



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



BIOVERSE

INNOVATING THE FUTURE OF LIFE AND MEDICINE



JUNE 2026
VOLUME XI

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF BIOMEDICAL ENGINEERING

Institute Vision

To create, translate and disseminate frontiers of knowledge embedded with creativity and innovation for a positive transformation of emerging society.

Institute Mission

- M1:** To nurture excellence in teaching, learning, creativity and research; translate knowledge into practice
- M2:** To foster multidisciplinary research across science, medicine, engineering, technology and humanities
- M3:** To incubate entrepreneurship; instill integrity and honour
- M4:** To inculcate scholarly leadership towards global competence and growth beyond self in a serene, inclusive and free academic environment

Department Vision

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

Department 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

Program Education Objectives

- PEO1:** Exhibit proficiency in designing and analyzing healthcare solutions to cater to the needs of the medical industry and societal needs
- PEO2:** Demonstrate professional networking in a diverse team setting and collaborate among peers with ethical practices in the workplace, ensuring integrity
- PEO3:** Reinforce lifelong learning practices for professional advancement not limited to higher studies and research.

Program Special Outcomes

- PSO1:** Apply critical reasoning to analyse, identify and solve solutions for problems related to Brain-Computer Interface (BCI)
- PSO2:** Design an effective interface between biological and electronic systems.
- PSO3:** Apply the knowledge of Artificial intelligence in healthcare engineering to solve real-time problems

Magazine Credits

From the Magazine Team

“This magazine is a reflection of the people, ideas, and shared moments that shape our academic journey. It represents the collective spirit of a community that learns together, grows through challenges, and continuously strives to innovate throughout the year.

This edition brings together faculty perspectives, student accomplishments, technical progress, and creative expressions that capture the dynamic energy of our academic environment. Each section highlights a commitment to learning, innovation, and personal development, showing how diverse efforts come together to build a vibrant and evolving community. Beyond celebrating achievements, the magazine also acknowledges the curiosity, experimentation, and perseverance that make those successes possible.

May this magazine stand as a testament to the power of collaboration and the meaningful outcomes that can be achieved when individuals work together with a shared purpose.

HAPPY READING!”

Chief Editors::

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- Gouri Pramod (VTU21593)- IV BME
- Yash Sharma (VTU23335)-IV BME
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DEAN



Dr. K Jagajjanani Rao, Professor (Research) in Biotechnology and the Dean, School of Bio Engineering (SoBE) at Vel Tech University. He completed his M.Tech and Ph.D. in Green Synthesis & Bio-nano technology from the National Institute of Technology, Rourkela, Odisha, and was awarded the prestigious BIRAC Postdoctoral Fellowship (2015-2018) from the Department of Biotechnology

Dr. Rao completed his M.Tech. and Ph.D. in Green Synthesis and Bionanotechnology at the National Institute of Technology, Rourkela, Odisha. His specialist training laid the foundation for his work in fields that connect biotechnology with environmentally conscious approaches to materials and nanoscale science. From 2015 to 2018, he held the prestigious BIRAC Postdoctoral Fellowship awarded by the Department of Biotechnology, Government of India—an important milestone in his research journey.

His scholarly contributions include 33 international research papers and three book chapters. He also holds five patents, reflecting the applied and inventive dimension of his work. In addition to his publications, Dr. Rao has helped secure funding for four sponsored projects supported by the Department of Science and Technology (DST) and the Department of Biotechnology (DBT). He served as Principal Investigator for two projects and Co-Principal Investigator for two others, contributing to the direction and implementation of funded research.

As Dean of the School of Bio Engineering, Dr. Rao's role extends beyond his own research. He contributes to academic leadership in a field where biology and engineering meet, supporting the broader development of bioengineering education and research at Vel Tech University.

Dr. Rao's career brings together advanced training, research publications, funded projects, and patents. Through his work in green synthesis and bionanotechnology, he continues to contribute to biotechnology research and the academic community.

