SRM
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University u/s 3 of UGC Act, 1956)

BIOSCOPE

Volume 4/Issue 1/July - December 2021

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Understanding clinical uses of applied pharmacogenetics

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Everything you need to prepare for your career.

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A new perspective on lighting cancer using x-ray imaging.

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What's inside?

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ON THE COVER

ACADEMIC & RESEARCH ADVANCEMENTS

"At its heart, engineering is about using science to find creative, practical solutions. It is a noble profession."

– Queen Elizabeth II

Message from the HoD

It has been many years since we began a profound transformation, across every aspect of the department, in order to adapt to the great changes and demands we see in the healthcare industry. Taking a proactive approach to connectivity strategies we can help and gain a competitive advantage while contributing the best to the world we live in.

On that note, we have measurable commitments towards 2022 to have powerful connect with all the stakeholders and make a positive contribution to the society. In the last six months we have been able to show that academic performance and industry connections go hand in hand and are mutually reinforced.

We have involved most of our stakeholders namely our students, faculty, alumni, industry, healthcare professionals and parents in the initiatives of the department. This issue of Bioscope is an example where our stakeholders have come forward to contribute, advertise and be a part of our newsletter making it a revenue generation model.

We have also achieved other important milestones particularly in terms of GOI funding for socially relevant projects, publication of research articles in indexed journals, industry driven student projects and placements. We are moving forward widening the spectrum of BME with the introduction of two UG specialisations on high demand namely Biosensors and Machine Intelligence. We aim and look forward to deploy our strategies in a way to achieve all our targets in the forthcoming semester.

"Identifying and Prioritizing stakeholder engagement can massively benefit the department, the organisation and the people we impact. To my mind, this is a win-win situation"

Dr. Varshini Karthik

HoD, BME

"Design is not just what it looks like and feels like. Design is how it works."

—Steve Jobs

Message from the Editor's Desk

Dear Readers,

Welcome to the first issue of the year 2022 of Bioscope- The Newsletter of the Department of Biomedical Engineering at the SRM Institute of Science & Technology, Kattankulathur.

We hope that you readers are staying home safe. It's a new year, which means there are new avenues out there that are waiting for you. Although before heading out to grab onto these opportunities, it's time to recap what all has been done the previous year, which will give us an insight into what all has to be done the following year in the path of self-improvement. As we head into a new year, we celebrate another year of learning and accomplishments, both curricular and extracurricular. During these tough times, we have indeed endured and successfully navigated through a year of virtual learning, thanks to the industrious efforts of our faculty, staff and students.

We congratulate all the students, staff and faculty for their hard work and success. While the future seems uncertain, we can confidently say that through hard work and enthusiasm, the upcoming academic year will also be as fruitful as the last.

We would also like to heartily wish our readers all the very best and that you have a splendid year ahead of you.

Stay Safe & Best Wishes,
The Editorial Board, BioScope

Editorial Board

Faculty Editor

Dr. T. Jayanthi
Associate Professor
Department of BME

Student Editors

Ms. Sreelakshmi
UG Student (Y3)
Department of BME

Ms. Vani Sridhar
UG Student (Y4)
Department of BME

Mr. Chandresh
UG Student (Y2)
Department of BME

Ms. Sudharshini M.
UG Student (Y2)
Department of BME

Mr. SaiTejveer S.
UG Student (Y4)
Department of BME

"There is nothing I believe more strongly than getting young people interested in science and engineering, for a better tomorrow, for all humankind."
— Bill Nye

Faculty from the Department of Biomedical Engineering
At the SRM Institute of Science & Technology.

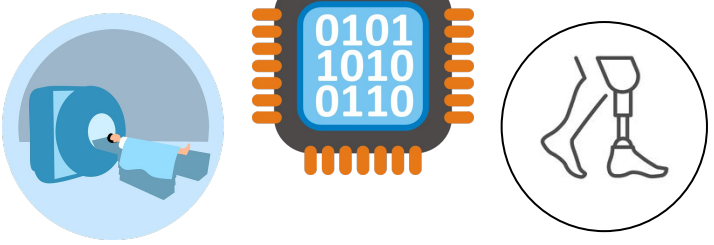
About the Department

Biomedical Engineering is the amalgamation of engineering principles and medical procedures in order to create solutions for healthcare. This essentially involves collaborating with doctors and medical researchers to develop medical equipments and devices as well as automated systems and software solutions related to the field.

Biomedical Engineering is one of the five departments in the School of Bioengineering. It was established in 2004, with active clinical partnership in association with SRM Medical College and Research Institute. The department aims to graduate responsible Biomedical engineers who can provide knowledge based, cost effective and high quality health care technology. Biomedical Engineering department offers B.Tech, M.Tech and Ph.D. programmes in Biomedical Engineering. Over the years, the department has actively been a part of diversified research and teaching, becoming one of the best institutions for the programme in the country.

Key Areas Of Research

1. Medical thermal imaging in diseases, diagnosis and management
2. Technologies focusing on Point of care devices for healthcare applications
3. Human Movement analysis and assistive technologies
4. Next generation healthcare technologies for communicable and non-communicable diseases involving Bio Signal Processing, Medical Image Processing, Bio electronics and Biomechanics
5. Advanced sensor technologies involving Biosensors with Instrumentation Systems and Biomedical Nanotechnology



"Failure is simply the opportunity to begin again, this time more intelligently."

\- *Henry Ford*

Research Publications

Ramji K, U. Snekhalatha, Usha Rani T, "A Breath analyzer for the Assessment of Chronic Kidney Disease Patients Breath print: Breath Flow Dynamic Simulation on the Measurement Chamber and Experimental Investigation". Biomedical Signal Processing and Communication Journal online, 18th August 2021 DOI: https://doi.org/10.1016/j.bspc.2021.103060 (IF 3.88) - SCI.

S. Gnanavel , S. Ponnusamy, Kirthana Sivakumar, and D. Priyadarshini, "Electrochemical and biological behavior of near β Titanium alloy for biomedical implant applications". Journal of Engineering Tribology online, September 2021 (IF 1.8) - SCI.

Varshini Karthik, T. Rama Rao, "Performance Investigations of a Quad-band Microstrip Antenna for Body Wearable Wireless Devices", The Applied Computational Electromagnetic Society- (Impact Factor:0.72), SCI.

Bhargavee Guhan, Sowmiya S, Bukka Shivani, U. Snekhalatha, T. Rajalakshmi. Automated Segmentation of COVID-19 Regions from Lung CT Images using Watershed Algorithm and Classification using Machine Learning Classifiers. Biomedical Engineering: Application, Basis and communication Journal online 30th October 2021. DOI: https://doi.org/10.4015/S1016237222500028, [SNIP:0.374) SCI.

P. Vinupritha, , D. Kathirvelu, and M. Hariharan "A Study on RBC Morphology among Subjects with various grades of Diabetic Foot Ulcers", Biomedical Engineering: Applications, Basis and Communications, ISSN (print): 1016-2372 I ISSN (online): 1793-7132, 30th October 2021 [SNIP : 0.377], SCI.

Swathi Lakshmi B, Hema Brindha M, Ashwin Kumar N*, Ganapathy Krishnamurthi*, "Impact of Gold-decorated Tantalum oxide (TaOx-Au) Nano-probes for Low Energy Cancer Diagnostic Agent", Material Letters, November 2021, [SNIP:0.854, Impact Factor:3.423], SCI.

Saravanan Krishnan, Ashwin Kumar N, Durgaprasad Gangodkar, Sugapriya Dhanasekarand, Niraj Kumar Jha, Kamal Dua, Vijay Kumar Thakur, Piyush Kumar Gupta, "Aptameric Nanobiosensors for the diagnosis of COVID-19: An update", Material Letters, November 2021, [SNIP:0.854, Impact Factor:3.423], Scopus & SCI.

Mummareddy S, Pradhan S, Ashwin Kumar Narasimhan, Natarajan A, "On Demand Biosensors for Early Diagnosis of Cancer and Immune Checkpoints Blockade Therapy Monitoring from Liquid Biopsy", Biosensors, December 2021, Year/Volume/Issue : 2021; 11(12):500, DOI: https://doi.org/10.3390/bios11120500, [Impact Factor:5.519], SCI.

Lakshmi Prabha, P., Oinam Robita, C., Anandhi, D., Malarvizhi, D., & Anusha, A. (2021). Phase I-Designing a biofeedback device for quadriceps re-education-bridging the gap in exercise compliance." Indian Journal of Engineering and Materials Sciences (IJEMS) 28.5 (2021): 529-532.

Patents & Intellectual Property Rights

Glory Precious J, S. P. Angeline Kirubha, Keren Evengeline I, Patent titled: "A System For Analyzing Images Of Brain Tumor And A Method Thereof", 23.07.2021; Patent application no. 202141033211 – Filed

Jaison Jacob Mathunny, Varshini Karthik, Patent titled: "A Perturbation Equipment For Providing Fall Prevention Training To A Person Having Weakened Legs", 12.07.2021: Patent application no. 202141031263 - Filed

P Lakshmi Prabha, R.Kayalvizhi, Banerjee Indrajit, Kuntal Konica, "A System For Enabling A Quadriplegic Person To Control Movement Of A Wheelchair", Patent application no. 202141036326, Status: Filed, DOF: 11.08.2021

Emilda Juidth Ezhil Rajan**, T. Jayanthi,** K. A.

"Innovation distinguishes between a leader and follower."

– Steve Jobs

Sunitha, "Portable Visual And Auditory Biofeedback Based On Eco-Therapy", Status: applied on November 2021

A. K. Jayanthy, "A Device For Detecting Drowsiness And Method Thereof", Patent No:380999, Application No: 201741037955, Status: Granted date: 1st November 2021

Lakshmi Prabha.P, R.Kayalvizhi, Banerjee Indrajit, Kuntal Konica, "A System For Enabling A Quadriplegic Person To Control Movement Of A Wheelchair", Application No: 202141036326 A, Status: Published on 3rd December 2021.

Glory Precious Jeeva Kumar, Angeline Kirubha, Samuel Paulraj, Keren Evangeline Isaac Boniface Michael, "Diagnosis of brain tumor using novel deep learning BT-GPM convolutional net from magnetic resonance images" Patent Application No: 202141033211, Status: Published on 3rd December 2021.

Dr.N. Ashwin Kumar, "A Nanoparticle Contrast Comprising Eu3+:Taox And Process Of Preparation Thereof", Application No: 202141062007, Status: Filed

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How to cross the bridge from Campus to Corporate?

