Initiatives

04

Institute Colloquia

06

Institute Events

13

R&D Highlights

16

Faculty Point

19

On Campus

23

Student Junction

24

At the School

31





(2nd from left) Mr. H. E. Marcelo Rebelo de Sousa, Hon'ble President of Portugal, (3rd from left) Dr. Pramod Sawant, Hon'ble Chief Minister of Goa, (3rd from right) Prof. Vladimiro Miranda and Prof. B. K. Mishra, Director, IIT Goa (2nd from right)

IIT Goa signs International Cooperation Agreements with France and Portugal

MoUs WITH FRANCE & PORTUGAL

IIT Goa has identified Marine Science and Technology as one of its focus areas for research and development. The aim is to make Goa a hub of excellence in marine science and technology by focusing on related academic programs, manpower training, industry-oriented activities, research and development. In this respect IIT Goa has signed MoUs with institutions in France and Portugal.

MoU with French Institutions

IIT Goa signed Memoranda of Understanding with multiple institutions in France on January 20, 2020. The MoUs will provide an opportunity to UG and PG students of the institute to get internships in partner institutions. This will be of special benefit to third year students in B.Tech degree programs who now have the unique opportunity to spend six months in France on an internship after their sixth semester gets completed. The MoUs were signed under the Goa Atlantic Cooperation Programme, also known as GOAT, with the following French institutes: Campus Mondial de la Mer (CMM), Pôle Mer Bretagne Atlantique (PMBA), École Nationale d'Ingénieurs de Brest (ENIB), École Nationale Supérieure de Techniques Avancées (ENSTA) Bretagne, Ecole Navale (EN), Université de Bretagne Occidentale (UBO), France Energies Marines (FEM), Service Hydrographique et océanographique de la Marine (SHOM) and the NAVAL Group. These MoUs also allow for faculty exchanges and joint Indo-French R&D projects. IIT Goa became a member of the GOAT - an

Indo-French collaboration for research and education - during the first Indo-French Knowledge Summit in 2017. Following its inception into the programme, a delegation from France had visited IIT Goa in April 2018 to carry out deliberations on possible collaborations between IIT Goa and French institutions. The continuous efforts of those involved paid

off when the MoUs were signed by our Director Prof. B. K. Mishra and Mr. Michel Gourtay, the Vice President of Brest Métropole. The MoUs were signed during the proceedings of a GOAT workshop on Marine Science and Technology, funded by the Indo-French Centre for the Promotion of Advanced Research (IFCPAR/CEFIPRA), held in the city of Brest from January 20 - 24, 2020. The workshop, coordinated by Prof. Sachin D. Kore, Dean (AP), IIT Goa, and Prof. Manell Zakharia (French Naval Academy), was also attended by a team of six faculty members from IIT Goa, including Prof. Kore, Dr. Sharad Sinha, Dr. Kuntal Deka, Dr. Neha Karanjkar, Dr. Harpreet Singh and Dr. Nandakumar Nambath.

During the workshop in January 2020, IIT Goa delegation also visited multiple partners in Brest. All the institutes expressed mutual interest and intent to undertake cooperative activities for their mutual benefits in education and research, mainly but not exclusively in the following fields: renewable marine energy, advanced computational techniques, numerical modelling and mathematics, combustion technologies, marine bio-technologies, non-destructive evaluation and control, bio-environment and Autonomous Underwater Vehicles (AUV) sensors, imaging, data processing and interpretation and autonomy. The cooperative activities to be undertaken by both parties include the development of a collaborative PhD program, exchange of faculty and students at UG and PG levels, hosting of post-doctoral students and researchers, conduct of joint education & training programs, conduct of joint research programs, and organization of symposia.

In the words of Prof. Mishra, the delegation's visit to Brest, as well as the workshop and the MoUs were meant "to finalise strategies to synergise the expertise on both the sides, so that Goa develops as an important hub of research and development, scientific production and engineering as well as human resource development in marine science and technology". These MoUs also align well with the Government of India's initiatives on blue economy.

MoU with Portuguese Institution

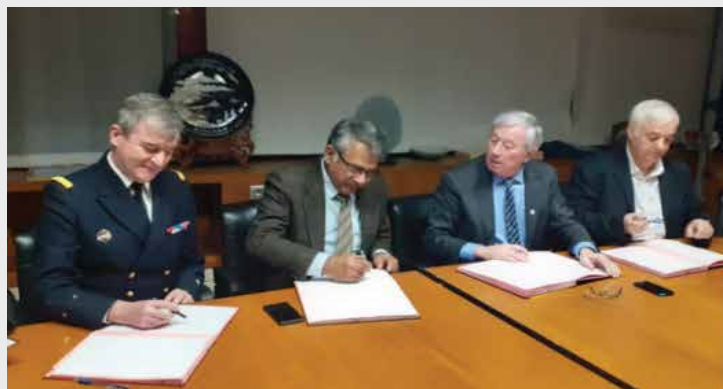
IIT Goa signed an MoU with INESC TEC (Institute for Systems and Computer Engineering, Tech-

nology and Science), Portugal during the state visit of the President of Portugal H.E Marcelo Rebelo de Sousa on February 15, 2020 in Goa. The MoU with INESC TEC also allows our UG and PG students to spend time at INESC TEC under a project, exchange of faculty and joint R&D projects including international projects funded by the European Union. A

delegation of INESC TEC scientists had visited Goa during the period September 25-27, 2019 as part of "BEST Goa-Portugal 2019 – Blue Economy, Science and Technology". The scientists from INESC TEC and IIT Goa had identified more than ten joint R&D

projects for collaboration in ocean science and technology related areas like underwater communications, autonomous underwater navigation, underwater and surface vehicles, marine robotics, marine ecology, chemistry and optics. This MoU became possible because of the extensive involvement of the Indian embassy in Portugal under the leadership of the Indian ambassador Mrs. K. Nandini Singla and the initiative taken by Prof. Vladimiro Miranda, Associate Director of International Affairs at INESC TEC.

"To finalise strategies to synergise the expertise on both the sides, so that Goa develops as an important hub of research and development, scientific production and engineering as well as human resource development in marine science and technology"



Prof. B. K. Mishra, Director, IIT Goa and Mr. Michael Gourtay, Vice President, Brest Metropole with other signatories

OUTREACH INITIATIVES

As part of the IIT Goa's initiative to reach out to the community and to inspire young minds to pursue higher education in the fields of technology, a one-day workshop on Artificial Intelligence was held at the institute on **August 30, 2019**. Drawing over forty participants, the workshop, titled **Artificial Intelligence (AI) For All**, introduced the basic concepts of AI to students and teachers from six schools in Ponda through two very simple technical talks, followed by a practical session. The workshop was made possible through award of a highly competitive outreach grant to the School of Mathematics and Computer Science (SMCS), IIT Goa, by the Association for Computing Machinery's Special Interest Group on Artificial Intelligence (ACM-SIGAI). The workshop was coordinated by Dr. Sharad Sinha (AP, SMCS) and Dr. Clint George (AP, SMCS). Copies of their book, **Artificial Intelligence (AI) Storybook** (English as well as the Hindi versions) were handed out to participants during the workshop. The book has now been made available online and can be freely downloaded for anyone's perusal from the IIT Goa website.

DR. SHARAD SINHA and DR. CLINT GEORGE AFFIRM 'AI FOR ALL'



(top-left) Dr. Clint George delivering a talk (top-right) The participants of the workshop outside the Academic Block, IIT Goa (bottom-left) Dr. Sharad Sinha helping a participant during the practical session (bottom-right) Participants with their copy of the book "Artificial Intelligence (AI) Storybook"

HIGHER SECONDARY SCHOOL STUDENTS TRAINED in ARDUINO



Participants of the CATeRs workshop with IIT Goa student coordinators

A one-day hands-on **Beginner's Arduino Workshop** was held on **September 28, 2019** for higher secondary school students in IIT Goa Electrical lab, under the banner of the Center for Appropriate Technologies for Rural Sectors (CATeRs), IIT Goa. The objective of the workshop was to introduce the students to the world of electronics at an early stage by familiarizing the students with the

popular open-source hardware platform - Arduino micro-controllers. The workshop was designed so that even students without a background in electronic circuits would be able to gather a minimum working knowledge of Arduino by the end of the workshop. The activities began with simple tasks such as blinking an LED and proceeded to more complex ones such as serial I/O operations using Arduino. More than 30 students from 11th and 12th standards from schools in and around Ponda participated in the workshop, accompanied by a few of their teachers. The workshop was managed by more than ten enthusiastic volunteers from the IIT Goa student and staff community. The workshop ended with positive feedback from the participants who expressed their desire to attend more such sessions at IIT Goa.

In the words of one of the participants: "...We didn't have much idea about the workshop and were a bit reluctant about the term Arduino, but your volunteers made sure that how simple this can be, even for beginners like us. It would have been a real miss if I had not participated because of our upcoming exams..."

The faculty coordinator for the workshop was **Dr. Nandakumar Nambath** (AP, SES), while the student coordinator was **Mr. Rohit Nair** (3rd yr., B.Tech, EE).