HoD'S Reflection



As we present this edition of the departmental magazine, it is a moment to reflect on the steady progress and collective efforts of the Biomedical Engineering department. Over the past academic period, the department has continued to strengthen its academic foundations while adapting to the evolving demands of healthcare, technology, and interdisciplinary learning.

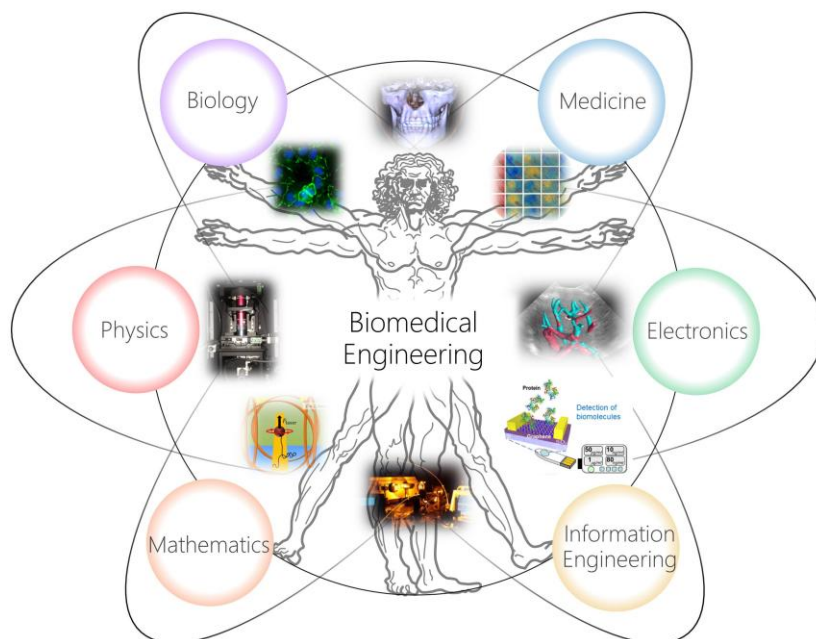
The department continues to promote learning that extends beyond textbooks and classrooms. Students are encouraged to question, explore new ideas, and engage with challenges critically. Such an environment nurtures innovation, strengthens academic foundations, and helps students develop confidence in applying their knowledge to real-world contexts.

The pages that follow capture this journey in meaningful ways. They highlight academic achievements, technical initiatives, research efforts, and creative expressions that showcase the evolving identity of the department. Together, these contributions reflect the active involvement of students in shaping a dynamic and forward-looking academic community.

May this volume serve both as a reflection of past efforts and as motivation for future endeavors. I sincerely appreciate the dedication of the students and the editorial team in compiling this thoughtful representation of our department's progress, and I encourage our learners to continue striving for excellence with curiosity and purpose.

Dr. Balasubramaniam. D

About the Department



The Department of Biomedical Engineering was established in the year 2017 with the objective of bridging engineering principles with medical and biological sciences to address challenges in healthcare. The department offers B.Tech. and Ph.D. programs, aimed at developing skilled professionals and researchers capable of contributing to healthcare technology, medical device development, and biomedical research. Emphasis is placed on outcome-based education, hands-on learning, and research-oriented training. With a focus on emerging areas such as medical imaging, biomechanics, biomedical signal processing, and artificial intelligence in healthcare, the department strives to produce graduates who are industry-ready, research-driven, and socially responsible.

Internship

Biomedical Engineering Internship at KIMS Sunshine Hospital, Begumpet, Hyderabad

I. Poojitha (VTU25397), P. Akshaya (VTU27084), and M. S. S. A. L. Indira (VTU27126) completed an internship at KIMS Sunshine Hospital, Begumpet, Hyderabad, as part of their academic exposure in Biomedical Engineering. The internship provided valuable practical experience in understanding the operation, maintenance, calibration, and management of medical equipment in a hospital environment.