BY APARNA BALAJI (Alumnus)
Territory Sales Manager
Cardiac Rhythm Management
Medtronic

The undergraduate life mostly revolves around getting familiar with the advanced concepts and coping up with the GPAs. However, in this process inherently we also get equipped with better soft skills that make us competent candidates once we enter the corporate world. The transition to office from classroom is usually portrayed as a big jump into another world. Simple proactive steps that we can practice in college can give us a great edge in the corporate world. Here, I will be sharing few useful pointers on the corporate life for an aspiring fresher.

"You need not know everything!"

After a wholesome student life, there is usually fear and misconception that you might not know how to adapt to work. The fact is that MNCs are well prepared to shape us into professionals.

After all, everybody has been at the bottom of the ladder at some point in their career. Your company will give you all the resources that you need to begin your step.

If you are still scared, there is always a hack for rescue – Copy! Copying leaders and professionals can help you to build your own profile.

What can I do while in college?

Interpersonal skills are vital – Though you are an introvert, start having short conversations with your peers on your desired topic to break barriers on communication. Practice confidence – Dress well, hold a straight posture and practice confidence in your day-to-day tasks.

Volunteer for presentations & take responsibilities whenever given a chance – Do not take the backseat!

Do not shy away from new opportunities – Be bold to try activities out of your comfort zone, see how well you are adapting to changing situations.

What to do before starting a new career?

Focus on your field of interest, not the offer package – As a beginner, it is crucial that you choose offers that suit your career preference and not that have only attractive packages.

"I don't spend my time pontificating about high-concept things; I spend my time solving engineering and manufacturing problems."

– Elon Musk

Practice email writing for all communications – Begin with just drafting an email for coordinating the university assignments or projects. Learn and correct your email etiquette with practice.

Make yourself visible to recruiters – Keep your social media profile updated with a brief summary of your career interests, short term/long term goal, efforts that you have put in so far and the accolades that you have gained.

Recruiters do not want to read elaborate stories when in search of talent – Have less and effective content.

Do your homework on the company before attending any interview – Be aware of where and who you'll be working with. A sound resume is important – Put yourself in the shoes of a recruiter and see if your resume speaks for the candidate No opportunity is small – Do not ignore any internship/training opportunities in your interested domain just waiting for a full-time offer. Every step in the ladder of your career holds you so long that you learn enough to climb the next one. Hope all of you climb higher up the ladder!

Funding & Grants

External Funding & Grants

Dr. T. Jayanthi - External fund approved for Rs.20,25,000 INR as Principal Investigator for 3 years under DST-TIDE scheme for project titled 'Breath Assist: A Continuous Positive Airway Pressure System" CO-PI: Dr.Priyanka kokil, Head, dept of ECE, IIITDM, Kancheepuram and Dr. subramanian, Professor, dept of Pulmonary Medicine, SRM Medical college hospital and Research centre.

Dr. S. P. Angeline Kirubha - External fund approved for 25,49,800 INR as Principal Investigator for 3 years under SERB - – Core Research Grant for project titled "Development of Smart spectacles to monitor and modify myopia related health behavior in children". CO-PI: Dr. Dharani R, Associate Professor, dept of Optometry and Ophthalmology, SRM Medical College Hospital & Research Centre and Dr. A. Pandian, Associate Professor, Computer Science Engineering Department, Faculty of Engineering and Technology, SRMIST.

External funding (sponsorship) for conducting Workshop on "Imaging and Optical Sensing Technology" (WIOST-2021), Rs.7500 was raised from Eagle Photonics Pvt Ltd, Bangalore, Karnataka, India. **Convenor : Dr. D Ashokkumar, Co-convenor: Vani Damodaran.**

Dr. S. P. Angeline Kirubha (Technology Advisor) - AKNA Innovations' (Fetal PCG Monitor) has been approved for incubation at IITM Incubation Cell (and HTIC) - Rs.100,000 INR

Dr. T. Jayanthi - Co-PI for Project 'Sensory relax' considered for pre-incubation in SIIC. PI: Dr. Emilda Judith Ezhil Rajan, Associate Professor, Department of Clinical Psychology, Co-PI: Associate Professor, Department of Biomedical Engineering and Dr. Sunitha (Co-PI), HOD, Dept of Electronics and Instrumentation.

Internal Funding & Grants

Dr. Varshini Karthik - Mentor- Bionic arm controlled by EMG signals and hand gestures -New Gen IEDC- Rs.46,000

DID YOU KNOW?

1. A patent is an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem. To get a patent, technical information about the invention must be disclosed to the public in a patent application.

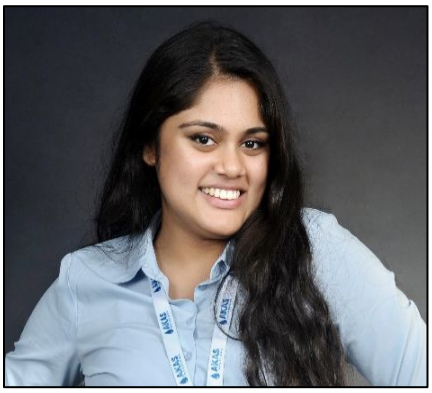
2. Patents are territorial rights. In general, the exclusive rights are only applicable in the country or region in which a patent has been filed and granted, in accordance with the law of that country or region.

3. The protection is granted for a limited period, generally 20 years from the filing date of the application.

Source: World Intellectual Property Organization (WIPO)

"Engineering is quite different from science. Scientists try to understand nature. Engineers try to make things that do not exist in nature. Engineers stress invention." — *Y. Cheng Fung*

An SRMIST Alumni's Zeal for Success at Akas Infusions



AKAS Infusions is a leading manufacturer and largest selling brand of Syringe Pumps & Infusion Pumps in India.

Firstly, with pleasure, we would like to thank the **Department of Biomedical Engineering, SRMIST**, for aiding many successful talent acquisitions for our company. In the last two years, we have had around ten Alumni of the Department work with us as a part of Akas Infusions.

AKAS Infusion takes immense pride in presenting one such excellent employee, **Ms Zindahi S,** an Alumni of SRM Institute of Technology, Department of Biomedical Engineering (Class of 2020) in recognition of her exceptional performance in Sales achievement ever since she joined AKAS Infusions as a fresher in the year 2020.

Ms Zindahi has been associated with AKAS Infusions for the past year based out of Bangalore for the territory of Karnataka and initially joined as a Product Specialist for an Innovative first of its kind Product in India called "UROMON" UO Systems. She had accomplished the first-ever commercial breakthrough sale of UROMON in India within a short time of her joining. Eventually, she was promoted as an Area Sales Manager for Karnataka (for Syringe Pumps and Infusion Pumps). She surpassed her Annual Sales Target within the First Quarter of the current financial year and went on to achieve 180%+ over her sales target for the current financial year of FY21-22 until the 3rd Quarter (December 2021).

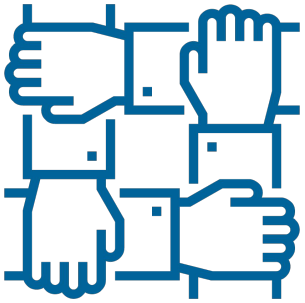
Ms Zindahi has cracked many new accounts in her territory, many of them being very tough to break orders and customers for AKAS Infusions, relentlessly following up on orders from stage zero to an exhaustive Negotiation to final closing. The consistent efforts she puts in, exhibiting the right balance of smart work and hard work, commitment to duty, love for travelling, bringing about valuable technical inputs to improvise and innovate technology, elaborate reporting and documentation style, self-interest to learn and zeal for closing orders are some of the greatest strengths we have observed in her from our management. Currently, she is handling a Team on her own along with an extensive stretch of strong Channel partner Networks she built and appointed in Karnataka after her joining.

At AKAS Infusions, we believe in recognizing and rewarding the deserving talents, and Ms Zindahi is one of them. We would love to come across many such success stories! All the very best to the upcoming batches. AKAS Infusions hopes this strong association with SRMIST's Department of Biomedical Engineering to further into many streams of support in future.

Amrith Rangan
Chief Marketing Officer
AKAS Infusions

"The brain weighs only three pounds, yet it is the most complex object in the solar system."

— Michio Kaku



Collaborative Work

S. P. Angeline Kirubha, (Technology Advisor) for the Proposal titled "A fetal heart disease screening and monitoring device", Submitted to BIRAC Big Grant funding; Reference No: BT/TEMP13905/BIG-19/21, September 2021.

Dr. S. Gnanavel, conducted training program for B.Tech-BME students by Siemens Industry Interface Program (Virtual)- Total 62 students trained and received certificate, from Aug 31 2021 to 3rd September 2021.

Dr. N. Ashwin Kumar - Interaction with Vtitan on possible collaboration for consultancy project

Dr. T. Jayanthi - Collaborative work initiated with Mr. Gopinath Bala, Managing Director, SVS Advanced Fabric (P) Ltd. (SAF) for fabrication of textile based temperature and respiration sensor.

Awards & Recognitions


ULektz
WALL of FAME
(An initiative to identify, recognise and award the contributors of higher education)

CERTIFICATE OF RECOGNITION

This certificate of recognition is awarded to
Dr. U. Snekhalatha
of
SRM Institute of Science and Technology
by
The Academic Council of uLektz
as one of the
Top 20 Expert Faculties in the field of Chemical, Bio-Medical, Marine, Petroleum & Textile Engineering
for the year
2020

Director Chief Executive Officer

Date: October 30, 2021
Certificate No: ULZ/AVoFi00001092 Verify at: https://ulektz.com/Certifications

Certificate of Recognition issued to Dr. U Snekhalatha by The Academic Council of ULektz for the academic year of 2020.

Dr. U. Snekhalatha was awarded the Top 20 Expert Faculty in the field of BioMedical Engineering by Academic council of Ulektz for the year 2020.