WORKSHOP on ARTIFICIAL INTELLIGENCE (AI) at DON BOSCO COLLEGE of ENGINEERING, FATORDA

As a part of its outreach initiative, IIT Goa coordinated a one-day workshop on Artificial Intelligence on February 8, 2020, at the Department of Mechanical Engineering, Don Bosco College of Engineering, Fatorda, Margao, Goa. The workshop, which was attended by 39 students and 24 teachers offered the participants a valuable opportunity to familiarize themselves with the concepts of AI and interact with experts in the field. Dr. Sharad Sinha and Dr. Clint P George, Asst. Profs. in CSE, IIT Goa, served as the resource persons and workshop instructors. Dr. Sinha introduced the participants to key concepts on artificial intelligence, defining critical terms, capabilities as well as current limitations of AI, while Dr. George provided an overview of the basic algorithms. Hands-on sessions were conducted, which built upon Dr. Sinha and Dr. George's talks and the knowledge as well as concepts learnt from all the theoretical sessions, using the open source programming language "R". The workshop in collaboration with IIT Goa was coordinated by Prof. Achintya



(top) Dr. Clint George and Dr. Sharad Sinha with the participants of the workshop
(bottom) Session being conducted by Dr. Clint George

Kambli and Prof. Swapnil Ramani, Asst. Profs., Department of Mechanical Engineering, DBCE and was convened by Prof. Ajit Salunke, HoD, Mechanical Engineering.

WHAT IS A PhD? A Q&A SESSION with Dr. NEHA KARANJKAR



(2nd from right) Dr. Neha Karanjkar with PhD scholars and faculties

A talk and an interactive Q&A session on Internship and Higher Education Opportunities at IITs and Other Institutes was jointly organized by the Computer Science and Engineering Department, IIT Goa and the Electronics and Telecommu-

nications Department, Goa Engineering College (GEC) on March 4, 2020. Attended by the final year B.E. and M.E. students at GEC, the purpose of the session was to familiarize the students with higher education programs and to discuss the benefits, the typical structure and admission processes regarding the same. Some concerns and questions that were discussed were the following: What is a PhD? What are the benefits and caveats in pursuing a PhD? Such queries, as well as reflections regarding what a typical PhD process entails were also discussed in detail to motivate and spread awareness among B.E. students. The session, conducted by Dr. Neha Karanjkar (AP, SMCS) was remarkably well received and highly appreciated by the attendees.

INSTITUTE COLLOQUIA

IN FOCUS

IIT GOA HOLDS DST-SERB SCHOOL on ADVANCED FUNCTIONAL MATERIALS at NANO and ATOMIC SCALE

The first DST-SERB School on the theme **Advanced Functional Materials at Nano and Atomic Scale** was held at Indian Institute of Technology (IIT) Goa from February 10 to 28, 2020. The School was sponsored by Science and Engineering Research Board, Department of Science & Technology, Government of India (SERB-DST) through the Programme Advisory Committee (PAC) of Condensed Matter Physics and Materials Science, with **Prof. D. Bahadur** (Visiting Professor, SCBS, IIT Goa) serving as Director and **Dr. Santosh Kumar** (Asst. Prof., SPS, IIT Goa) as Co-director. The School was inaugurated on February 10, 2020 with welcome remarks by the Director of IIT Goa, Prof. B. K. Mishra as well as Prof. D. Bahadur and the chairman of PAC, Dr. D. Kanjilal. Dr. Kanjilal's remarks also provided the SERB perspective about the School. This was followed by the inaugural technical talk by Prof. D. D. Sarma (IISc, Bangalore). 38 participants from over 33 institutes were chosen to be present at the School, selected from over 200 applications received from senior Ph.D. students and postdoctoral fellows from across the country.



Participants of DST-SERB School with Prof. B. K. Mishra

The purpose of the School was to impart advanced knowledge to the young and talented researchers of India regarding the state-of-the-art research and technologies in the fields of broad classes of advanced functional materials, focusing primarily on 2D materials, oxide semiconductors, perovskites and organic semiconductors in their atomic scale, in nanocrystalline & thin-film forms. About twenty renowned experts from the leading institutions, universities & industry delivered hour-long lectures and tutorials, providing the participants a strong fundamental understanding of the materials, the knowledge of state-of-the-art research methodology, and techniques in the field of advanced materials. The knowledge gained during the School would be essential for participants to initiate and accelerate their research at their respective labs and institutes, helping to further enhance the quality of the research activities and the future technologies emanating from our nation. The School also included six special evening lectures from various eminent speakers on topics of interest to participants. Multiple laboratory visits were also organised for the benefit of the participants, both to the laboratories at IIT Goa as well as visits to Goa University.

One of the highlights of the School was the high degree of engagement & interaction between the participants and the speakers, reflected in the lengthy and sustained Q & A sessions after the talks which often extended well into the snack breaks. During the three-week duration of the School, the participants also found the opportunity for interactions aplenty among themselves, hopefully gener-

ating exciting future collaborations. The School also provided the participants with ample opportunities in order to develop close links with the speakers depending upon their areas of research, interactions which would surely be of great help to their career and research.

On the sidelines of the SERB School, on February 12, 2020, another fascinating training session was organized for the participants through a program called 'NanoJatha'. As a part of NanoJatha, on February 11, after their SERB School hours, the participants of the School came to be acquainted with new and exciting experiments on nanomaterials. The next day, on February 12, they worked as volunteers for the NanoJatha program for the first-year students of different colleges and institutes across Goa. The School received excellent feedback from the participants and was successfully concluded on February 28, 2020.

HEALTH TALK on STRESS and EMOTIONAL REGULATIONS

Recognizing the necessity to address stress within today's competitive academic milieu, IIT Goa organized a lecture titled **Emotional Regulations** on **September 25, 2019**. The health talk, which emphasized the need to develop emotional literacy to improve emotional intelligence as a way to combat the academic stress, was delivered by **Dr. Priyanka Sahasrabhojane, MD**. An experienced consultant psychiatrist at Goa Medical College, Dr. Sahasrabhojane is also known to conduct workshops on mental health awareness in corporate and community organizations.



Prof. Mahan Mj delivered a talk on "Hyperbolic Geometry and Chaos in the Complex Plane" on September 9, 2019

IIT GOA & CSIR-AMPRI CELEBRATE 78TH CSIR FOUNDATION DAY

IIT Goa and CSIR-Advanced Materials and Processes Research Institute (CSIR-AMPRI) celebrated the 78th CSIR Foundation Day by jointly organizing a One Day Workshop on **Advanced Materials and Processes**. The workshop, held at CSIR-AMPRI in Bhopal on **September 28, 2019**, was attended by our director, Prof. B. K. Misra and a delegation of faculty members from the institute.

An interactive session with the AMPRI Director Dr. A. K. Srivastava kick-started the workshop, which was followed by the Foundation Day lecture on "Particulate Materials" delivered by Prof. Mishra. With discussions, laboratory visits & technological presentations, this one-day workshop provided the perfect platform for participants to interact, understand and exchange information on infrastructure and the nature of research under-



Director Prof. B. K. Mishra (2nd from right) and Dean Dr. Sachin Kore (1st from left) at the 78th CSIR Foundation Day Celebrations held at CSIR-AMPRI

taken at both the institutes. Coordinated by Dr. N. Sathish and Dr. Meraj Ahmed of CSIR-AMPRI and IIT Goa's Prof. Sachin D. Kore, the workshop laid a strong foundation for possible future collaborative projects of national importance. Prof. Kore, along with Dr. Santosh Kumar and Dr. Sandip Haldar, also presented ongoing research and technological activities at IIT Goa.

Prof. Manell Zakharia from École Navale, France addressed the students on **Summer Internships in France** for the academic year 2019–2020. Conducted on November 6, 2019, the seminar threw light on the opportunities in France open to Indian students as well as offered information on how they can go about pursuing them.

IIT GOA TRAINS ALL-INDIA ENGINEERING FACULTY



Workshop participants with Dr. Sharad Sinha (4th from left, in front)

The School of Mathematics and Computer Science (SMCS), IIT Goa, in association with Arm University Program (co-organiser and sponsor), organised a three-day workshop on the topic **Specification to System-on-Chip (SoC) Design** under the Special Manpower Development Program of the Ministry of Electronics & Information Technology (MeitY), Government of India. The workshop, held from **December 1 - 3, 2019** at IIT Goa for faculty members hailing from various IITs, NITs and other engineering colleges all over the country was conducted in line with the government's Make in India initiative. With the aim to strengthen teaching and research in System-on-Chip Design throughout the country, the program is an example of how IITs, industry organizations and government departments can work in tandem to create a system wherein education as well as research and development feed into the industry in order to strengthen the nation's progress. At the workshop, SoC designs were taught and discussed mainly from two points of view: The Integrated Wireless System-on-Chip Design with FMCW Radar Example and Using SoC FPGAs. Lab sessions saw participants working in groups of two and three to develop software (to run on Arm microprocessor) and hardware (digital hardware in FPGA logic) for a given application. The panel of speakers included Dr. Sharad Sinha (AP, SMCS, IIT Goa), the guest speaker Dr. Akshay Visweswaran (IMEC, Belgium, SMDP-C2SD), the

keynote speaker Mr. Ish Dham (Arm, Lead Validation Architect and Distinguished Engineer), Ms. Apurva Varma (Regional Manager, Arm University Program, India) and Dr. Neha Karanjkar (AP, SMCS, IIT Goa). The programme was coordinated by Dr. Sharad Sinha and Ms. Apurva Varma.

