Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

School of Electrical & Communication

Department of Biomedical Engineering

SYMBIOSIS

A BIOMED COLLAB NEWSLETTER

AY: 2022-2023

4th Edition

Department of Biomedical Engineering

Vel Tech is one of the few Institutes offering Biomedical Engineering in Tamil Nadu, with an immense aim of providing a different learning environment to inculcate out-of-box thinking. The department of Biomedical Engineering was established in 2017 under the school of Electrical and Communication with an aim to connect engineering and biology. True to its mission, the department is propelling itself to become a major educator in biomedical instrumentation and allied engineering by employing diverse workforce. The department has raised to the standards of world class laboratories by setting up Brain Computer Interface (BCI) from open BCI. The department has introduced a major pedagogical shift by incorporating integrated lab courses in curriculum with the motive of giving learn-by-doing experience to the students.

Vision - To be recognized as an excellent centre in Biomedical Engineering for imparting quality technical education that leads to transformative advancements in healthcare industries

Mission

- M1: To infuse critical thinking skills by providing a strong foundation that enables the students for continuing education
- M2: To create an ambience of academic excellence with state-of-the-art laboratories to compete globally
- M3: To establish a dynamic research environment that integrates advanced healthcare technologies for innovation and progress

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Editor's Desk

The Editors take a great pleasure in presenting the annual newsletter (for AY: 2022-2023) of the Department of Biomedical Engineering, SYMBIOSIS, 4th Edition with its usual flavour and variety.

We would like to start this newsletter with a famous quote from Nobel laureate, Richard P. Feynman, based on his approach of life, "*Study hard what interests you most, in the most undisciplined, irrelevant and original manner possible*". As quoted, the students should be willing to work on their interests. Besides in general, "*Those who seek knowledge, will learn; those who learn, will apply; and those who apply, will succeed*".

In the academic year of 2022-2023, both faculties and students have given their best in teaching and seeking knowledge and also in applying it for various useful purposes. So, we take pride in applauding their efforts and successes/achievements. We also thank the readers of this newsletter for their support and encouragement.

We hope to be back in next year with another vibrant issue of SYMBIOSIS with all the information from our department that never fails to stir the enthusiasm.

Faculty Editor - Dr. K. Ganeshlenin, PhD

Assistant Professor (TTS2843)

Student Editors – Kandula Indhu (VTU21280)

& Pittu Pallavi(VTU 19829)

HoD's Desk

Greetings, I am very happy to spin our fourth newsletter that highlights our various student and faculty activities including the industry visit to ISRO Bangalore. I appreciate the students who got laurels to the department through their participation and winning in various activities including project contest. Also, I appreciate the faculty behind their success. I am glad to state that the department of biomedical engineering is one of the finest and establishing department which continuously grows and for this, I would like to give credit to every member of this family for their respective roles in this passionate endeavour.

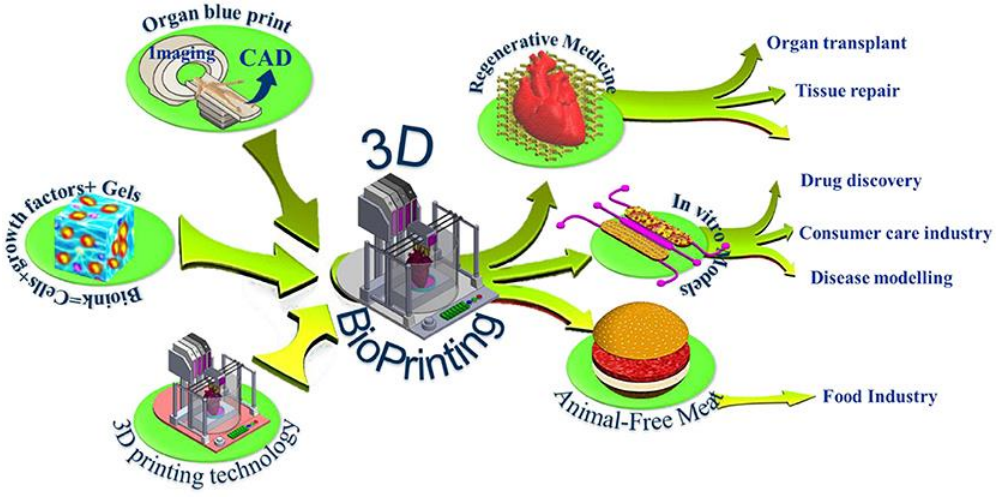
Dr. N. M. Masoodhu Banu, PhD
Professor.