MOOCs & Certifications

Faculty MOOCs & Certifications

Dr. Vani Damodaran completed an online course on LinkedIn titled "Neural Network and Convolutional Neural Network essential training" on 12th August 2021

Student MOOCs & Certifications

Lalith Kumar S J (Reg.No.RA1911034010019), B.Tech ECE-BME student has successfully completed an online course "C programming for beginners – Master the C Language", on 21st July 2021

Lalith Kumar S J (Reg.No.RA1911034010019), B.Tech ECE-BME III year student has successfully completed "HTML, CSS, and Javascript for Web Developers", an online non-credit course authorized by Johns Hopkins University and offered through Coursera on 25th August 2021

Vijay Niranjan S G (RA1911034010030) B.Tech ECE-BME III year student has successfully completed "The science of stem cells", an online non-credit course authorized by American Museum of Natural History and offered through Coursera on 22nd August 2021

Ashwin V (RA1911034010004) B.Tech ECE-BME III year student has successfully completed "Introduction to the internet of things and embedded systems", an online non-credit course authorized by University of California, Irvine and offered through Coursera on 22nd August 2021

Neha Sharma (RA1811034010008) B.Tech ECE-BME IV year student has completed SQL-MySQL for Data Analytics and Business Intelligence on 29th August 2021

Ashwin V (Reg.No. RA1911034010004), B.Tech ECE-BME III year - Student completed has successfully completed "Wireless Communications for Everybody", an online non-credit course authorized by Yonsei University and offered through Coursera on 29th August 2021

Nithish Kumar S (RA1911034010035),, B.Tech ECE-BME

"Talent hits a target no one else can hit. Genius hits a target no one else can see."

— Michio Kaku

III year student has successfully completed "Biomedical Visualisation" an online non-credit course authorized by University of Glasgow and offered through Coursera on 30th August 2021

BIRUNDHA J (RA1911034010036), B.Tech ECE-BME III year student has successfully completed the online course "Python for Data Science on July to August 2021

Advika Srinivasan (Reg.No. RA1911034010037), B.Tech ECE-BME III year - Student completed "Biology Meets Programming: Bioinformatics for Beginners"

Sreelakshmi K Vijayan (Reg.No. RA1911034010026), B.Tech ECE-BME III year student has successfully completed "Introduction to the internet of things and embedded systems", an online non-credit course authorized by University of California, Irvine and offered through Coursera on 6th September 2021

Sreelakshmi K Vijayan (Reg.No. RA1911034010026), B.Tech ECE-BME III year student has successfully completed "Foundations of User Experience (UX) Design", an online non-credit course authorized by Google and offered through Coursera on 10th September 2021

Sreelakshmi K Vijayan (Reg.No. RA1911034010026), B.Tech ECE-BME III year student has successfully completed "Foundations: Data, Data, Everywhere", an online non-credit course authorized by Google and offered through Coursera on 15th September 2021

A.Keerthana (RA1911034010029) B.Tech ECE-BME III year student has successfully completed "Biomedical Visualisation" an online non-credit course authorized by University of Glasgow and offered through Coursera on 29th August 2021

KEERTHANA D (RA1911034010029), B.Tech ECE-BME III year student has successfully completed "Biomedical Visualisation" an online non-credit course authorized by University of Glasgow and offered through Coursera on 5th September 2021

GORAKAPUDI GANGA SAI AMARNATH (RA1911034010023), B.Tech ECE-BME III year student has successfully completed "Biomedical Visualisation" an online non-credit course authorized by University of Glasgow and offered through Coursera on 5th September 2021

DURGA R (RA1911034010033), B.Tech ECE-BME III year student has successfully completed "Biomedical Visualisation" an online non-credit course authorized by University of Glasgow and offered through Coursera on 5th September 2021

Jaldu Siddhartha (RA1911034010003), B.Tech ECE-BME III year student has successfully completed "Biomedical Visualization", an online non-credit course authorized by University of Glasgow and offered through Coursera on 14th September 2021

Arul UM (RA1911034010015), B.Tech ECE-BME III year student has successfully completed "The Raspberry Pi Platform and Python Programming for the Raspberry Pi", an online non-credit course authorized by University of California, Irvine and offered through Coursera on 3rd October 2021

MALINI S (RA1911034010028), B.Tech ECE-BME III year student has successfully completed "Biomedical Visualisation" an online non-credit course authorized by University of Glasgow and offered through Coursera on 21st October 2021

KAVIYA S (RA1911034010027), B.Tech ECE-BME III year student has successfully completed "Biomedical Visualisation" an online non-credit course authorized by University of Glasgow and offered through Coursera on 24th October 2021

Ms. Keerthana A, has successfully completed "create your first Python program from UST" an online non-credit course authorized by Coursera Project Network and offered through Coursera on 5th December 2021.

Lalith Kumar S J, has successfully completed "Foundation Course on 3D Bioprinting" on 12th November 2021.

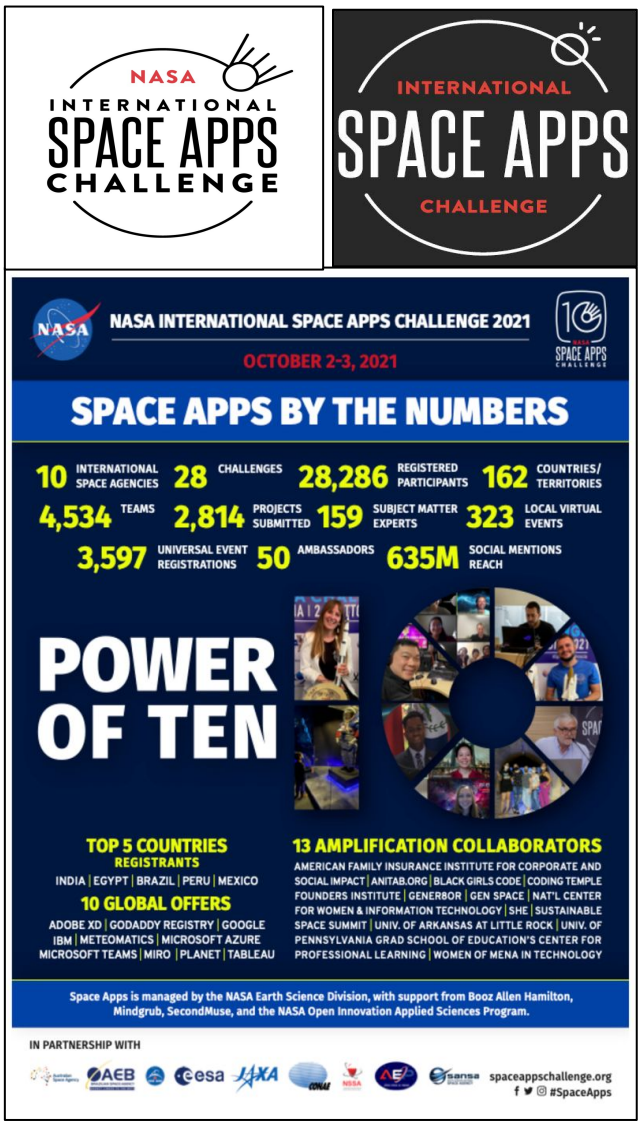
"Science can amuse and fascinate us all, but it is engineering that changes the world."

– Isaac Asimov

Hackathons & Competitions

SREELAKSHMI VIJAYAN (RA1911034010026), B.Tech ECE-BME III year student Participated in the NASA SPACE APPS HACKATHON and got selected for the global challenge as part of the team MAROONED 5 conducted by AARUSH,CHENNAI. There were 120 plus teams participating, and by making it to the top 3 the team was selected to be part of the global challenge round of the hackathon.

SREELAKSHMI VIJAYAN (RA1911034010026), Participated in the Smart 3.0 Pitch Hackathon .



NASA Space Apps Challenge 2021 Infographic
Source: NASA Space Apps Challenge

Academic Tie-Ups

Faculty Contributions as Panel Members

Dr. S. P. Angeline Kirubha, was a DC member in the 1st DC meeting at Biomedical Engineering Department, VELS Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai, Tamil Nadu, India on 16th July 2021

Dr. T. Jayanthi, was a DC member in 1st DC meeting at Biomedical Engineering Department, VELS Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai, Tamil Nadu, India on 19th July 2021

Dr. S. P. Angeline Kirubha, Delivered Guest Lecture for Webinar on "Point of Care Devices" Virtual mode, organized by Department of Biomedical Engineering, Sethu Institute of Technology, Kariapatti, on Tamil Nadu, India on 26th July 2021.

Dr. A. K. Jayanthy, Expert member in Faculty recruitment Interview committee member at Jerusalem Engg College on 23rd July 2021

Dr. S. P. Angeline Kirubha, Reviewed article for the Journal "Computers in Biology and Medicine" - Kidney Pathomics -- Interpretable Subvisual Features that Provide New Insights in Histopathological Images. 31-July 2021.

Dr. S. P. Angeline Kirubha, was a DC member in the 1st DC meeting at Biomedical Engineering Department, VELS Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai, Tamil Nadu, India on 16th July 2021

Dr. T. Jayanthi, was a DC member in 1st DC meeting at Biomedical Engineering Department, VELS Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai, Tamil Nadu, India on 19th July 2021

Dr. S.P.Angeline Kirubha, Reviewer for an article for Journal of Pharmaceutical Research International on 16th December 2021.

"Scientists study the world as it is, engineers create the world that never has been."

— Theodore von Kármán

Dr. A. K. Jayanthy, Expert member in Faculty recruitment Interview committee member at Jerusalem Engg College on 23rd July 2021

Dr. T. Jayanthi, served as DC member - Zeroth Doctoral Committee meeting for one of the candidate in Karunya Institute of Technology and Sciences attended on 1st September 2021.

Dr. D. Ashokkumar, Expert Member- 3rd Board of studies Meeting - Kongunadu College of Engineering and Technology, Trichy, Tamil Nadu, India on 3rd September 2021.

Dr. A. K. Jayanthy, expert speaker during a webinar on "Biomedical Optics-Opportunities Challenges and Future" organized by Parul Institute of Engineering and Technology-DS, on 9th September 2021.

Dr. Varshini Karthik, served as a Board of studies member for Biomedical Engineering at St.Peter's Institute of Higher Education and Research on 15th September 2021.

Dr. A. K. Jayanthy, participated as DC member at PSG College of Technology, Coimbatore, Tamil Nadu, India on 22nd October 2021

Dr. U. Snekhalatha participated as DC member in the first doctoral committee meeting, for the research scholar Ms. Rama at St. Joseph college of Engineering, Anna University, Chennai, Tamil Nadu, India held on 1st October 2021

Dr. A. K. Jayanthy, Faculty Interview panel member at Jerusalem engineering College, Chennai, Tamil Nadu, India on 27/11/2021

Dr. T. Jayanthi, served as DC member in The Annual Doctoral Committee meeting for a candidate in Karunya Institute of Science and Technology, Coimbatore, Tamil Nadu, India held on 11th November 2021

Dr. S. P. Angeline Kirubha, DC member at Bharath Institute of Higher Education and Research, First DC conducted to T.SWETHA KUMARI, Biomedical Engineering Department, Chennai, Tamil Nadu, India, on 10th November 2021.