3 DAY WORKSHOP on ELECTRICAL SCIENCES



Participants of the workshop with the faculty members from the School of Electrical Sciences, IIT Goa and Dr. Sachin Kore, Dean, IIT Goa

The School of Electrical Sciences (SES), IIT Goa, conducted a three-day workshop on Electrical Sciences from **December 5 to 7, 2019**. Instituted with the intention to contribute to the knowledge, expertise and development of faculty, scientists in R&D Organizations, graduate students and engineers throughout the country on recent technological advances in electrical sciences, such as power electronic converter and control design for renewable resources and their integration to grid and micro-grids/advances in signal processing techniques for imaging, radar and 5-G communication networks/circuits and systems with emerging sub-micron technology. By providing insight on the state-of-the-art technologies in the above-mentioned research areas, the workshop drew over 30 participants from all over the country. The workshop, occurring over three days, was split into three subjects. Track 1, coordinated by Dr. Shashidhar S. (AP, SES) and Dr. Sheron F. (AP, SES) on "Power Electronics, Control and Machines for Microgrid System and Renewables"; Track 2, coordinated by Dr. Neelakandan R. (AP, SES) and Dr. Sujit K. Sahoo (AP, SES) concerned "Advanced Signal Processing Techniques in Imaging, Radar & 5G Communication Networks"; and Track 3, named "Circuits & Systems with Emerging Sub-Micron Technology" was coordinated by Dr. Ganga and Dr. Bidhan P (AP, SES). Prof. Bidyadhar Subudhi (HoS, SES) served as the chief coordinator for the workshop.

Besides the track coordinators, the invited speakers Prof. T. K Bhattacharya from IIT Kharag-

pur, Prof. Anamitra Makur from Nanyang Technology University, Singapore and Dr. Nandakumar Nambath (AP, SES), Dr. Kuntal Dekka (AP, SES) and Dr. Shakthi Prasad (AP, SES) too delivered instructive, illuminating lectures.

8-DAY AUTOMOBILE INTERNSHIP WORKSHOP

In an 8-day internship workshop from January 3-10, 2020 organized by STAB in collaboration with Elite Techno Groups, the students were imparted theoretical as well as practical knowledge about making a well-functioning car, right from making its solid works design to the actual manufacturing and testing. During the course of the workshop, students built two Formula 5 design cars, electric and petrol, under the guidance of experts. The institute purchased both cars made by the students.

8-DAY R-IoT INTERNSHIP WORKSHOP

In an 8 day RIoT Internship Workshop from January 5-12, 2020, coordinated by STAB, students learned about the basic applications of engineering fields such as Mechanical, Electrical and Computer Science. Participants were guided on how to use Arduino Uno, the ESP8266 Wi-Fi module and Raspberry Pi modules, along with the process of setting up global & local servers on the internet. Hands-on sessions made the students familiar with various sensors and their use in building line-following, edge-detecting and other kinds of robots.

THE GOA PHYSICS MEET



(left) Physicists who were a part of the meet; (right) members of the School of Physical Sciences, IIT Goa

The Goa Physics Meet was organized and hosted by the **School of Physical Sciences**, IIT Goa on **January 25, 2020**. The meet which is an annual one-day meeting of physicists working in different government and private colleges, universities and institutes in the state of Goa, aims to encourage knowledge-sharing and enhance active collaborations in teaching, education and research among the physics community within Goa. With about 90 participants comprising of faculty & students from across the state, the meet - consisting of 6 talks that covered many areas of physics, such as condensed matter physics, 2-Dimensional materials, high energy nuclear physics, soft matter, nanomaterials, material modelling, and particle physics etc., - was deemed a huge success. A poster presentation session was also held, wherein over 20 posters were displayed and discussed. The event established itself as a perfect platform for discussion and exchange among the attendees, opening up multiple possibilities of enriched collaboration among physicists in Goa.

SMART INDIA INTERNAL HACKATHON

The 2020 edition of the Smart India Internal Hackathon was conducted from **February 4 to 5, 2020**. The event was organized by the IIT Goa SPoC for Smart India Hackathon (SIH) 2020 in association with IIT Goa's **Institution Innovation Council (IIC)** and **Students' Technical Activity Body (STAB)**. A nationwide initiative by the Ministry of HRD to provide students a platform for approaching problems emerging from everyday life, the Smart India Hackathon is meant to instil in them a mindset of problem-solving, innovation and more importantly out-of-the-box thinking. Bright students relish the opportunity to work on the challenges faced within various Ministries, Departments, Industries, PSUs and NGOs to create and propose world-class solutions to them, thus allowing the private sector to identify and hire the best minds in the nation. The event, run in software and hardware categories, witnessed an enthusiastic participation from the students. Student teams were asked to choose various topics from the SIH 2020 problem statements and imagine, identify and build solutions for the problem. The teams showcased their innovative interventions & solutions in a presentation session held on the second day of the event.



Teams and faculty judges at the SIH presentation session; (right) poster of the event

Prof. Manindra Agarwal delivered a lecture on Polynomial Identity Testing on February 17, 2020.

ON the CUTTING EDGE of TECH – NANOJATHA



Padmashree Prof. Ajay K. Sood honouring the quiz winners from PES's SRN College of Science & Arts

In an attempt to disseminate information on the latest advances in science and technology among first year engineering students across Goa and to kindle their interest in the niche area of nanoscience and nano technology, IIT Goa, in association with the Karnataka Science & Technology Promotion Society (KSTePS), organized Nanojatha on February 12, 2020. The event was coordinated by Prof. Dharendra Bahadur (Professor-in-charge, R&D) and Dr. Thaseem Thajudeen (AP, SMS).

Director, Prof. B. K. Mishra inaugurated the lecture and inaugural remarks were made by Prof. Dharendra Bahadur. This was followed by an introductory lecture on nanoscience and nano technology by Prof. G. U. Kulkarni (Director, Centre for Nanoscience and Soft Matter and President, JNCASR, Bangalore), who introduced the students to the various facets of research in nanoscience with an emphasis on nature-inspired technological developments.

With around seventy five first-year engineering students coming together from different colleges across the state, the Nanojatha was an undeniable success. Students from the Goa College of Engineering, the National Institute of Technology Goa, the Dhemphe College of Arts & Science and the PES's SRN College of Arts & Science along with the students from our very own institute participated in the lecture-cum exhibition event. Volunteers from then-ongoing the SERB school turned teachers and interacted with the participants of Nanojatha, providing answers and feedback to the queries raised by them. The expo was followed by a fun and informative quiz session on various topics in basic science and nanoscience. First place in the quiz was shared between PES's SRN College of Science & Arts and Goa College of Engineering, while the second place went to NIT Goa, with IIT Goa finishing third. Padmashree Prof. Ajay K. Sood (FRS, FNA) from IISc Bangalore delivered the valedictory remarks and distributed the prizes.

HEALTH TALK on WORLD KIDNEY DAY

IIT Goa organised a health talk to mark the occasion of World Kidney Day, on **March 12, 2020**. The World Kidney Day is jointly organised by the International Society of Nephrology (ISN) and the International Federation of Kidney Foundations (IFKF) to raise awareness about the importance of kidneys to our health and also reduce the impact of kidney diseases and the health problems associated with it. The year 2020 also marks the 15th observance of World Kidney Day, which has been held globally on the second Thursday of March every year since 2006. **Dr. Amol Mahaldar**, Consultant Nephrologist and Transplant Physician, Nephrology from Manipal Hospital, Dona Paula delivered a talk on the occasion which was very well appreciated by the IIT Goa community

IN NEWS

NATIONAL COLLABORATION

On September 13, 2019, IIT Goa signed a Memorandum of Understanding with ALCOLAB India LLP, which is a research and development lab and a group company of ALCON (Anil Counto Enterprises), a Goa-based construction company. With the primary focus on the processing of industrial and mining wastes for the production of construction-grade products, this collaboration seeks to develop nanomaterial-based advanced construction materials. The collaboration is for a stipulated period of five years.



L to R : Mr. S. S. Naik (Manager, ALCOLAB), Dr. Ashish (AP, SMS), Dr. Harpreet (AP, SMS), Prof. D. Bahadur (Professor-in-charge, R & D, IIT Goa), Mr. S. Pandey (Administrative Advisor, IIT Goa), Dr. Arindam (AP, SMS), Mr. N. S. N. Counto (Chairman, ALCOLAB), Prof. S. Kore (Dean (AP & SA), IIT Goa), Prof. B. K. Mishra (Director, IIT Goa), Mr. B. V. B. Pal (Advisor, ALCOLAB), Prof. S. Biswas (Professor-In-charge, Faculty Affairs, IIT Goa), Dr. Thaseem (AP, SMS), Mr. G. K. S. Kerkar (ALCON), Mr. M. Shakeel (Registrar, IIT Goa), Mr. S. K. Mhamai (DGM, ALCOLAB)

SUMMER INTERNSHIPS 2019

IIT Goa saw a huge jump in applications for summer internships in 2019 for research assistantships with Professors of the institute. IIT Goa received in excess of 1200 applications for 150 openings. The internships, which involve assisting institute faculty in laboratory and field work for ongoing research projects, are offered for a period of six to eight weeks. Applicants for the internships consist of undergraduate college students hailing from institutes across India, but mainly from colleges in Goa.

INSTITUTE EVENTS

CELEBRATING 150 YEARS of the PERIODIC TABLE

The year 2019 represented the 150th anniversary of Dmitry Mendeleev's discovery of the Periodic System and has been declared by the International Union of Pure and Applied Chemistry (IUPAC) and a host of other international scientific organisations as the "International Year of the Periodic Table of Chemical Elements" (IYPT 2019). Participating in the worldwide celebration of the commemoration of the sesquicentennial anniversary of Mendeleev's marvellous achievement, IIT Goa celebrated the International Year of the Periodic Table on **September 4, 2019**. A session on poster-making by hand, with a focus on different aspects of the periodic table, was organized by the SCBS for the first year B.Tech students of all branches. The session proved to be hugely popular with the students.