Faculty's Desk

"Talk-of-The-Town"

3D Bio-printing in Medicine

In the early 2000s Biomedical developers started seeing the 3D printing technology as a method to replace sick or damaged tissue and organs with on-demand, printed components with the introduction of additive manufacturing and a flurry of new-generation. Similar to 3D printing, bioprinting is an additive manufacturing technology that prints objects layer by layer using a digital file as a template. However, unlike 3D printing, bioprinters produce organ-like structures using cells and biomaterials, allowing live cells to proliferate. Despite being a relatively new technology, bioprinting has enormous potential to aid sectors such as regenerative and customized medicine, drug development, and cosmetics.



Ref: Ramadan Q and Zourob M (2021), "3D Bio-printing at the Frontier of Regenerative Medicine, Pharmaceutical, and Food Industries", Front. Med. Technology.

Pre-printing/pre-processing comprises picking the right cells and bio-ink materials, combining the elements, and making the 3D design. Bio-printing utilizing crosslinking to maintain a stable structure and one or more of the existing printing processes to bio-print a tissue construct. The tissue structure is grown in a bioreactor during the post-printing phase. After that, the printed structure is mechanically tested and appraised. The construct can then be put to use in the specified application. With appropriate bio-inks and improved bio-fabrication methods, this technology will be able to bridge the vast gap between the lab and the fab, eventually meeting current clinical and industrial demands and pushing the frontiers for enhanced drug discovery and regenerative medicine.

In several biomedical fields, 3D bio-printing might represent a paradigm shift for the twenty-first century. Effective collaboration and information transmission across the scientific and technical communities becomes critical to accelerating the advancement of this technology and making this vision a reality.

Dr. J. Saminathan, Ph.D.,
Assistant Professor

Department Cites

- A memorandum of understanding (MoU) with Andhra Pradesh MedTech Zone (AMTZ), Visakhapatnam is signed on 5th September, 2023.
- A 4-days faculty development programme (FDP) on "Real Time Medical Signal Processing – Hands on" is organized for faculties and research scholars from 2nd to 6th December 2022.

- A 1-day industrial visit to ISRO Bangalore for 2nd – 4th year students is organized on 3rd November, 2022.

- A 5-days student workshop on "L1 Critical Care Equipment" is organized for all students in collaboration with Andhra Pradesh MedTech Zone (AMTZ), Visakhapatnam from 20th to 25th March, 2022.

- A one-day program on “Intellectual Property Rights Awareness” is organized for students and faculties on 24th February, 2023.

Faculty Cites

Research Activities:

A. Research Articles

- The faculties in the Department of Biomedical Engineering have published articles in national/international journals/conferences in calendar year 2023, whose details are given below.

Name of the faculty and other authors	Title of the research work	Journal / Conference Published
Saranya, G.	Integrated Vision and Sensor Based Analysis for Sleep Apnea Using Feat Face Net Deep Learning	Journal of Electrical Engineering and Technology
Jehosheba Margaret, M., Masoodhu Banu, N.M.	Performance analysis of EEG based emotion recognition using deep learning models	Brain-Computer Interfaces
Hema, S.	Flop Resistance Controlled Circulating Current Minimization of Parallel Quadratic Step Up Converter in DC Micro grid Applications	ICCECE 2023 - International Conference on Computer, Electrical and Communication Engineering
K. Ganeshlenin	Oxides for Medical Applications	Oxides for Medical Applications
K. Ganeshlenin, Thiyam, Deepa Beta, Vennila Preethi & Shelishiya Raymond.	Biocompatibility of oxide nanoparticles	Oxides for Medical Applications
K. Ganeshlenin	An overview of biomedical applications of oxide materials	Oxides for Medical Applications
K. Ganeshlenin	Synthesis and characterization of ferrite nanostructures for specific biomedical applications	Applications of Nanostructured Ferrites
Paramasivam, A., Khanal, R., Kamar, R., Lyngdoh, L., and Masoodhu Banu, N.M.	Analysis of Impacts of Various Masks on Human Health using IoT Device	Proceedings - 5th International Conference on Smart Systems and Inventive Technology, ICSSIT 2023

Hema, S.	Deep Learning Based FOPID Controller for Cascaded DCDC Converters	Computer Systems Science and Engineering
Muthalakshmi, M	Deep Learning Framework for the Prediction of Childhood Medulloblastoma	Computer Systems Science and Engineering
K. Ganeshlenin	Current advancements in self-assembling nanocarriers based siRNA delivery for cancer therapy	Colloids and Surfaces B: Biointerfaces
K. Ganeshlenin	State of th eart: MXene structures in nanooncology	Biomaterial Advances

B. Patents & Funding/Awards

- The faculties in the Department of BME have published patents and obtained funding, whose details are given below.