Dr. S. P. Angeline Kirubha, DC member at Bharath Institute of Higher Education and Research, First DC conducted to G. Divya, Biomedical Engineering Department, Chennai, Tamil Nadu, India on 20th November 2021.

Dr. A.K. Jayanthy, Expert member for the academic external audit of EIE department, Crescent Institute of science and technology, Chennai, Tamil Nadu, India during 4th December 2021.

Doctoral Thesis & Dissertations

Mrs. A. Bhargavi Haripriya - Thesis submitted, Title: " Self monitoring for pre-evaluation of diabetic foot ulcer using thermal imaging ".

Internships & Training

Arul Shankar (Reg.No. RA1911034010015), B.Tech ECE-BME III year student completed IOT internship at Verzeo

Technical Events & Seminars

Faculty Participation & Contribution

Dr. Varshini Karthik, attended online Faculty Development Programme on "Precision Healthcare Technology" organized by the Department of Biomedical Engineering, SSN Engineering College, Chennai, Tamil Nadu, India, 28th June to 2nd July 2021.

Dr. D. Ashokkumar, attended online Faculty Development Programme on "Precision Healthcare

"The engineer has been, and is, a maker of history."

— James Kip Finch

Biomedical Engineering, SSN Engineering College, Chennai, Tamil Nadu, India. 28th June to 2nd July 2021.

Dr. Ashwin Kumar N, invited as a Guest speaker, talk title on ''Nanotechnology Meets Microfluidics - An Interface", in five days AICTE ATAL-Faculty Development program ""Bio-MEMS and Lab-On-Chip Technologies for Point of Care Applications" organized by Department of Electronics and Communication Engineering, C Abdul Hakeem College of Engineering, Chennai, India. from 5th to 9th July 2021.

Dr. Kathirvelu D, participated in Faculty Development Programme on "Applications in Medical Image and Signal Processing", organized by Department of Biomedical Engineering, B.V. Raju Institute of Technology, Hyderabad, Telangana, India from 14th to 16th July 2021

Dr. Kathirvelu D, Attended Webinar on "National Education Policy-2020" organised by The Department of Electronics and Communication Engineering, SRM Institute of Science and Technology, Kattankulathur, Chennai, Tamil Nadu, India on 24th July 2021

Dr. T. Jayanthi, attended online Faculty Development Programme on "Precision Healthcare Technology" organized by the Department of Biomedical Engineering, SSN Engineering College, Chennai, Tamil Nadu, India. 28th July 2021.

Dr. S. Gnanavel, participated in a webinar on "Embedded system and IOT in Biomedical applications (ESIBA)" organized by Department of Biomedical Engineering, Sahardaya college of Engineering and Technology, from 12 -16 July 2021.

Dr. S.P. Angeline Kirubha, Attended online 5 days Faculty Development Program on "Python for Vision Techniques" (26-30, July 2021), Conducted by Centre for Healthcare Advancement, Innovation and Research (CHAIR) & School of Electronics Engineering (SENSE), VIT – Chennai.

Dr. U. Snekhalatha, gave a talk titled "Thermal Imaging Applications in Machine learning and Deep Learning Techniques" in online webinar organized by Department of Biomedical Engineering at Sethu Institute of Engineering and Technology, Kariapatti, Virudhunagar district, Tamil Nadu, India on 27th July 2021.

Dr. Kathirvelu D, participated in the APJAKTU sponsored 5 days Faculty Development Programme on "Embedded systems and IOT in Biomedical Applications (ESIBA)" organized by department of Biomedical Engineering, Sahrdaya College of Engineering and Technology, Thrissur, Kerala, India on 12th to 16th July 2021.

Dr. Vani Damodaran, Attended Workshop on examination reforms conducted by SRMIST from 26th July to 2nd August 2021.

Dr. P Vinupritha, participated in Faculty Development Programme on "Applications in Medical Image and Signal Processing", organized by Department of Biomedical Engineering, B.V. Raju Institute of Technology, Hyderabad, Telangana, India from 14th to 16th July 2021

Dr. P Vinupritha, Attended Webinar on "National Education Policy-2020" organised by The Department of Electronics and Communication Engineering, SRM Institute of Science and Technology, Kattankulathur, Chennai, Tamil Nadu, India on 24th July 2021

Dr. U. Snekhalatha, participated in the Faculty Development Programme on "AI-ML Software Tools" conducted by the school of Electronics Engineering (SENSE), Vellore Institute of Technology, Chennai, Tamil Nadu, India from 21st to 25th July, 2021.

Dr. D Ashokkumar, has undergone Innovation Ambassador training (Foundation Level) conducted by MoEs Innovation Cell & AICTE, Institution Innovation Council from 30th June to 30th July 2021 in online mode.

Dr, A. K. Jayanthy, participated & completed successfully AICTE Training And Learning (ATAL) Academy Online Elementary FDP on "Intelligent Interactive Medical Services" At Christ (Deemed To Be University), from 02nd August 2021 to 06th August 2021

Dr. U. Snekhalatha, participated & completed successfully AICTE Training And Learning (ATAL)

"I didn't know how to do it so I tried, failed, failed, failed and then got it right."

– Elon Musk

Academy Online Elementary FDP on "An insight to Biomedical Instrumentation, Biomedical Signal and Image Processing with hands on experience and LabVIEW Programming" at Poojya Doddappa Appa College of Engineering, Kalaburagi, from 2nd August 2021 to 6th August 2021

Dr. Vani Damodaran, participated in Faculty Refresher and Assimilation Programme (FRAP) organized by SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India, from 19th and 21st August 2021.

Mrs. A. Bhargavi Haripriya, participated and successfully completed webinar on "Nanotechnology in Healthcare" through Online mode organized by the Department of Biomedical Engineering, Bharath Institute of Higher Education and Research, Chennai, Tamil Nadu, India. On 10th August 2021.

Dr. P. Muthu, participated & completed successfully AICTE Training And Learning (ATAL) Academy Online Elementary FDP on "An insight to Biomedical Instrumentation, Biomedical Signal and Image Processing with hands on experience and LabVIEW Programming" at Poojya Doddappa Appa College of Engineering, Kalaburagi, from 2nd August 2021 to 8th August 2021

Mrs. Oinam Robita chanu, participated & completed successfully AICTE Training And Learning (ATAL) Academy Online Elementary FDP on "Intelligent Interactive Medical Services" At Christ (Deemed To Be University), from 02nd August 2021 to 06th August 2021

Dr. S. Gnanavel, given the presentation on the topic of "The Role of Nanotechnology in Healthcare Applications" during the National level Webinar organized by the Department of Biomedical Engineering, Bharath Institute of Higher Education and Research (Deemed to be University),BIHER, Chennai, India. on 10th August 2021 from 10.00 AM to 12.00 PM.

All 15 Faculty Members, participated in the 2 days Workshop on "Robotics and AI Healthcare, organized by Department of Biomedical Engineering, SRM Institute of Science and Technology, Chennai, Tamil Nadu, India from 26th to 27th August 2021

All Faculty Members completed 4 days Workshop on 'Examination Reforms Policy" organized by SRM Institute of Science and Technology, Kattankulathur, Chennai, Tamil Nadu, India from 9th to 16th August 2021

QAYSAR Mohi Ud Din (RA1913011011004), Full time research scholar participated in the 2 days Workshop on "Robotics and AI in Healthcare" in online mode organized by the Department of Biomedical Engineering, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India from 26th to 27th August 2021.

Dr. U. Snekhalatha, Participated in online webinar titled "Mastering the Craft of academic writing: a systemic approach conducted by Research Marketing APAC, Wiley on 31st August 2021.

Dr. U. Snekhalatha, Participated in a Faculty Development Programme titled "Master class on Data analytics in online mode" 30 days at Pantech Prolabs India Pvt Ltd, from 12th July 2021 to 20th August 2021.

Dr. P. Muthu, Mrs. A. Bhargavi Haripriya, completed 4 days Workshop on 'Examination Reforms Policy" organized by SRM Institute of Science and Technology, Kattankulathur, Chennai, Tamil Nadu, India from 26th July to 2nd August 2021.

Dr. Ashwin Kumar N, participated in the Faculty Refresher and Assimilation Programme (FRAP) organized by SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India, from 19th and 21st August 2021.

Dr, T. Jayanthi, participated in the virtual event "Webinar on Manuscript Preparation – 2020" organised by Department of Analytical Chemistry, University of Madras, Guindy campus, Chennai, Department of Nanoscience and Technology and Abinnovus consulting private limited, from 20th to 21st September 2021.

Dr. P. Muthu, attended the three days Faculty Development Programme on "Technology for effective teaching, Learning and Evaluation"

"Strive for perfection in everything you do. Take the best that exists and make it better. When it does not exist, design it."

– Sir Henry Royce

organized by Department of Computer Science, (SF) in association with the IQAC under UGC PARAMARSH scheme, Ayya Nadar Janaki Ammal College, Sivakasi from 23rd to 25th September 2021.

Dr. Vani Damodaran, delivered a talk on "Study of Artificial Demineralization and Secondary caries using Optical Coherence Tomography" in webinar on NCKU-SRM SATU joint research seminar co-organized in association with Dr. Shu-Fen Chuang on "OCT in Dental Applications", on 17th September 2021 .

Dr.A.K.Jayanthy, awarded for demonstrating competence in the completion of "Fundamentals of Deep Learning" organized by NVIDIA deep learning Institute. on 14th September 2021.

Dr. A. K. Jayanthy, participated in 5 days International Workshop on Deep Learning in Healthcare", organized by the Department of Data Science and Business Systems, School of Computing, College of Engineering and Technology, SRMIST, KTR, in Association with University of California, Davis, USA, from 6th to 10th September 2021.

Dr. U. Snekhalatha, Participated in AICTE Training and Learning (ATAL) Online Elementary FDP on "Machine Learning in Medical Image Processing" at Katihar Engineering College, Katihar, from 5th to 9th September 2021.

Dr. U. Snekhalatha, Participated in online webinar titled "Winning the game of publishing research papers, raising your profile, and extending the impact of your publications conducted by Research Marketing APAC, Wiley on 7th September 2021.

Dr. U. Snekhalatha, Participated in online webinar titled "Attracting Grants and Funds conducted by Wiley Team, Wiley on 14th September 2021.