The poster exhibition attended by the faculty and IIT Goa Director, Prof. B. K. Mishra

HINDI PAKHWADA 2019

In accordance with the MHRD directive and in celebration of Hindi Diwas, Hindi Pakhwada was observed at the institute from **September 5-11, 2019**. This two-week programme is held annually by educational institutes in the nation to create awareness regarding the Hindi language and to recognize and celebrate its importance in national life. The Hindi Cell organised various competitions for students and staff such as one-minute talks, poster-making, debate competition, story writing competition, among others in celebration of the Hindi language over the course of the week.



A participant during the story writing competition

IIT GOA CELEBRATES GANDHI JAYANTI

On October 2, 2019, IIT Goa celebrated Gandhi Jayanti, Mahatma Gandhi's birth anniversary. Gandhi Jayanti is celebrated every year to commemorate the father of the nation and his noble ideals of peace and non-violence as well as his singularly critical contribution to India's freedom struggle. In tune with the rest of the country, IIT Goa too marked his 150th birth anniversary with much fervour. The celebrations that extended long into the day witnessed some soulful performances by the institute music club Orion, dance club Meraki and drama club Mukhota. This was then followed by a campus wide cleanliness drive, to emphasize the importance of Gandhian ideals of a minimal, spartan and simple life with the contemporary national goals of hygiene and sanitation which are manifested in the Swachh Bharat Abhiyan.



Performers of Mukhota, the drama club of IIT Goa

IIT GOA CELEBRATES 71ST REPUBLIC DAY



Performers of Mukhota, the drama club of IIT Goa.



Dr. Somenath Biswas addressing the audience

On January 26, 2020, IIT Goa community came together to celebrate India's 71st Republic Day with enthusiasm and great pride. On this day in the year 1950, three years after winning a hard-fought battle for freedom, the Constitution of India came into effect, thus cementing India's status into the world as a sovereign socialist secular and democratic republic. The then acting director, Prof. Somenath Biswas (PIC, FA), unfurled the *Tiranga* and the National Anthem was sung by the students and staff members gathered at the occasion, led by a choir of students. The cultural programme put together by the various student clubs of the institute beautifully demonstrated the essence of India's unity in diversity.

A PLEDGE TO KEEP FIT

As a harbinger of IIT Goa's inaugural edition of Techno-Cultural Fest, CultRang, and in keeping with the Fit India Movement, the IIT Goa Sports Council, in collaboration with the Fit India Committee, organised a marathon on February 7, 2020. The CultRang Marathon was launched with the starting point marked at the Hostel Complex gate, with a route that covered a circuit traversing the campus. The marathon had the female students, faculty and staff members covering a distance of 2.5 kilometres and the male students, faculty and staff members a distance of 4 kilometres.



Participants of CultRang Marathon in front of IIT Goa Hostel Complex

MANY LANGUAGES, ONE DAY

The International Mother Tongue Day, also known as the International Mother Language Day is observed to generate awareness of linguistic and cultural diversity and to promote multilingualism. It has been celebrated on February 21 annually since the year 2000. It is described as part of an initiative of the United Nations "to promote the preservation and protection of all languages used by peoples of the world". In observance of this day, IIT Goa organised two competitions for students, namely poster-making and 'Singing in One's Mother Tongue'. The competitions, coordinated by Dr. Sabiha Hashami (AP, SHSS), were held on February 22 and 24 respectively, since February 21 was a holiday.



Siddharth Shah (2nd yr., BTech, CSE) and Tushya Chheda (2nd yr., BTech, ME) during the singing competition

INTERNATIONAL WOMEN'S DAY

In observance of International Women's Day on March 13, 2020, several events were organized under non-technical and technical categories at IIT Goa. The competitions were centred on the contribution of women pioneers in science and technology, education, social reforms, entrepreneurship, and arts. Other issues that were also discussed were women empowerment, women's rights and the prevention of discrimination and violence against women. Non-technical events included the recitation of self-written poetry and the screening of the movie *Bulbul Can Sing* (2018, Assamese, Dir. Rima Das), while technical events included a short film-making competition on the aforementioned themes. All these events were successfully coordinated by Dr. Sabiha Hashami (AP, SHSS).



Students and faculty members in the audience

IIT Goa organised **ACM-W Regional Celebration 2020** in collaboration with Padre Conceicao College of Engineering (PCCE), Verna, Goa Business School and Goa University. The First ACM-India National-level Idea/Prototype Presentation Competition on "Technology for Women Safety" and a Poster Competition on the same topic were held. On March 13, a panel discussion titled 'Does Gender Impact Technology' was also organized as part of the celebration at PCCE Verna. Dr. Sudhakinsha Dutta (AP, SMCS) and Dr. Ponnulakshmi (AP, SMS) from IIT Goa, were part of the panel.

R&D HIGHLIGHTS

List of sponsored R&D projects at IIT Goa

	NAME OF THE FACULTY	SCHOOL	SPONSORING AGENCY	NAME OF THE PROJECT	DATE OF COMMENCEMENT	PROJECT DURATION
01.	Dr. Sashidhar Sampathirao	SES	National Institute of Wind Energy	Direct-Drive Doubly Salient Permanent Magnet Machine for Roof- Top Wind Energy Application	18.10.2019	3 Years
	Dr. Sashidhar Sampathirao (PI) Dr. Arindam Das (Co-PI) Prof. Dharendra Bahadur (Co-PI)	SES	River Navigation Dept., Govt. of Goa	Evaluation and Expert Opinion for Providing Technical Clarification for Specifications of First Electric/Solar Hybrid Boat	01.10.2019	6 Months
02.	Dr. Sharad Sinha	SMCS	CEFIPRA	Design Automation for Intelligent Vision Hardware in Cyber Physical Systems	27.09.2019	3 Years
03.	Dr. Rishikesh Narayan	SCBS	DST-SERB	Cationic 4(pi)-Electrocyclization Cascade for the Expedient synthesis of biologically Relevant Pyrrolidine Derivatives with multiple sterogenic centres	30.10.2019	2 Years
04.	Dr. Raja Mitra	SCBS	DST-SERB	Electrochemical Reduction of CO ₂ using a Mechanically interlocked Molecule (MIM) as a Catalyst.	11.10.2019	2 Years
05.	Dr. Anirudha D. Ambekar	SMS	DST-SERB	Technology development for 3D Printing solid rocket Propellants and their green alternatives	31.12.2019	2 Years
06.	Prof. Bidyadhar Subudhi	SES	DST-UK India Education Research Institute (UKIERI)	Development of Control and power electronics schemes for a smart micro grid with high penetration of PV Generation and electric vehicles	28.06.2019	2 Years
07.	Dr. Arindam Das	SMS	DST-SERB	Experimental Investigation on Stability of Fluid Phase at complex Multiphase interphase of fluid impregnated Surface.	26.11.2019	2 Years

	NAME OF THE FACULTY	SCHOOL	SPONSORING AGENCY	NAME OF THE PROJECT	DATE OF COMMENCEMENT	PROJECT DURATION
08.	Dr. Ashish Bhateja	SMS	DST-SERB	Kinematics and rheology of granular flow in a multi outlet silo	03.12.2019	3 Years
	Dr. Ashish Bhateja	SMS	DST-SERB	Coupling of Particle-based DEM and DSMC Techniques for Understanding Dusty Gas Flow Dynamics	17.03.2020	2 Years
09.	Prof. Bidyadhar Subudhi	SES	DST-SERB	A Smart Bidirectional Electric Vehicle Charging System connected to PV Integrated Micro grid	07.02.2020	3 Years
10.	Prof. Sachin D. Kore	SMS	DST Science for Equity Empowerment & Development Division	Scaling up of Technology developed for Manually Operated Equipment for Bamboo Stripes Manufacturing.	19.02.2020	2 Years

OTHER IMPORTANT R&D PROJECTS at IIT GOA

1. Dr. Arindam Das, Prof. B. K. Mishra, Dr. Shakthi Prasad has been awarded the Defence India Start-up Challenge (DISC-1) Project. The project is of 2 years duration. The project has led to the incorporation of a start-up company named "Interfacial Fluids Technology Private Limited". This is the first start-up of the institute. The company will be working on R&D and production of specialized fluids and Interfaces relevant to water technologies, separation, filtration, corrosion, energy, medical technologies etc. The company is expected to get a total grant of 1.5 Crore from Ministry of Defence for the production of indigenous Bilge oil water separator.
2. Centre of Excellence for cyber-crime prevention against Women and Children, Ministry of Home Affairs, Govt. of India Principal Investigators: Dr. Sharad Sinha and Dr. Clint George (SMCS)
3. The Institute has been awarded an ACM SIGAI Outreach Grant for conducting a workshop on Artificial Intelligence for general audience. CSE in IIT Goa is among the select few in the world to have received this grant. A workshop on Artificial Intelligence for All using R Language was conducted in August 2019 with hands-on exercises, technical demonstrations related to AI and distribution of AI activities book. Coordinated by Dr. Sharad Sinha and Dr. Clint George
4. Dr. Sharad Sinha (SMCS) has been awarded following short-term projects from various agencies:
 - (i) Agency: Ministry of Electronics & IT (MeitY)
Project Name: IIT Goa - Arm- MeitY Faculty Development Program on Arm Architecture and System on Chip Design
Dates: December 1-3, 2019