Name of the Patenter	Patent Number	Title of the patent	Nature of the patent
Dr. Thiyam Deepa Beeta Dr. Saranya G	202321000166 A	Heart Disease Detection Using Big Data Analytics & Deep Learning Approach With Python	Publication Of The Patent Office, India
Dr.Saranya G	6274670	Iot Based Wearable Medical Monitoring Device	Intellectual Property Office, UK

Name of the Faculty	Name of the award, fellowship, received from Govt. or Govt. recognised bodies	Name of the Awarding Agency
Dr. N.M.Masoodhu Banu	Senior scientist travel grant award	DST SERB

C. Faculty Development Program

- The faculties in the Department of BME have attended Faculty Development Program (FDP - Professional Development Programmes, Orientation / Induction Programmes, Refresher Course, Short Term Course, Faculty Industry Training), whose details are given below.

S. No	Name of Faculty who attended	Title of the program	Duration	
1	Mrs.S.Hema	Real Time Medical Signal Processing Hands-On	02-12-2022	06-12-2022
2	Dr. Thiyam Deepa Beeta	Real Time Medical Signal Processing Hands-On	02-12-2022	06-12-2022
		National Education Policy (NEP) 2022 for Higher Education	30-12-2022	30-12-2022
		Faculty Development Program on Biomechanics and Its Applications	13-03-2023	18-032023
		National Intellectual Property Awareness Mission	24-02-2023	24-02-2023
3	Dr. A. Paramasivam	Real Time Medical Signal Processing Hands-On	02-12-2022	06-12-2022
		Seven day training program in State of art in Artificial Intelligence and Machine Learning	16-12-2022	22-12-2022
		Data Analytics and Artificial Intelligence in Healthcare	22-05-2023	26-05-2023
4	Dr. K. Ganeshlenin	Real Time Medical Signal Processing Hands-On	02-12-2022	06-12-2022
		National Intellectual Property Awareness Mission	24-02-2023	24-02-2023
		Hands on Training on Critical Care Equipment	25-07-2023	30-07-2023
5	Dr.N.M.Masoodhu Banu	NBA Accreditation and Teaching and Learning in Engineering (NATE)	15-01-2023	15-04-2023
6	Dr.G.Saranya	Real Time Medical Signal Processing Hands-On	02-12-2022	06-12-2022
		National Education Policy (NEP) 2022 for Higher Education	30-12-2022	30-12-2022
		Faculty Development Program on Biomechanics and Its Applications	13-03-2023	18-032023
		National Intellectual Property Awareness Mission	24-02-2023	24-02-2023
7	Mrs.R.Shelishyah	Faculty Development Program on Biomechanics and Its Applications	13-03-2023	18-032023
		Real Time Medical Signal Processing Hands-On	02-12-2022	06-12-2022
		National Intellectual Property Awareness Mission	24-02-2023	24-02-2023
8	Dr. M. Muthalakshmi	Real Time Medical Signal Processing Hands-On	02-12-2022	06-12-2022
		Short-term Course on Grid Power Electronics Technology	26-04-2023	30.04.2023

Student Cites

- Details of the 2019-2023 batch students who have done their industry based field project / internship (in collaboration) are given below.

Name of the student	VTU No.	Field projects / research projects	Name of the Company / Industry
Sujitha N.S.	VTU11563	Field projects	Medcuore Medical Solutions
Pooja B.	VTU12628	Industry Internship	Amphenol Sensors (AMTZ)
Ridakordor Kamar	VTU13957	Industry Internship	Panakeia Medisys Pvt. Ltd (AMTZ)
S. Selva Reetika	VTU13977	Industry Internship	Amphenol Sensors (AMTZ)
Roiky Suchiang	VTU11958	Industry Internship	Panakeia Medisys Pvt. Ltd (AMTZ)
Riddhi Khanal	VTU16219	Industry Internship	Panakeia Medisys Pvt. Ltd (AMTZ)

- Details of the students (2nd and 3rd year) who have received awards / recognitions for research/innovations during the year are given below.