Dr. T. Jayanthi, Attended 3 days FDP on PALS - VLAB - Project from 6th to 9th September 2021.

Mrs. Oinam Robita Chanu, participated in the virtual event "Webinar on Manuscript Preparation – 2021" organised by Department of Analytical Chemistry, University of Madras, Guindy campus, Chennai, Department of Nanoscience and Technology, Bharathiyar University, Coimbatore and Abinnovus consulting private limited, from 20th to 21st September 2021.

Dr. S. P. Angeline Kirubha, participated in "Capacity Building Webinar series for faculty" Conducted by ECE Department, SRMIST, KTR, Chennai, Tamil Nadu, India on 28th September 2021.

Dr. S. P. Angeline Kirubha, "PALS Associated Program: BIG Awareness Session for College Students & Faculty Members on 24th August 2021.

Dr. S. P. Angeline Kirubha, was one of the team members in IITM HTIC Pre-Incubation Program for women, presentation title "A fetal heart disease screening and monitoring device", on 27th September 2021.

Keren Evangeline, S P Angeline Kirubha, J Glory Precious, Presented Paper titled "Prediction of Breast Cancer Recurrence in Five Years Using Machine Learning Techniques and SHAP" in 2nd International Conference on Intelligent Computing Techniques for Smart Energy Systems (ICTSES 2021) held at MANIPAL UNIVERSITY JAIPUR, India during 1st to 3rd September, 2021.

Ms. Devaki V, full time research scholar participated in virtual event "Webinar on Manuscript Preparation – 2021", oragnised by Department of Analytical Chemistry, University of Madras, Guindy campus, Chennai, Department of Nanoscience and Technology, Bharathiyar University, Coimbatore and Abinnovus consulting private limited., from 20th to 21st September 2021

Dr. A.K Jayanthy, K.Vijaya, K. Senthilkumar, presented a paper titled, "Optimal Path Determination to Transport Biomedical Waste -A case study" in A virtual International Conference on "Smart Waste Management" organized by Department of Chemical Engineering, SRM Institute of Science and Technology. Kattankulathur, Tamil Nadu, India from 11th & 12th October 2021.

Dr. A. K. Jayanthy, attended Workshop on "value addition of delicious foods for entrepreneurship development" organized by SRM Institute of Agriculture Sciences, Kattankulathur, Chennai, Tamil Nadu, India from 21st & 22nd October 2021.

Dr. U. Snekhalatha, Participated & completed successfully AICTE Training And Learning (ATAL)

"Failure is central to engineering. Every single calculation that an engineer makes is a failure calculation. Successful engineering is all about understanding how things break or fail." — *Henry Petroski*

Academy Online Elementary FDP on "Artificial Intelligence Applications in Medical Diagnosis" organized by B.S Abdur Rahman Crescent Institute of Science and Technology, All India Council for Technical Education, New Delhi, India from 4th to 8th October 2021 .

Mrs. Oinam Robita Chanu, participated in Webinar on "Liquid Chromatography – Mass Spectroscopy, Theory and its Applications" organized by Interdisciplinary Institute of Indian System of Medicine, SRM Institute of Science and Technology. Kattankulathur, Tamil Nadu, India on 8th October 2021.

Dr. T. Jayanthi, Participated in "6 Days online workshop on Deep learning techniques - A practical perspective" conducted by K.S.R. College of Engineering, Tiruchengode from 25th Oct to 30th Oct 2021

Mrs. Oinam Robita Chanu, Participated Faculty Development Program on "Recent Advancements in Organic and Nanoelectronics-RAONE 21", organized by Department of Electronic Communication Engineering, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India from 8th to 13th October 2021.

Dr. Varshini Karthik, chair person in 4th International Conference in Emotion and Sensibility ICES2021, Korea on 26th November 2021.

Dr. A. K. Jayanthy, chair person in 4th International Conference in Emotion and Sensibility ICES2021, Korea on 26th November 2021.

Dr. U. Snekhalatha, Participated & completed successfully AICTE Training And Learning (ATAL) Academy Online Elementary FDP on "Exploring Machine Learning and Deep Learning Algorithms for Natural Language Processing (NLP) Applications" at Vallurupalli Nageswara Rao Vignana Jyothi Institute of Engineering & Technology, New Delhi, from 22nd to 26th November 2021.

Dr. T. Jayanthi, participated in the workshop on "Cyber Security" conducted by Department of Electronics and Communication Engineering, SRM Institute of Science and Technology, Vadapalani, Tamil Nadu, in collaboration with Tata Consultancy Services, India from 1st & 2nd November 2021.

Dr. D. Ashokkumar, chairperson in 4th International Conference in Emotion and Sensibility ICES2021, Korea on 26th November 2021.

Mrs. A. Bhargavi Haripriya, participated in the workshop on "Cyber Security" conducted by Department of ECE, SRM Institute of Science and Technology. Vadapalani, Tamil Nadu, in collaboration with Tata Consultancy Services, India from 1st & 2nd November 2021.

Mrs. Oinam Robita Chanu, participated & completed successfully AICTE Training And Learning (ATAL) Academy Online Elementary FDP on "Electroanalytical Techniques for Bio-sensing Applications", at CSIR-Central Electrochemical Research Institute, New Delhi, from 22nd to 26th November 2021.

Mrs. Oinam Robita Chanu, participated & completed successfully AICTE Training And Learning (ATAL) Academy Online Elementary FDP on "Lab on chip and affordable diagnostics (under 'Lab on chip' thrust)", IIT Kharagpur, New Delhi, India from 1st to 5th November 2021.

Ms. Hema Brindha M, participated in the Workshop on "Imaging and Optical Sensing Technology" (WIOST-2021), organized by the Department of Biomedical Engineering, SRM IST, Kattankulathur, Tamil Nadu, India from 10th to 12th November 2021.

Dr. A.K. Jayanthy, participated in workshop on "Incorporating Universal Human Values in Education" from 6th to 10th December 2021.

U. Snekhalatha, presented paper titled "Computer aided diagnosis of Autism spectrum disorder based on Thermal imaging" in the 6th IAPR International Conference on Computer Vision & Image Processing (CVIP-2021) organized by IIT, Ropar, Rupnagar, Punjab, India from 3th to 5th December, 2021

P. Kavya, Dr. S. Gnanavel, presented the research paper titled, "Design and Development of Novel 3D bone scaffold for Implant Application" in the 2021 3rd International Conference on recent advances in materials and manufacturing (ICRAMM 2021), held at the Department of Mechanical Engineering, D Y Patil College of Engineering and Technology, Kolhapur, Maharastra, India from 25th to 26th November 2021.

"It is difficult to say what is impossible, for the dream of yesterday is the hope of today and the reality of tomorrow."

– Robert H. Goddard

Mrs. Oinam Robita Chanu, participated in the one-day symposium on "Applications of machine learning methods in physics" organized by the Department of Physics, SRM University, Andhra Pradesh, India, on 18th December 2021.

Dr. S. P. Angeline Kirubha, Attended One Day Workshop on 'Student Centric Approach – Counselor Training Program for Faculties - Phase 1' at SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India on 16-12-2021.

Mrs. A. Bhargavi Haripriya, participated in the online workshop on "Examination Reforms" and successfully completed with 'B' grade at SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India from 26th July to 2nd August 2021.

Mrs. P. Lakshmi Prabha, participated in the online workshop on "Examination Reforms" and successfully completed with 'A' grade at SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India from 26th July to 2nd August 2021.

Dr. P. Muthu, participated in the online workshop on "Examination Reforms" and successfully completed with 'C' grade at SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India from 26th July to 2nd August 2021.

Dr. N. Ashwin Kumar, participated in the online workshop on "Examination Reforms" and successfully completed with 'C' grade at SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India from 26th July to 2nd August 2021.

Mrs. Bhargavi Haripriya, delivered Guest Lecture on "Recent Trends in Biomedical Applications" held at Saveetha Engineering College, Chennai, Tamil Nadu, India on 20th December 2021.

Mrs. Bhargavi Haripriya, participated in Industrial webinar session for Biomedical Engineer and two hours of professional learning in Engineering in Oxygen Concentrator at Indian Biomedical Skill consortium on 9th September 2021.

Dr N. Ashwin Kumar participated in "Two day FDP on Advances in Photonics and Fiber optics Technologies" organized by IETE Chennai center and IEEE Photonics Society Madras Chapter

Mr. Jaison Jacob Mathunny, participated in the 5 days workshop on "Advanced statistical data analyzing using SPSS" conducted by the Centre for statistics, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India from 22nd to 26th November 2021.

Mr. Jaison Jacob Mathunny, participated in the 2 days workshop on "Robotics and AI in Healthcare", organized by the Department of Biomedical Engineering, College of Engineering and Technology, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India from 26th to 27th August 2021.

Mrs. I Keren Evangeline, presented a research paper titled, "Prediction of Breast Cancer Recurrence in five years using machine learning techniques and SHAP", in the 2nd International Conference on Intelligent Computing Techniques for Smart Energy Systems (ICTSES 2021), held at Manipal University, Jaipur, India from 1st to 3rd September 2021.

Ms. Devaki V, participated in the Faculty Development Program on D3 (Design. Developed. Decode) CUI based FPGA Programming, conducted by the Department of Electronics and communication Engineering, SRM IST, Vadapalani, Chennai, Tamil Nadu, India in collaboration with VI Solutions from 20th to 24th December 2021.

Qaysar Mohi Ud Din, A K Jayanthy, presented a paper entitled "Autism spectrum disorder classification using EEG and 1D-CNN" in the International Conference on Internet of Everything, Microwave Engineering, Communication and Networks (IEMECON 202), IEEE technically sponsored, Jaipur, India from 1st to 2nd December 2021.

Hari Raj K, S Gnanavel, presented a poster at the ICAMMC-2021, organized by the Department of Physics and Nano Technology and Department of Mechanical Engineering, SRM ISTin association with the IISC, IIT - Delhi, IITM, IIT Hyderabad, IIT Indore, Indian Institute of Metals Chennai Chapter, ASM International Chennai Chapter, Indian Ceramic Society, Indian Physics Association and ACS- India Chapter from 2nd to 4th December 2021.

"I have always felt it is my destiny to build a machine that would allow man to fly."

— Leonardo da Vinci

Student Participation & Contribution

Sreelakshmi K Vijayan (Reg.No.RA1911034010026), B.Tech ECE-BME III Year attended webinars as a part of NeuroRehack 21, online from 28th June to 16th July 2021.