(ii) Agency: Arm University Program (Industry Partner)

Project Name: IIT Goa - Arm- MeitY Faculty Development Program on Arm Architecture and System on Chip Design

Dates: December 1-3, 2019

(iii) Agency: Department of Science and Technology (DST)

Project Name: India Science Research Fellowship 2019

Duration: 4 Months

Date of Commencement: November 1, 2019

5. Prof. Sachin Kore, SMS, is currently engaged in a project titled "Electromagnetic Welding of Tubes for Nuclear Reactor Application", funded by BNRS.
6. Dr. Sudhakar Yogaraj, SMS, is currently engaged in a project titled "A multiscale modelling framework for fluid Para elastic structure interaction", funded by Ramanujan Fellowship/DST.
7. Dr. Sudipta Kanungo, SPS, is currently engaged in a project titled "Emerging phases due to spin-orbit coupling in 5d oxides: A first-principles simulation approach", funded by DST INSPIRE
8. Dr. Sheron Figarado, SES, is currently engaged in a project titled "Investigations on Dodecagonal Space Vector Base Pulse Width Modulation techniques for an Open-End Winding Induction Motor Drive".
9. Dr. Sabiha Hashmi, SHSS, is currently engaged in a three year project which began in 2019 titled "Hindi as Contact Language in Goa - An enquiry into Variation, Linguistic Vitality and Identity".



The Directors of IITs, NITs and IIEST Shibpur at a conference hosted by Hon'ble President of India, Shri Ram Nath Kovind at the Rashtrapati Bhavan on November 19, 2019

FACULTY POINT

AWARDS, HONOURS & RECOGNITION

Prof. B. K. Mishra, received the Distinguished Alumnus Award from NIT Rourkela

Dr. Sharad Sinha, SMCS, appointed as Editor-in-Chief of IEEE Potentials for 2020.

Dr. Sandip Halder, SMS, has been awarded the prestigious Ramanujan Fellowship of the DST.

Prof. Bidyadhar Subudhi, SES,

- chaired a session in the 5th IEEE International Symposium on Smart Electronic Systems 2019, Dec-16-18, Rourkela
- was invited to give a talk on Control of Autonomous Underwater Vehicles, 22 Feb 2020, MIT Manipal
- participated LEAP in ISER Kolkata, 12-25 Jan 2020
- was elected as a Fellow, INAE, 2019
- became a Fellow, IET (UK), 2020
- appointed as Associate Editor, Technology Conference Editorial Board, IEEE Control System Society
- became a member of IEEE Technical Committee on Intelligent Control (Adaptive Control Group)

Dr. Sabiha Hashami, SHSS, was invited as a resource person for conducting a workshop on "Language Documentation and Archiving" at Goa University. 9th-20th December 2019.

Dr. Saumya Bajpai, SMCS,

- received an invitation from the American Mathematical Society to become a reviewer for 'Mathematical reviews the journal MathSciNet.
- received an invitation to become a reviewer for the journal Numerical Algorithm.

Dr. Sunil Paul, SHSS,

won the Best Paper Award for the paper titled "Time-varying dynamics of volatility spill over between oil and stock returns: A comparison between India and China", at Conference on Applied Economics and Finance, Goa Institute of Management, Goa, December 16-18, 2019

Dr. Sreenath Balakrishnan

has been selected to attend the Young Investigator's Meeting 2020 was featured in www.indiabioscience.org.

Dr. Arindam Das (SMS) and Dr. Shakthi Prasad D. (SES) guided by Prof. B. K. Mishra (SMS), have won the 'Defence India Start-up Challenge (DISC-1) launched under the iDEX initiative of Govt. of India.

Dr. Sharad Sinha and Dr. Clint George (SMCS) have been awarded THE SENTNEL – Active Intelligent Agent for Actionable Intelligence on Cybercrime Control and Prevention” Grant under Cyber Crime Prevention against Women & Children (CCPWC), the scheme of the Ministry of Home Affairs, Govt. of India

Dr. Amaldev Manuel, SMCS, was invited as the keynote speaker at the conference 'Teaching for 21st century Problems' at GVM Dr. Dada Vaidya College of Education.

PUBLICATIONS

SCHOOL OF MECHANICAL SCIENCES (SMS)

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U. Lacis, Y. Sudhakar, S. Pasche, S. Bagheri. (2019) “Transfer of Mass and Momentum at Rough and Porous Surfaces.” *Journal of Fluid Mechanics*, vol. 884, 2019, doi:10.1017/jfm.2019.897.

R. Kumar and S. D. Kore. (2019) “Effect of the Field Shaper Geometries in Electromagnetic Crimping of Tubes on Rods”, *Journal of Manufacturing Science and Engineering (ASME)*, vol. 141, no. 11, pp. 1-11, 2019, <https://doi.org/10.1115/1.4044516>.

A. K. Rajak, R. Kumar, and S. D. Kore. (2019) “Designing of field shaper for the electromagnetic crimping process”, *Journal of Materials Science and Technology (JMST)*, vol. 33, no.11, pp 5407-5413, 2019, Online ISSN 1976- 3824, 10.1007/s12206-019-1035-1.

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S. Revanth, A. Nithin, and Y. Sudhakar. (2020). “Simulations of fluid-structure interaction using open source tools”, in *2nd International Conference on Numerical Heat Transfer and Fluid Flow*, 17—19 January, 2020, NIT Warangal.

Rajesh S. Prabhu Gaonkar (2019), "Application of Fuzzy Sets in Reliability and in Optimal Condition Monitoring Technique Selection in Equipment Maintenance", *Advances in RAMS Engineering*, edited by Durga Rao Karanki, Gopika Vinod, Srividya Ajit, Springer Series in Reliability Engineering, Springer, Switzerland, pp. 327-359.

Saurabh L. Raikar, Rajesh Prabhu Gaonkar (2019), "Reliability Models of Stress-Strength Interference with Combination of Laplace and Exponential Distribution", in *Proceedings of the 5th International Conference on Industrial Engineering (ICIE-2019)*, 12 - 14 December 2019, Surat, pp. 899-903.

Sunay P. Pai, Rajesh S. Prabhu Gaonkar (2019), "Modelling Uncertainty using Neutrosophic Sets for Precise Risk Assessment of Marine Systems", presented in the *International Conference on Maintenance and Intelligent Asset Management (ICMIAM-2020)*, 17-18 January, 2020, Bangalore.

SCHOOL OF MATHEMATICS AND COMPUTER SCIENCES (SMCS)

Clint P George, Wei Xia, George Michailidis (2019). "Analyses of multi-collection corpora via compound topic modeling." *International Conference on Machine Learning, Optimization, and Data Science*. Springer.

Clint P George (2019). "Convolutional Neural Networks: Alternate Drivers' Visual Perception". *IEEE Potentials*, vol. 39, no. 1, pp. 19-24, Jan.-Feb. 2020. Doi: 10.1109/MPOT.2019.2942072.

A. K. Pany, S. Bajpai and S. Mishra. (2020) "Finite Element Galerkin Method for 2D Sobolev Equations with Burgers' Type Nonlinearity." *Applied Mathematics and Computation*, 2020, p. 125113., doi: 10.1016/j.amc.2020.125113.

Shenoy, Ajith & Biswas, Somenath & Kurur, Piyush. (2020). "Efficacy of the Metropolis Algorithm for the Minimum Weight Codeword Problem using Codeword and Generator Search Spaces." *IEEE Transactions on Evolutionary Computation*. PP. 1-1. doi: 10.1109/TEVC.2020.2980111.

SCHOOL OF ELECTRICAL SCIENCES (SES)

Anupam Sharma and S. Sashidhar (2019) "Comparison of Wind Turbine Generators for Roof-top Wind Power: Case Study, Issues and Challenges", in *Proc. of 33rd IEEE Region 10 International Conference TENCON 2019*, Kochi, Oct 2019, pp. 1-6.

Nithin Goona, P.S. Reddy and S. Sashidhar (2019) "Effect of Magnetisation of Bulk Superconductors on Permanent Magnets for Reversible Braking Applications", in *Proc. of 11th International Workshop on Processing and Applications of Superconducting (RE)BCO Materials (PASREG 2019)*, Prague, Sept 2019, pp. 1-4.

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Sanjay Sharma and B.Subudhi. (2019) *Navigation and Control of Autonomous Marine Vehicles*, Institution of Engineering and Technology - IET, 2019.

R. Kamran, N. Nambath, S. Manikandan, R. Ashok, R. Jain, N. B. Thaker, and S. Gupta (2020) "Demonstration of a Low-Power, Local-Oscillator-Less, and DSP-Free Coherent Receiver for Data Center Interconnects." *Applied Optics*, vol. 59, no. 7, 2020, p. 2031., doi:10.1364/ao.383185.

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Xiangwen Zhu, Sujit Kumar Sahoo, Dong Wang, Huy Quoc Lam, Philip Anthony Surman, Dayan Li, and Cuong Dang, "Single-shot multi-view imaging enabled by scattering lens," *Opt. Express* 27, 37164-37171 (2019). Doi: 10.1364/OE.27.037164.