Title of the innovation	Name of the Student Awardee	Name of the Awarding Agency
Second Prize in 13th INTERNATIONAL PROJECT COMPETITION & EXHIBITION for the project entitled "Novel Drone Assisted Transportation of Medical Kit with Peltier Module"	Pittu Pavan Sai Kiran Reddy, Mohamed Thoufeek K.S. and Chitra A.	Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai - 600062
First Prize for the Project “Design of Internet of Things based real-time Electromyogram device” in National Level Technical Symposium organized by SRM	Dhiya Sabu, Pittu Pallavi and Pittu Pavan Sai Kiran Reddy	SRM Easwari Engineering College, Chennai

Easwari Engineering College, Chennai held on 4th March 2023		
First Prize for the Project "Internet of Things based Temperature Monitoring and Control for Healthcare Transportation Drone Applications" in Project Competition (NEXUS - 2023) organized by Dr. M.G.R. Educational and Research Institute, Chennai held during 2nd to 3rd March 2023	Dhiya Sabu and Pittu Pavan Sai Kiran Reddy	Dr. M.G.R. Educational and Research Institute, Chennai
First Prize in Innopix 2023 Project Expo on the topic "Development of Technology for EMG Control Bionic Hand" at Mahendra College of Engineering, Salem on April 6, 2023.	Bidheyak Pokharel and Dikendra Baduwal	Mahendra College of Engineering, Salem

- Details of the 2019-2023 batch students who have received placements are given below.

S.No	VTU Number	Name of the Student	Name of Company Placed/Accepted
1	VTU11958	Roiky Suchiang	AMTZ Medi Valley Incubation Council
2	VTU16219	Riddhi Khanal	Panakeia Medisys Pvt. Ltd (AMTZ)
3	VTU11563	Sujitha N.S.	S10 Healthcare

- Besides above, the details of the 2018-2022 batch students who have progressed to higher education are given below.

Name of student enrolling into higher education	Name of institution joined	Name of programme admitted to
Shrinithi G.S	Anna University Chennai	M.Tech-(Biomedical Engineering)
Swetha Jha	Yuan Ze University	Master-Department of Electrical Engineering
Perumal. D	University of North Texas	Major (Program/Plan): BMEN-MS

Alumni Talks

I wanted to take a moment to express my gratitude to the Medi Valley Incubation Council (MVIC) in the Andra Pradesh MedTech Zone (AMTZ) for allowing me to become a Fellow. I'm delighted to join MVIC and the AMTZ family. I also want to thank the staff at Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, particularly our HoD Dr. Masoodhu Banu, for their invaluable assistance, support, and guidance throughout my 4-year B. Tech. in Biomedical Engineering programme, which allowed me to reach this milestone. I also want to thank the Indian Biomedical Skills Consortium (IBSC), led by Mr. Mrutunjay Jena Scientist-G and Head of the Department and Regulatory Affairs, and Mr. Nitturi Kumar Scientist-D and IBSC Coordinator, for the 45-day training on "Hands on training on medical devices" where I was able to gain practical knowledge of the critical care equipment, radiological equipment, and operating room equipment.

Roiky Suchiang
Alumni, B-Tech, BME

Student Talks

Learning is not something you watch. Simply sitting in class, listening to the teachers, memorising the pre-packaged assignments, and spitting out the answers doesn't teach me very much as a student. I need to be aware of what I'm learning so I can describe it in writing, connect it to previous knowledge, and use it in my everyday activities. In an active learning setting, the teacher just provides guidance as we each explore uncharted territory.

To make learning enjoyable, our faculty is heavily involved in designing active learning techniques for our curriculum. My personal favourites among the numerous techniques include "Think Pair and Share" since it allowed me to examine my own thinking, share it with a partner, and discover how we each understood the subject differently. In addition to this, "game-based learning" is another approach that enables students to absorb challenging material easily and enthusiastically. Not just me, but also other students find it intriguing and help to clarify it so that we may all understand.

Kandula Indhu
2nd Year, B-tech, BME