Lalith Kumar S J (Reg. No. RA1911034010019), B.Tech ECE-BME III Year student participated in the National Level Workshop on "Arduino Programming", hosted by Pantech eLearning in association with Top Universities from 26th July to 30th July 2021.

Thella Shalem Rahul (RA2012015010015), M. Tech-BME II year participated in the 2 days Workshop on "Robotics and AI in Healthcare" in online mode organized by the Department of Biomedical Engineering, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India from 26th to 27th August 2021.

Sreelakshmi Vijayan (RA1911034010026), B.Tech ECE-BME III Year student participated in the Short Term Training Programme (STTP) on "Cognitive Learning Framework for IoT Devices", organized by the department of Electronics and Communication Engineering, SRM Institute of Science and Technology, Kattankulathur, Chennai, Tamil Nadu, India from 3rd to 8th August 2021.

Sreelakshmi K Vijayan (Reg. No. RA1911034010020), B.Tech ECE-BME III Year student participated in Hands on Workshop –AI & ML in Healthcare System organized by Vidyalankar Institute of technology, Mumbai, India on September 2021.

Sreelakshmi K Vijayan (Reg. No. RA1911034010020), B.Tech ECE-BME III Year student participated in 5 days International Workshop on Deep Learning in Healthcare", organized by the Department of Data Science and Business Systems, School of Computing, College of Engineering and Technology, SRMIST, KTR, in Association with University of California, Davis, USA, from 6th to 10th September 2021.

Sreelakshmi Vijayan (Reg.No.RA1911034010026), B.Tech ECE-BME III Year student participated in 4 days Virtual Industry Interface Program conducted online by Siemens Healthineers from 31st August 2021 to 3rd September 2021.

SRIJA S (Reg.No. RA2012015010010), M.Tech BME II year student participated in 4 days Virtual Industry Interface Program conducted online by Siemens Healthineers from 31st August 2021 to 3rd September 2021.

Advika Srinivasan (Reg.No. RA1911034010037), B.Tech ECE-BME III year - Student Leader at IITM PALS – SRM

T U Jaya Krishnan (Reg.No. RA2012015010009), M.Tech BME II year student participated in 4 days Virtual Industry Interface Program conducted online by Siemens Healthineers from 31st August 2021 to 3rd September 2021.

A.Keerthana (Reg.No. RA1911034010029), B.Tech ECE-BME III Year student Research opportunities in biomedical field in japan.

Sreelakshmi Vijayan (RA1911034010026). B.Tech ECE-BME III Year student Got special certificate for the performance in the project "Clan Optimism" at IEEE SRMIST SB, IAS and CES on October 2021.

Nithish Kumar S (Reg. No. RA1911034010035), participated in "Virtual Industry interface program" conducted online at Siemens Healthineers from 31st August to 3rd September 2021

Non-Teaching Staff Participation

Mr. J Bilal Ahamad, Mrs. C. Chitra, Mrs. A. D. Josephine Shaila, Mr. B. Devanathan, Mr. V. Madankumar and **Mrs. G. Nagalakshmi** participated in Workshop on "Soft Skills and Office Skills" organized by department of CDC, SRM Institute of Science and Technology, Kattankulathur, Chennai, Tamil Nadu, India on 31st July 2021, 4th, 5th, 6th, 11th, 12th and 16th August 2021

Mr. J Bilal Ahamad, Mrs. C. Chitra, Mrs. A. D. Josephine Shaila, Mr. B. Devanathan, Mr. V. Madankumar and **Mrs. G. Nagalakshmi** participated in Workshop or Training - Pep talk on "Your Way to Fitness" by Mr. Ambalavanan Sivagurunathan, Life Coach and Health and Wellness Coach, UK, online Zoom meeting on 28th August 2021

"We are what we repeatedly do. Excellence, then, is not an act, but a habit."

– Will Durant

Corporate Interactions

Industrial Visits

Several students and faculty members took part in the 4 Day long **Industrial Interactive Program** organized virtually by the SIEMENS Healthineers team and the Department of Biomedical Engineering, SRM Institute of Science & Technology. Students and faculty interacted with experts in various imaging fields & products offered by SIEMENS.

Industrial Collaborations

Dr. N. Ashwin Kumar - Interaction with vTitan (sister entity of Zoho Corporation) is further extended to visit our campus for possible research collaboration with biomedical engineering faculty.

Preliminary virtual meeting on the interests and scope of collaborative projects with Samsung (PRISM) was initiated by Dr.Vani Damodharan. The meeting had Mr. Veerendhra leading the team from Samsung

Pictures: Industrial Collaborations
Clockwise from top-left: (1,2& 3) Interaction with HCL Technologies Team, (4&5) Interaction with team from vTitan.

MoUs & Agreements

A Memorandum of Understanding (MoU) has been signed between the Department of Biomedical Engineering, SRM IST and the Life Science Wing, Capgemini.

Campus Placements

We are happy to announce about 74% of students who opted for placement from our department have received offers in a variety of prestigious companies with various tier salary packages. Students from both undergraduate and graduate classes were successfully placed in different positions in reputable companies listed below. We would also like to congratulate the students placed and wish them a successful career.

Cognizant, L&T Technology Services, Deloitte., AstraZeneca, highradius, Meril More to Life, ZenSar, wipro, amdocs, L&T Infotech, stryker, Capgemini, Hewlett Packard Enterprise, KPMG

"We would like to wish all the students, a hearty congratulations on their achievements. Wishing you the very best in your careers and lives."

- Team BioScope

"Design is intelligence made visible."

– Alina Wheeler

Guest Lectures

3D Bioprinting

BY Dr. Pallab Datta

The department of Biomedical Engineering organized a virtual guest lecture in the field of 3D Bioprinting used in medical Sciences on November 9th, 2021. The lecture was delivered by the esteemed Dr. Pallab, PhD from the School of Medical Science and Technology, Indian Institute of Technology, Kharagpur. Students gained a new perspective regarding 3D printing methods and how the same can be incorporated in the Biomedical field.

IoT in Healthcare

BY Dr. T Ruso

This guest lecture was conducted on 4th October, 2021 and delivered by Dr T Ruso, Associate Consultant at Wipro Chennai. He has worked as Assistant Professor at Saveetha University & as a Project Associate in IIT Madras. He was awarded PhD in Computer Science and Engineering from Anna University. The lecture focused on the advancements in the field of IoT and how it can be utilized in the field of healthcare.

Medical Market

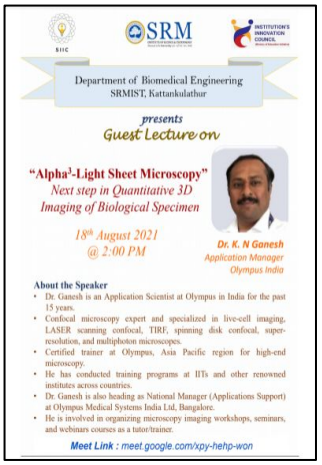
BY Mr. Ramesh Y.

A guest lecture on "Market Scenario and Growth prospects of Healthcare industry in India" was conducted by the department on July 27th, 2021. The guest speaker was Mr Ramesh Yellayi, Vice President for Sales & Marketing" at M/s AKAS Infusions. The lecture specifically focused on research and work prospects of Biomedical students and the current scenario of the healthcare field in our country.

3D Imaging

BY Dr. K. N. Ganesh

The highly unique topic of the lecture held on 18th August, 2021 was Quantitative 3D imaging of Biological Specimen delivered by Dr. K. N. Ganesh, Application Scientist at Olympus, India. Dr. Ganesh was invited & introduced by Dr. Ashwin, a faculty member of the BME department. It was a scintillating lecture based on Medical Imaging techniques and analysis methods followed by a highly interactive doubts session.



Healthcare & Industry

BY Ms. Divya R

Ms. Divya R, Senior Analyst at Capegemini India was invited to speak on the topic of Healthcare in the Fourth Industrial Revolution on September 29th, 2021. The lecture focused on aspects of medical device testing, FDA product documentation & tracking.

"Scientists build to learn; Engineers learn to build."

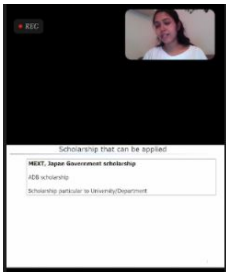
– Fred Brooks

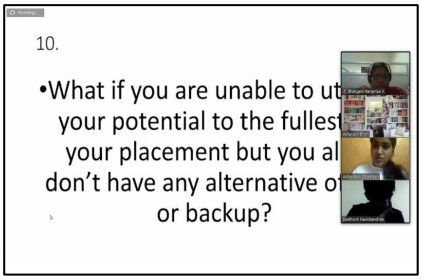
Alumni Connect

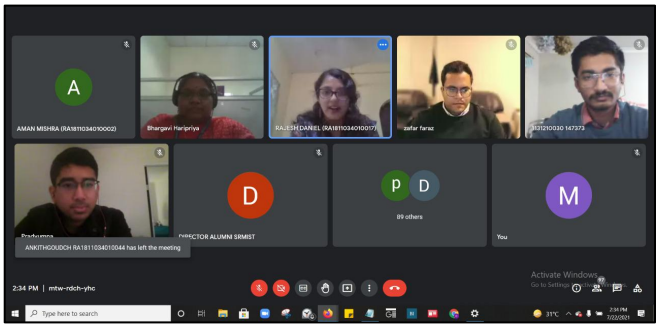
BY STAFF WRITER

The department often organizes Alumni Connect, a virtual meet-up with alumni students of the department. They each speak about their area of expertise and interact with the current students of the department. One such Conclave organized to focus on Placement Opportunities in the Biomedical Industry was organized on 22nd July, 2021. The alumni who participated in the event are Karan Mehta (2016), Technical Product Support at Dalcross Medical Equipment, Mohammed Zafar Faraz (2016) at Synchron inc and Pradyumna Choudhury (2017) Lab Technician at National Serology and Reference Lab (NRL).

Another Conclave on Career prospects in BME was organized on 27th August, 2021 presided over by Santhosh (2019), Sales Representative, Medtronic, Aishwarya Chandra (2016), Senior Executive, Johnson & Johnson and Ashutosh Bhyri (2015), Co-Founder, Recruit. Students gained a lot of understanding regarding placements and job opportunities. 2 more Alumni Connect events were organized to provide more insights to students planning to pursue their Masters' degrees abroad.