Vinh Tran, Sujit K. Sahoo, Dong Wang, Cuong Dang, "Utilizing multiple scattering effect for highly sensitive optical refractive index sensing," *Sensors and Actuators A: Physical* 301, 111776 (2020). Doi: 10.1016/j.sna.2019.111776.

SCHOOL OF CHEMICAL AND BIOLOGICAL SCIENCES (SCBS)

Properzi, R.; Kaib, P. S. J.; Leutzsch, M.; Pupo, G.; Mitra, R.; De, C. K.; Schreiner, P. R.; List, B. (2019) "Strong and Confined Acid Catalysts Impart Stereocontrol onto the Non-Classical 2-Norbornyl Cation." *Chemrxiv*, 2019, doi:10.26434/chemrxiv.10887914.v1.

SCHOOL OF PHYSICAL SCIENCES (SPS)

Wasnik, Vaibhav H., Peter Lipp, and Karsten Kruse. (2019) "Positional Information Readout in Ca 2+ Signaling." *Physical Review Letters*, 123.5, 2019, doi:10.1103/physrevlett.123.058102.

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ON CAMPUS

IDEATE, INITIATE, CREATE: A WINDOW into IIC



The smallest idea, if fostered and nourished, has the capacity to initiate change. IIC strives to encourage such change. Constituted as a part of the MHRD's Innovation Cell initiative for the development of an innovation-promotion ecosystem within campuses, the Institute Innovation Council (IIC) at IIT Goa has been working toward fostering an environment within the institution in order to bridge the idea-research-market gap. Since its inception in early 2019, under the guidance of Director Prof B K Mishra, IIC has established itself as central to the institution's manoeuvre to inculcate a culture of innovation & entrepreneurship among the academic community. The council consists of many institute faculty, industry experts and partners. Along the mentors there are many interested and active students representation and participation from all batches of IIT Goa.

In keeping with its mission to translate research and ideas into sustainable and scalable market opportunities, the IIC instituted a bi-annual pre-incubator program called **Ignite**. The program mainly aspires to develop and promote a culture of innovation through locating a real world social or global problem and finding a technologically driven sustainable solution which caters to a "validated - market" opportunity in a bootstrap type environment. The program has broadly three stages, at the end of which teams which put forward promising prototypes are recommended for incubation support and pre-seed funding. Judged by a panel comprising of industry representatives, additional subject experts, institute faculty and the complete IIC team, **Ignite** foregrounds innovation as a driving force in engineering and not as an adjunct to it. It provides students with the perfect platform to blend creativity with learning and to understand their responsibility to the community. **Ignite**, in its first edition, has yielded one very promising project: the Bike Crash Detection System put up by the team consisting Raj S. Jagtap, Sameehan Deodhar, Pranav Yeola, and Hrishikesh Kotwal (Illyr students). The team was unanimously chosen by the panel to be awarded an initial grant of INR 10,000 to further develop and test the prototype.

In the last six months, several other events were also organized by the IIC. The **Drone Workshop** by Dr. Apruva Joshi, organized by the council with SES on **October 18, 2019** was extremely well-received. Likewise, the council's collaborative efforts – a **Two-Day Session on Entrepreneurship with Dr Nusrat**, co-organised with SCBS on **January 17, 2020** and the **Internal Hackathon for SIH**, jointly organized with STAB on **February 4, 2020** - have been highly appreciated by students and faculty alike. Several students also participated in various national level programs like the Wadhwani Foundation E-Cell Meet, the Microsoft Seminar etc. through IIC.

IIC is in the works to create more workshops and seminars in conjugation with other schools. Many partnered and self – driven hackathons and training events are in the pipeline, giving students the advantage in their various life skills and prospects. The council also hopes to propose and implement a tinkers' lab and a co-working incubator space to enable the mission.



IIC Meet, November 2019

STUDENT JUNCTION

IN FOCUS



Performance of the band *Spencer Maybe* as part of the Western Nite on 9th February 2020

CULTRANG

by Aditi Saxena, Student Editor

The year 2020 began on a high note for the IIT Goa student community as they hosted the very first edition of CultRang - the Techno-cultural fest of the institute. Preparations had gone on for months among a hubbub of meetings and a flurry of activity with decorations and purchases. The PR and the Sponsorship team were constantly on their heels till the event, gathering funds and inviting colleges to be part of our celebration. IIT Goa was all set to host the largest event it ever conducted and no doubt the expectations were sky high. The event was finally rolled out between February 7 and 9,

2020, featuring the theme "Space and Time Exploration". CultRang also set an inspiring example of environment-friendly organisation by being a carbon-neutral fest. To further this initiative, a plantation drive was held on campus on January 17, 2020, marking the commencement of festivities. As the name well indicates, CultRang is incomplete without colours and the decoration team made sure that the event was vibrantly colourful. By the eve of the prime event, the whole hostel complex of IIT Goa seemed to have come alive, with lights of rainbow hues in the corridors, brightly colored

ribbons, paper flowers, vibrant posters and banners and a delightful WALL-E effigy made of waste materials at the main entrance.

On February 7, 2020, the first day of the event, even the fatigue from the preparations couldn't hold back the students from rising before sunrise and participating in the CultRang Marathon. The soaring spirit and excitement for the coming days was evident in their energetic sprint. The very first event of CultRang, *Symphony*, started at 2 pm. The organizers' faces held the bittersweet expression of nervousness as well as the pride and happiness in seeing their vision come true. As the melodious voices enthralled the audience in the Green Lawn, the scratching and scribbling sound of pencil on paper pronounced the display of talent by many an artist in the *Sketching* event taking place in parallel, outside the mess. One after the other, five more events went by smoothly before night came. The participants got their grey cells worked out in the *Coding Triathlon*, got their robots chasing after a goal in *Robosoccer*, unleashed their creative side in *Face Painting*, raised awareness on social issues through street play *Tamasha* and lost themselves in the surreal world of poetry in *Lafz*. The day ended witnessing merry groups of friends sharing papri chaat and ice-golas at the food stalls, narrating their experiences of the whole day, complaining about their hurting legs yet zealously planning big for the coming day.

On February 8, the events were many and the time less. So the day started early at 9 am with the quiz *Know-it-All* conducted by the quizmaster, Vyshak Naik simultaneously along with the space-time-themed *T-shirt Painting* event in the mess. A heated *Debate* competition drew spectators next, followed by a contest among teams with their line-following robots. The evening was reserved for a special inaugural event which was graced by the presence of Shri Govind Gaude, (Honourable Minis-

ter of Art and Culture, Govt. of Goa), Dr. Gopal Mugeraya (Director of NIT Goa), Prof. B. K. Mishra (Director of IIT Goa), and several other faculty and staff members. Wrapped in an ethnic vibe, the highlights of the ceremony included the lighting of lamps by the dignitaries, followed by a tribute to Goddess Saraswati and an enlightening address by Shri Govind Gaude. Continuing with the enchantment of the eve, *Pandit Yogaraj* and his band mesmerized the audience with their fusion project. Soon after that, keeping the excitement at a high, the *Battle of Feet* ensued. The catchy beats, groovy dance moves and the unanimous cheering chants left everyone in a trance which did not fade away until the next day.

Before the participants could slump down with weariness from the day before, February 9 began soon and got them on their toes right from the very start. Four major events concurrently commenced at 9 am: the group dance contest, *Groove It*, the second phase of the quiz *Know-it-all*, the RC racing event *Race-It-Out* as well as the art event *Unbrush*. The contest *Blind Arts* followed soon after. With the stage all set, the last contest of CultRang, *Cascading Amps*, rocked the audience who immersingly vibed and swayed as the bands of all participating colleges hit the right notes.

Now, free from all responsibilities, the event heads and organizers finally drew a breath, the stage was prepared for the last but yet another fascinating evening. Hence, the first edition of CultRang came to a conclusion with the *Western Nite*. The bands *Electric Pulse* and *Spencer Maybe* brought everyone together to their feet and created a surreal atmosphere full of carefreeness, contentment and fascination. The satisfied faces of all CultRang team members retold a story of sleepless nights of preparations, last minute hassles overcome, a fest made a success and a dream finally come true.



(right) Shri Govind Gaude, the Hon'ble Minister of Art and Culture, Govt. of Goa sitting with Dr. Gopal Mugeraya, the Director of NIT Goa



Director Prof. B. K. Mishra planted a sapling during the Plantation Drive

STAB: an OVERVIEW

by Pranav Yeola, General Secretary- STAB
and Aditi Saxena, Student Editor



AutoCAD Workshop organized by M-DASH Club

As the name stands, IITs have long been known across the world for fostering some of the best minds in the technological province. We here at IIT Goa truly aim at keeping up with the good name by equipping our college students with an extensive interdisciplinary knowledge, creative and analytical thinking along with a broad spectrum of skills, to nurture them into, not just highly capable but also, impactful engineers who grow to bring a positive change in the world. This clearly requires them to be as sound in practical application as they are in theoretical knowledge. The creation of the **Student Technical Activities Body (STAB)** in IIT Goa's very first year of existence was a big step towards the realization of this goal.

The initial team of STAB consisted mainly of eight people - Jarnu Girdhar, Prabal Bhatnagar, Revanth Sharma Kollegala, Shanmuga Srinivas, Ansh Rajdev, Abhishek Varghese, Gaurav Ganna, and its very first elected GS, Mr. Vikas Bansal. The functioning began with just two clubs in place - Robotics and Electronics Club and the Coding Club. In spite of the scarcity of resources and facilities proving to be a hurdle, this group worked diligently, along with mentors from IIT Bombay to set up a technically innovative culture in IIT Goa.

STAB is composed of a group of students who help build the habit of experimenting, learning, developing and conceptualizing different scientific ideas within the student community at IIT Goa. The body encourages students to transform knowledge

they gain in the classroom to their real-world applications. Currently, STAB has six clubs & a well-structured core team. The six clubs are **Electronics and Robotics Club**, **Go Myno Club**, **Economics Club**, **Mechanical Design, Analysis & Simulations M-Dash Club**, **Google Developer Student Club (Google DSC)** and **Architects Club**. **Dr. Amaldev Manuel** (Assistant Professor, SMCS) serves as its Faculty Coordinator of STAB while **Pranav Yeola** holds the post of the General Secretary. The body aims to bolster the technical expertise of the students of IIT Goa by integrating their skills in the various fields of engineering & technology, so they may navigate and excel within the highly competitive environment.

STAB has organized a number of compelling events in the six past months. The Electronics and Robotics Club conducted the event **Elementary** (August 24, 2019) to kick-start tinkering, an **Arduino Workshop** (September 29, 2019) and the **RC Car Race** (November 28, 2019). The Go Myno Club conducted two events: **Back to Square One** (August 18, 2019) and **Game of Codes (GoC)**. The M-DASH Club held basics and advanced workshops on **AutoCAD**. The DSC conducted the **Puzzle-Solving Competition** and the Economics Club held **Shape of Money** (September 2, 2019) and **Stock Market Workshop** (October 1, 2019). A **Student Project Exhibition** to provide a platform for students to showcase their projects to faculty and their peers was also held by STAB on **November 29, 2019**. This helped to familiarize and acquaint the freshers with the kind of projects being carried out in the institute.



Elementary Workshop organised by E&R Club

IIT GOA JOINS GLOBAL BATTLE AGAINST CORONA

by Nithin Adidela, Special Correspondent

As the whole world faces the challenge of COVID-19, the response of IIT Goa represents a story of caution, hope and sagacious planning prioritizing the safety of its fraternity without neglecting the academic needs of its student community. This is an account of how IIT Goa, along with several other institutions, boldly led the educational system to come to a standstill even before the Govt of India stepped in to handle this pandemic on a war footing.

India registered its first COVID-19 case on January 30, 2020. This happened very close to the scheduled mid-semester recess in IIT Goa when most students travel back to their homes and that posed a delicate conundrum for the administration. IIT Goa's medical team released a detailed brochure enlisting the dos and don'ts to avoid infection. The warden promoted this information, additionally urging the students to avoid mass gatherings even for festivals like Holi and advising the students who chose to leave the campus during the recess to act with utmost care.

For the duration of the recess, the number of cases in India grew at an alarming rate. The recess divided students into broadly two categories. There were students who were at home and could not travel back, owing to several travel bans initiated by various states and on the other side, there were the final year students who had stayed back for their graduation, thesis research and placement, as well as doctoral and masters' students. The Academic Office, after considering and deliberating upon the suggestions of the students and faculty, declared on March 13, 2020 that classes were to be held online from March 16-31, 2020. Students at home were advised not to travel back. Stringent measures were taken to safeguard the students in the hostel from March 14, 2020 by imposing a lockdown in the premises. A 24-hour medical help-desk was set-up along with an ambulance service. The Hall Office suspended group activities such as the usage of gym, basketball, badminton, and volley-ball courts. Sporting and cultural events planned for the month of March were suspended.

Although the above measures were prudent and timely, the administration quickly grasped the risk posed by having students living in close confines when a pandemic is likely to occur. On March 17, the Assistant Registrar announced a complete

shutdown of the hostel and mess facilities and all remaining students were advised to travel home using the safest possible mode between March 18-22, 2020. Online classes were suspended for the week. The Hall Office provisioned each and every student travelling with a mask, and this was much appreciated in the student community.

On March 24, 2020 the Government of India ordered a nationwide lockdown for 21 days. On the same day, the Assistant Registrar shared a circular announcing the extension of the semester by 15 days with the mode of evaluation to be finalised later, along with an advisory for all students to stay home until further notice. The fate of the rest of the academic year was to be reviewed in numerous senate meetings. The key points under discussion consisted of the mode of conduction of end-semester examinations, make-up classes for students who were unable to attend the online classes due to inadequate internet facilities, the mode, means and alternatives for the final year undergraduates to continue work on their graduation thesis, doubts regarding placements for final year and internships for third-year undergraduates. The student representatives did a commendable job in collecting and conveying opinions and concerns from the student community.

Amidst much trepidation, it was announced on April 12, 2020 that online classes were to be held until May 5, 2020 in keeping with the academic calendar, with extra e-classes scheduled in the previous lab slots. The graduation projects for the final year undergraduates were to be continued only if they could remotely access the computational facility at IIT Goa. Otherwise, it was left to the teams and their respective supervisors to consider appropriate alternatives, which may include theoretical, analytical and computational components, along with relevant literature review. The Placement Cell continues to actively provide professional working opportunities for students by requesting companies to offer internships and conduct their selection processes online. Work From Home opportunities are being explored so as to facilitate the commencement of summer internships.

Students are secure with their families and their academic activity continues to progress with minor setbacks. The student fraternity injected a necessary spark that completed the magical circle

of college life in such a time of emergency. The Sports Council kept the sporting spirit high with pan-IIT initiatives like the WINIndia Campaign, consisting of challenges aimed towards improving the fitness of students under this lockdown. The Cultural Council's efforts to maintain the artistic life of the institute was led by Originals, the film and photography club, with #CaptureQuarantine, an online photography contest on Instagram with weekly themes to document lives during the lockdown period. Orion, the music club, initiated Quarantine Jams, an online music contest. Also, Corona-Innovate, an intra-college hackathon was proposed by the Entrepreneurship Cell of IIT Goa, inviting innovative solutions to the problems the country faces during this pandemic.

In such dire times, it is imperative that institutes like IIT Goa focus their considerable scientific acumen for the aid of humankind. Significant steps were taken in that direction under the leadership of Prof. B. K. Mishra, the Director of IIT Goa. In his own words, "IIT Goa has begun working on addressing multiple challenges related to COVID-19. They range from personal protective equipment (PPE), drug

discovery, rapid detection kits, epidemiological modelling to development of contact-less interfaces. On these lines, a team consisting four faculty members from the computer science and mechanical engineering departments of IIT Goa, are working on developing models and predictive algorithms on the spread of COVID-19 pandemic specific to the Indian population."

Whenever human beings face such scenarios of crisis, they might lack the motivation to strive and the future may seem bleak. Young minds, having grown up in the fast-paced dynamic of the 21st century, cannot be expected to quickly acclimatize and adjust to the stifling lockdown conditions. IIT Goa hopes that the continuation of academic activity further enhanced with the spirit of sport and cultural creativity will help the students not only survive this lockdown but also endeavour to achieve individual brilliance with an enduring sense of community and togetherness. In the face of adversity like COVID-19, the IIT Goa community would do well to recollect words spoken by Al Pacino in the film *Any Given Sunday*, particularly appropriate here: "Either we heal as a team, or we're gonna crumble".

ACCOLADES



Ms. Devyani Maladkar and her teammate Ms. Aishwarya Agarwal during the INVENT workshop at IIT Gandhinagar

Ms. Devyani Maladkar (2nd yr., BTech, CSE,) with her teammate Ms. Aishwarya Agarwal from IIT Bombay invented an affordable device to clean reusable sanitary pads and to reduce biomedical waste as part of the "Invent@IITGN", a six-week annual summer programmer at IIT Gandhinagar. Their project has been awarded a start-up grant of INR 50,000/-

Members of the IIT Goa's photography club, Originals, participated in the cultural fest of BITS Goa, Waves 2k19 and secured applaudable positions. They stood 1st in Short Filmmaking Competition - Sh(o)rt and 2nd in Photography Competition - Oh Snap! The theme for both the competitions was Envoyage.



A still from the winning short film - 'A Millennial's Walkabout'



Ms. Pavitra Bhade and Ms. Prachi Kashikar, PhD students winning the ACM

Mr. Adwait Agashe (1st yr., BTech, SMS) brought home three medals - two bronze and a silver - in the 35th Inter-IIT Aquatics Meet held at IIT Kharagpur. He won the medals in 200m freestyle, 50m freestyle and 50m butterfly respectively.



(left) Mr. Adwait Agashe with his medals; (right) ASO Mr. Santosh Upadhyay (2nd from right) with the students who represented IIT Goa at the Inter-IIT Aquatics Meet



Final year student Mr. Himanshu Choudhary receiving his prize money cheque

Mr. Revanth S. K. (4th yr., BTech, ME) and Mr. Nithin Adidela (4th yr., BTech, ME) presented their research paper titled 'Simulations of Fluid-Structure Interaction's using open source tools' at the 2nd International Conference on Numerical Heat Transfer and Fluid Flow, held at NIT Warangal in January 2020.

Mr. Rahul Kashyap (3rd yr., BTech, CSE) won Unlock Your Mind, a nationwide literary competition organized by IIIT Guwahati's reading club, Overbooked. Abhishek Borah (1st yr., BTech, SMS) also won an honorary mention in the same.

Mr. Siddharth Solanki (2nd yr., BTech, CSE), Mr. Nidhish Sawant (2nd yr., BTech, CSE) and Mr. Meghej Khandelwal (3rd yr., BTech, EE) qualified for the regional round of the annual Proof of Concept event held at the Army Institute of Technology, Pune.