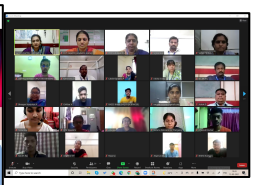


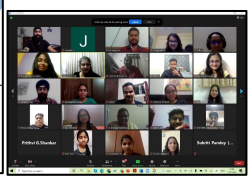




Events Organized By The Dept.

BY STAFF WRITER





A variety of events were organized by the department of Biomedical Engineering with students, faculties and staff volunteering to help successfully coordinate these events. The events consisted of cultural, academic and extracurricular elements. A few of these events include the farewell event for the UG & PG graduates, Virtual Tours organized for school students, conferences conducted by the department in various emerging fields of Bioengineering, etc. As seen in the images on the left, cultural events such as the Farewell *(2nd right)* and the Fresher's Orientation *(topmost)* were organized for the 2021 Batch of graduates from the undergraduate and postgraduate programs as well as the incoming batches of 2021, celebrating their progress, reliving their memories and wishing them the very best in their studies and careers.

Conferences and workshops in the fields of medical imaging & clinical AI were conducted by the department, at times in association with other institutions such as the Biomedical Engineering Society of India.

Despite the staggering circumstances of the global pandemic, adapting to the circumstances, the students & faculty with tremendous effort have managed to successfully organise & conduct a variety of events.

"Strive for perfection in everything you do. Take the best that exists and make it better. When it does not exist, design it."

- Sir Henry Royce

"Engineering is not only study of 45 subjects but it is moral studies of intellectual life."

- Prakhar Srivastav

Lighting Cancer with X-rays – A New Perspective

BY
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Medical imaging is the process of penetrating tissue with an external radiation source to demonstrate disease diagnosis and therapeutic success. External energy sources include near-infrared radiation, visible light, and X-ray radiation. The two main types of medical imaging are anatomical and molecular imaging. Molecular imaging techniques such as positron emission tomography, bioluminescence, fluorescence, chemiluminescence, and NIR based imaging, uses exogenous materials like radioactive isotopes, optical, and NIR based fluorophores to detect and monitor cancer treatment. While the lack of ionizing radiation and the ability to provide real-time images via optical imaging is advantageous, it can only be used to provide images a few centimeters deep due to its lackluster penetrating power [1].

Compared to light, X-rays possess unlimited penetration of tissues. X-rays, are electromagnetic radiation, generated when high energy electrons from cathode colloid with a rotating tungsten anode. After the discovery of X-rays by Wilhelm Roentgen in 1895, tremendous improvements led to a new way of imaging organs.

X-rays can absorb, attenuate, emit and scatter depending on the type of material. X-ray interaction with materials is governed by the Beer Lambert's Law as shown in equation (1).

$$I = I0\ e^{-\mu x} \quad \text{------- (1)}$$

Wherein, 'I' is the final intensity, Io is the initial intensity of X-ray photons, μ is the linear attenuation coefficient, and 'x' is the thickness of the tissues. X-rays are used in clinical settings for both therapeutic and diagnostic purposes at low (keV) and high (MeV) energies.

X-rays are often utilized to identify only anatomical structures, not molecular data, similar to PET or optical imaging [2]. This is owing to the inability to gather molecular information due to the lack of external contrast agents. X-ray imaging techniques, in particular, are the initial diagnostic tool for detecting structural changes in bones & tissues. However, the differentiation between tissues is feasible when exposed to exogenous contrast agent like Iodine, radio-isotope and nanomaterials. Among contrast agents, nanotechnology based probes are efficient in terms of sensitivity, resolution and specificity.

Nanotechnology, defined as the manufacturing of material to a size ranging from 1-100 nm having one dimension in nanoscale. Controlling the size at this scale range, alters the properties with high surface to volume ratio, where possess novel applications.

For example, nanoparticles are potential for biomedical applications in both therapeutic and disease diagnosis. In particular, nano-sized contrast possess unique properties with good X-ray attenuation, photostable fluorescent and high payload of drugs. For instance, gold nanoparticles, quantum dots, nano bubbles and iron oxide based nanoparticles are excellent contrast agent for X-ray CT, optical, ultrasound and MR Imaging systems respectively. Other properties of these contrast agents such as high biocompatible, long circulation, renal clearance, ease of surface functionalization to enhance targeting tissues and ability to track cells [3].

Integrating nanotechnology based solution and X-rays can simultaneously provide molecular data along with tissue structures as shown in Figure 1. This is possible based on the scintillating mechanism, a down conversion process, incident X-rays on phosphor materials converts to visible photons to form 2D images. The down conversion process is known as X-ray excited optical luminescence (XEOL) or X-ray Luminescence Computed Tomography (XLCT). This property will be useful for X-ray excited optical luminescence (XEOL), which can be used to obtain deep seated images of various tissues. This is done in order to overcome the limited penetration of optical imaging. X-ray excited nanoparticles (NPs) can be used as scintillators [4]. XEOL based nanophosphors have been developed with host materials such as Gadolinium oxysulfide, Sodium

"The most important thing is to keep the most important thing the most important thing."

- Donald P. Coduto

Gadolinium Fluoride, Cesium Iodide etc. Doping these host materials with different rare earth based materials like Europium, Erbium, Terbium, generates luminescent properties from visible to near infrared region. More recently, the X-ray induced persistence luminescence in NIR region and X-ray induced acoustic signals are alternative tools for NIR and ultrasound imaging [5].

Advancements in X-ray as molecular imaging tool along with nanoprobes has increased the attention in scientific community. This led to incorporation of various elements to nano sized structure to enhance the therapeutic efficiency, emission at NIR region, localized cancer treatment bi- and multimodal imaging applications. High energy X-rays acts as therapeutic agent by appropriate nano-radiosensitizers have been emerging technique. In conclusion, there is an immense potential related to X-ray as molecular imaging tool aided by nanomaterials for cancer treatment and diagnosis. However, the major challenge that limits the use of X-rays as primary imaging technique is radiation exposure to patients. Also, the toxicity of nanomaterials when contrast agent used as high concentration to reveal molecular structures. Mitigating these issues can eventually improve the treatment monitoring, and reveal disease diagnosis at early stage.

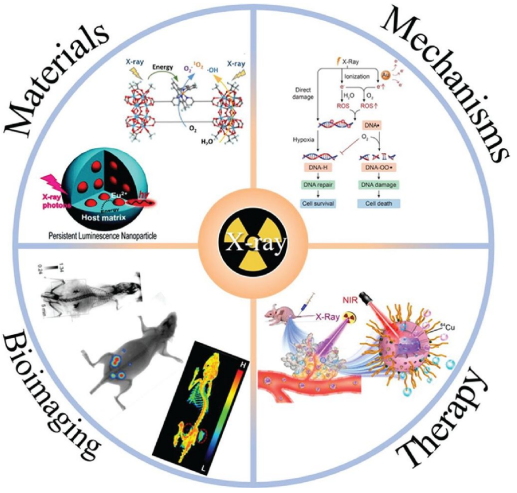

Figure. 1: The schematic illustration represents the use of X-rays as therapy, diagnostic and materials used for X-ray contrast and their mechanisms. Adapted from reference [5]

Pharmacogenetics For Daily Clinical Decision Making

BY AVIROOP MUKHERJEE (Alumnus)
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General President,
Nascent Research Association of India

In vitro diagnostics are tests done on samples such as blood or tissue that have been taken from the human body and subsequently facilitates early detection and more effective treatment of diseases. This being said, it is one of the most potent and most addressed area of biomedical sciences and engineering in terms of innovation and advancement.

Amongst the various types of In-Vitro Devices being dealt with, one very specialized area worth the attention of biomedical scientists and engineers is

"Pharmacogenetics: as a tool for daily clinical decision making".

Pharmacogenetics is a blend of genetic science with pharmacology. Our genes dictate our nature of response to certain medicines and this is extremely individual for all of us, and this science can be used to personalize medication for all types of patients.

At present times, it is a Finnish company founded in 2013, by two medical doctors, who eventually made pharmacogenetics a simple guidelines based tool for doctors in their day-to-day clinical work.

Based on a simple blood test, doctors are provided with a patient-specific report that shows the suitability of a particular drug with respect to a patient and how the dosage should be adjusted; all of it being implemented in form of software based decision making systems.

Scientific evidence shows that pharmacogenetics gives better clinical outcomes for the patient and better cost efficiency for society. This is particularly true in the treatment of depression and geriatric polypharmacy apart from it being a potent tool in treatment of monitored orthopaedic cases. Evidence is strong also in the

"I have not failed, but found 1000 ways to not make a light bulb."

- Thomas Edison

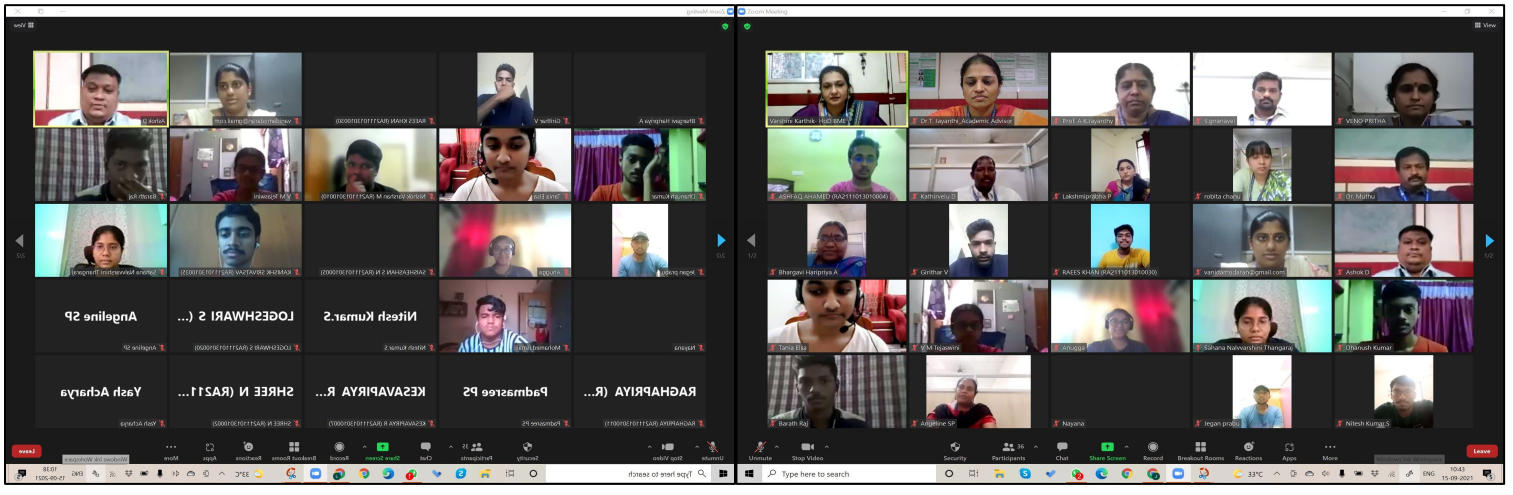
treatment of coronary heart disease, thrombosis and stroke.

Therefore, it can be firmly said that with the advent of modern medical technology, such modules are bonus to the daily system of medication in any medical scenario and at a certain depth; such modules would definitely prove to be the lifelines when treating acute but uncommon cases requiring extremely sensitive medical monitoring of patients.

Gallery

A PICTURE IS WORTH A THOUSAND WORDS

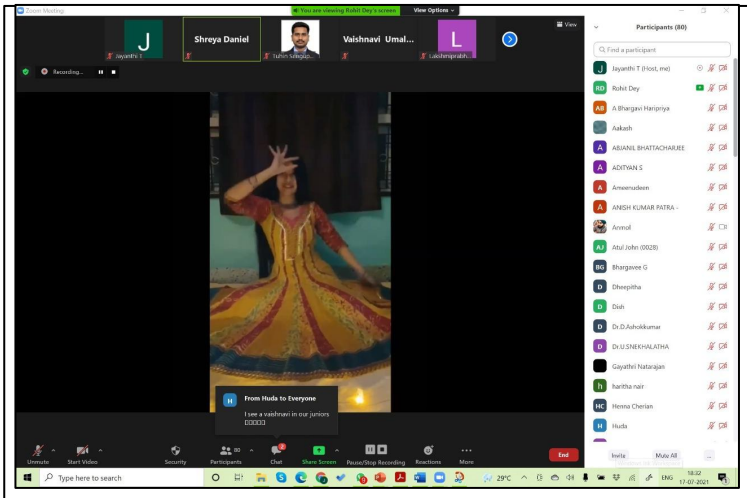
Images: New Year Celebrations at the Department of Biomedical Engineering.

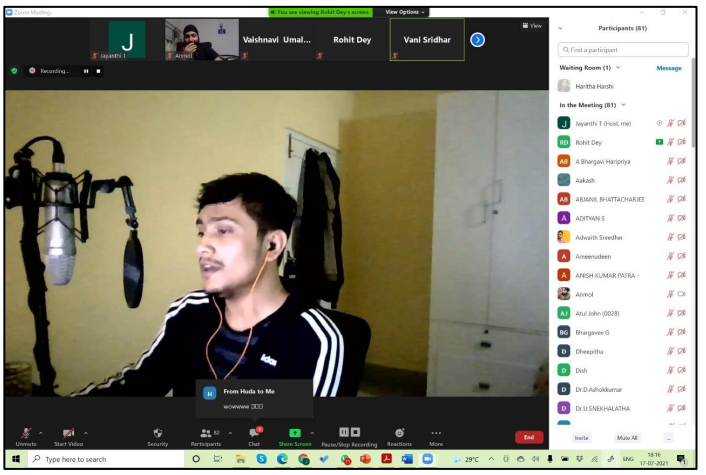


Images: Various screen grabs from the virtual orientation event held for the incoming classes of 2021. Courtesy: Students & Staff, Department of BME.

"The scientist discovers a new type of material or energy and the engineer discovers a new use for it."

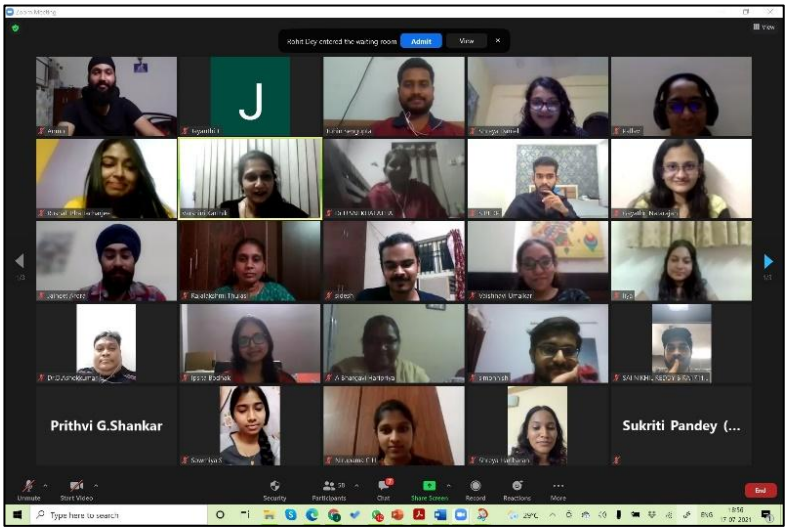
- Gordon Lindsay Glegg

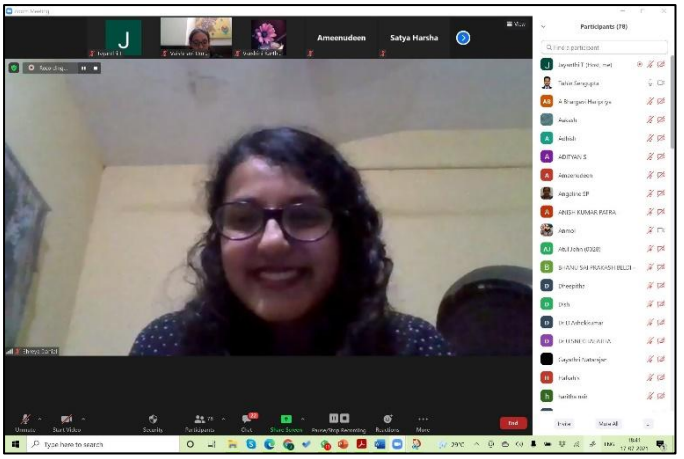




Images: Various screen grabs from the virtual farewell event held for the graduating classes of 2021.

Courtesy: Students & Staff, Department of BME.





"The life work of the engineer consists in the systematic application of natural forces and the systematic development of natural resources in the service of man."

- Harry Walter Tyler

Images: Faculty from the Department of Biomedical Engineering.

"Quality means doing it right when no one is looking."

— Henry Ford

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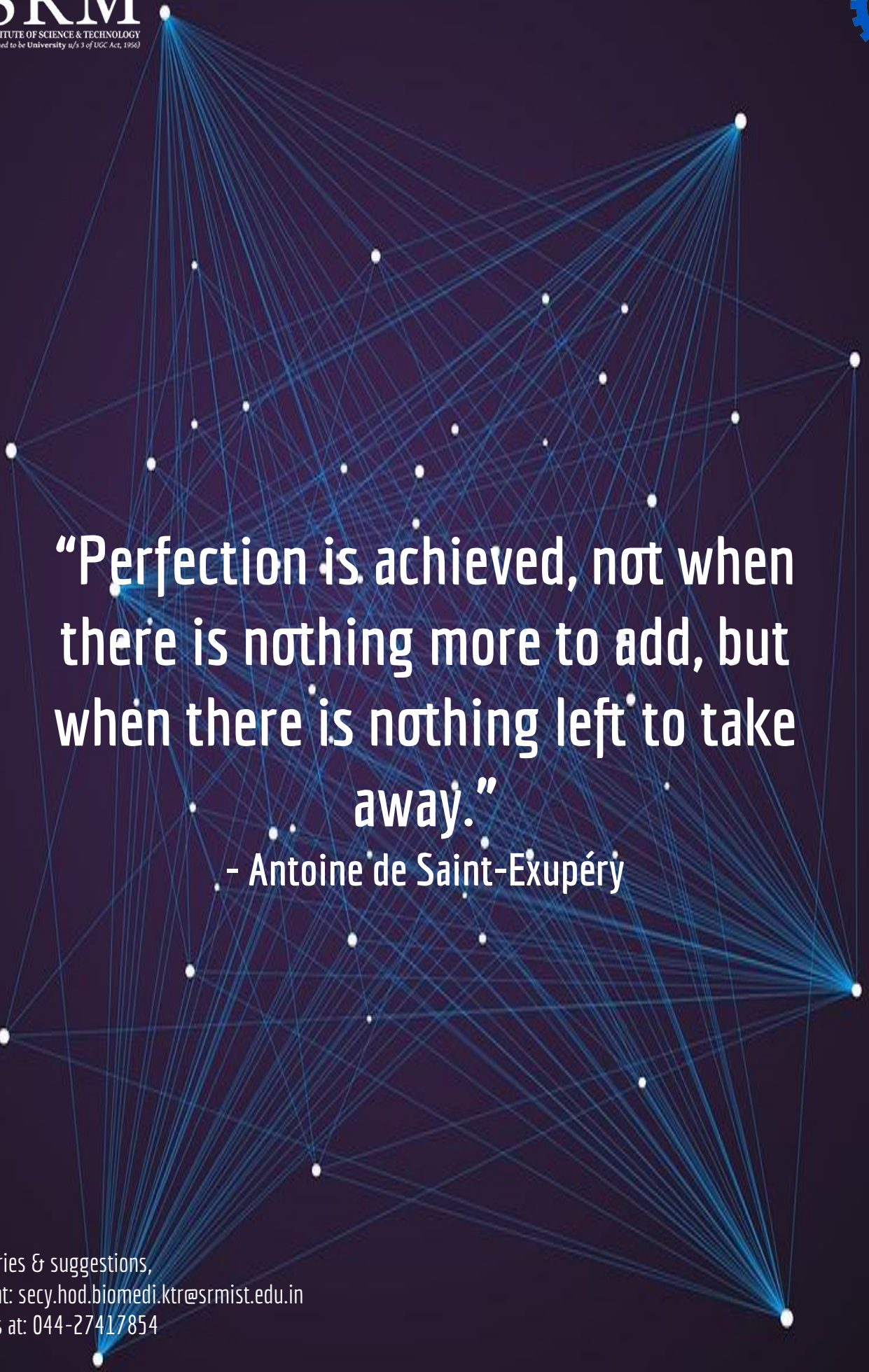

"Perfection is achieved, not when there is nothing more to add, but when there is nothing left to take away."

- Antoine de Saint-Exupéry

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For more information about the department, please visit
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