Final year student Mr. Nithin Adidela presenting his paper during the conference

IN SHOTS

SPORTS

A sneak peek into events organized by the IIT Goa Sports Council in the recent past

SPORTS WEEK AUG 31 - SEPT 2, 2019



VOLLEYBALL TOURNAMENT OCT 19, 2019



FLOCK OCT 26-27, 2019



TABLE TENNIS TOURNAMENT JAN 18, 2020



LIGA NOGOMETA JAN 24-26, 2020



CRICVERSE JAN 31 - FEB 2, 2020



FIT INDIA INITIATIVE AUG 29, 2020



AT THE SCHOOL

COLLOQUIA

SCHOOL OF MECHANICAL SCIENCES

Dr. Mohit Kumar Jolly	Indian Institute of Science, Bengaluru	09-Aug-19	Computational systems biology of cancer metastasis: Decoding the nonlinear dynamics of cancer cell plasticity.
Dr. Niraj Kumar Jha	JK Tyre Technology Center, Mysuru	23-Aug-19	Constitutive modelling with emphasis on Residual stresses & damage
Prof. Ishan Sharma	IIT Kanpur	23-Aug-19	Forces on intruders in complex granular flows
Dr. Safvan Palathingal	Indian Institute of Science, Bengaluru	29-Aug-19	Statics of bistable arches: designing for "failure"
Dr. Shaurya Shriyam	Indraprastha Institute of Information Technology, Delhi	16-Oct-19	Planning for multi-robot teams
Prof. Sudharshan Kumar	IIT Bombay	20-Jan-20	Measurement of laminar burning velocity of fuel-oxidizer mixtures at elevated mixture pressures
Dr. Jimreeves David	Weizmann Institute of Science, Israel	22-Jan-20	What is common between an escaping fish and an opening door
Prof. Puneet Mahajan	IIT Delhi	07-Feb-20	Mechanical Behaviour of Snow and Avalanche Initiation

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES

Dr. Suvadip Sinha	University of Minnesota, Twin Cities	13-Sept-19 27-Sept-19	"Sessions on Cinema study- Environmental Crisis and the Human Question"
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Dr. Leslee Lazar	IIT Gandhinagar	04-Oct-19	Constitutive modelling with emphasis on A Lecture on "Understanding the Brain: The Next Frontier (why Engineers should study Cognitive Sciences)"
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Prof. Cedric Serpes	Goa Institute of Management	16-Oct-19	Workshop on "Imagination and Creativity"
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Mr. Vilas Shinde	Chairman National Gallery of Modern Art Mumbai	23-Oct-19	Workshop on "Introduction to Painting"
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Prof. Meenakshi Bharat	University of Delhi	08-Nov-19	Lecture and Workshop on "Literature Appreciation and Creative Writing"
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Prof. Vidya Shah	Goa University	13-Nov-19	Lecture on "Classical Music and the Challenge of Changing Values in India: Classical in the Coke Studio"
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Prof Raja Sethu Durai	Hyderabad Central University	03-Mar-20	What is common between an escaping fish and an opening door
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Prof. Puneet Mahajan	IIT Delhi	07-Feb-20	"Representativeness in Indian Elections"
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SCHOOL OF MATHEMATICS AND COMPUTER SCIENCES

Pradeep Boggarapu	BITS Pilani Goa Campus	23- Oct- 19	Trace Hardy and Hardy's inequalities for some fractional Laplacians
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Jajati K Sahoo	BITS Pilani Goa Campus	30- Oct- 19	Alternative iterative schemes for large singular system based on matrix splitting
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Dr. V V Kamat	Goa Business School	13-Nov-19	CS-100 Introduction to Profession
Sanjay Kumar Singh	IISER Bhopal	05- Nov-19	The diagonal and the point property
Abhijit Pal	IIT Kanpur	14-Nov-19	Combination of Relatively Hyperbolic Groups
Gaurav Bhatnagar	Jawaharlal Nehru University	19-Nov-19	On some ideas of Euler, Ramanujan, Andrews, Bailey and others
Dr. Parshu Ram Dhungyel	Royal University of Bhutan	05-Dec-19	Bhutan, its Education System and Protecting the Dzongs
Dr. Milind Sohoni	IIT Bombay	28-Jan-20	Engineering and Society
Rahul Roy	Indian Statistical Institute	16-Jan-20	On rumour propagation among sceptics
Marius Tucsnak	Université de Bordeaux, France.	06-Feb-20	Mathematics and swimming of aquatic organisms
Ratnasingham Shivaji	University of North Carolina, Greensboro	05-Feb-20	An exact bifurcation diagram for a reaction diffusion equation arising in population dynamics
Dr. Aiswarya Cyriac	Chennai Mathematical Institute	10-Mar-20	Weighted Tiling Automata on Graphs: Evaluation Complexity

SCHOOL OF PHYSICAL SCIENCES

Dr. Mehul Malik	Heriot-Watt University	13-Dec-19	Unscrambling entanglement through a complex medium
Prof. Tanusri Saha-Dasgupta	S. N Bose National Centre for Basic Sciences, Kolkata	09-Jan-20	Understanding & Prediction: Quantum Materials via Modeling & Computation
Dr. Hrishit Banerjee	Institut für Theoretische Physik - Computational Physics, Technische Universität, Graz, Austria	22-Jan-20	Electronic structure of low dimensional materials.

SCHOOL OF ELECTRICAL SCIENCES

Mr. Shiv Mathur	Western Digital, Bangalore	03-Oct -19	Analog trends in recent high performance SOC's
Dr. Apurva Joshi	Director of Dronitech	18-Oct-19	Introduction to drones and various sub systems, Control algorithms implementation for autonomous missions and swarm behaviour
Dr. Bama Muthuramalingam	Qualcomm Chennai Design Center	18-Oct-19	Making 5G NR a commercial reality; A unified more capable 5G air interface
Dr. Debasattam Pal	IIT Bombay	13-Nov-19	Solving for an equation that doesn't exist: the generalized Riccati theory
Prof. D. Subbaram Naidu	University of Minnesota Duluth, USA	06-Jan-20	Fusion of Hard and Soft (AI) Control Strategies For a Smart Prosthetic/Robotic Hand
Dr. Manohar Singh	Engineering Officer Power Systems Division Central Power Research Institute, Bangalore	09-Jan-20	Emerging challenges in operational of National Grid with Inertia less Generations or Protection of Modern Power system
Prof. Radhakant Padhi	Indian Institute of Science, Bangalore.	03-Feb-20	Dynamic Modelling and Optimal Management of Air-traffic over Indian Airspace

SCHOOL OF CHEMICAL AND BIOLOGICAL SCIENCES

Dr. Nusrat Sanghamitra

CyCa Oncosolutions

17-Jan-20

Entrepreneurship as a career: Myth Vs Reality

Prof. Sounak Roy

BITS Pilani, Hyderabad

14-Feb-20

From Filth to Wealth: The Structure Sensitive Electrocatalytic Reduction of CO₂

Prof. Pierre H. Dixneuf

Campus de Beaulieu,
University of Rennes

06-Mar-20

Catalytic C-H bond functionalization of arenes, pyridines, and phosphines

OTHER ACTIVITIES



The School of Mechanical Sciences organized an industrial visit to the Crompton Greaves factory at Ponda, as part of the Introduction to Profession course. The 1st. yr. undergraduates were accompanied by Dr. Sreenath Balakrishnan and Dr. Sandip Halder.



A study trip to Cotigao Wildlife Sanctuary was organised by the School of Humanities and Social Sciences on February 21, 2020 as part of coursework on Environmental Studies for 8th sem. EE and 6th sem. ME & CSE students, to understand the management of preserved area and conservation activities. Prof. G. V. Prabhu Gaonkar, Prof. Ravi Mittal and Dr. Sunil Paul accompanied the students.

NEW APPOINTEES

(IIT Goa fraternity welcomes new joinees)



Prof. Bidyadhar Subudhi
Professor
SES



Dr. Mantu Santra
Assistant Professor
SCBS



Dr. Somnath Jha
Visiting Assistant Professor
SMCS



Dr. Ravi Mittal
Visiting Faculty
SMCS



Ms. Neeraja Raghavan
English Language Instructor
SHSS



Mr. Abhishek Gupta
Assistant Registrar
Dean (AP & SA) Office



Mr. Hrishikesh Kalita
Assistant Registrar
Internal Audit Section



Mr. Anup Kumar
Senior Superintendent
Construction & Estate
Management Division



Mr. Jitendra Karna
Senior Superintendent
Internal Audit Section



Mrs. Shyamala Sasidharan
Senior Superintendent
Administration



Mr. Amol Kamble
Technical Superintendent
SMCS



Mr. Balaji Dodda
Technical Superintendent
SPS



Mr. Saptesh Sambhaji Pandit
Junior Engineer
Electrical Construction &
Estate Management Division



Mr. Akshaykumar Patil
Junior Assistant
Transport & Staff
Recruitment Cell



Ms. Jismy Jose
Junior Assistant
Directorate Office



Mrs. Sadhana Soni
Junior Assistant
Dean (AP & SA) Office



Mr. Roni Singha
Junior Assistant
Dean (AP & SA) Office



Mr. Bikram Kumar Singh
Junior Assistant
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IIT GOA

INDIAN INSTITUTE OF TECHNOLOGY GOA

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