During the internship, we learned about the responsibilities of Biomedical Engineers in ensuring the accuracy, safety, reliability, and continuous availability of medical equipment. We gained exposure to various diagnostic, monitoring, and therapeutic devices, including ECG machines, EEG systems, patient monitors, multiparameter monitors, defibrillators, ventilators, infusion pumps, blood pressure monitoring equipment, and other critical-care devices.

We also visited different clinical departments such as Cardiology, Operation Theatre, 2D Echo, Radiology/X-ray, and Ophthalmology. We observed the functioning of medical equipment and diagnostic procedures, including ECG and Treadmill Test (TMT), and understood their importance in clinical diagnosis and patient monitoring.

A major part of the internship involved Preventive Maintenance (PM) and Annual Maintenance activities. Under the guidance of experienced Biomedical Engineers, we observed and assisted with routine inspections of patient monitors, defibrillators, ventilators, hospital beds, and other equipment. We learned to check cables, power connections, displays, alarms, accessories, controls, and overall equipment functionality to identify potential faults at an early stage.

Internship

We also received practical exposure to calibration procedures for defibrillators and ABG analysers, which helped us understand the importance of maintaining measurement accuracy and equipment performance within specified limits.

Overall, the internship successfully bridged the gap between theoretical knowledge and practical hospital applications. It strengthened our technical knowledge, equipment-handling skills, troubleshooting awareness, and understanding of hospital equipment management. The experience provided valuable insight into the essential role of Biomedical Engineers in supporting healthcare professionals and ensuring safe and effective patient care.



I.Poojitha (vtu25397)
P. Akshaya (vtu27084)
M.s.s.a.l.indira(vtu27126)

Best Project

ECG Arrhythmia Detection using Machine Learning

The project “ECG Arrhythmia Detection Using Machine Learning” presents a machine-learning-based system for automatically detecting and classifying cardiac arrhythmias from Electrocardiogram (ECG) data. ECG is an important diagnostic technique used to record the electrical activity of the heart and provides information about heart rate, rhythm, and cardiac function. Abnormalities in ECG waveforms may indicate conditions such as atrial fibrillation, arrhythmia, congestive heart failure, and other cardiac disorders. The project aims to reduce the limitations of manual ECG interpretation, which can be time-consuming and difficult to apply to large datasets.

The proposed system uses a structured machine-learning pipeline based primarily on a Support Vector Machine (SVM) classifier. The dataset contains 1,200 ECG samples with 56 extracted features and four classes: AFF (Atrial Fibrillation), ARR (Arrhythmia), CHF (Congestive Heart Failure), and NSR (Normal Sinus Rhythm). Each class contains 300 samples. The dataset is processed before model training to improve data quality and classification performance.

The preprocessing stage includes removal of irrelevant attributes, handling missing values using median imputation, and converting categorical class labels into numerical values using Label Encoding. The dataset is divided into training and testing sets using an 80:20 stratified split. To handle class imbalance during training, the project applies SMOTE (Synthetic Minority Oversampling Technique). Although the original dataset is described as balanced, SMOTE is included in the developed pipeline to support minority-class learning.

Best Project

For feature engineering, SelectKBest with the ANOVA F-test is used to select the 30 most relevant features. The selected features are then scaled using RobustScaler, which reduces the influence of outliers. Principal Component Analysis (PCA) is subsequently applied while retaining 95% of the variance, thereby reducing dimensionality and computational complexity.

The SVM model uses GridSearchCV for hyperparameter optimization, considering different values of C, gamma, and kernel type. Stratified cross-validation is used to assess model generalization. The system evaluates performance using several metrics, including accuracy, precision, recall, F1-score, ROC-AUC, Matthews Correlation Coefficient, and Cohen's Kappa. A confusion matrix and learning curve are also generated to analyze classification performance and potential overfitting.

The reported results show an accuracy of 86.67%, with precision of 86.00%, recall of 87.00%, F1-score of 86.50%, ROC-AUC of 91.20%, MCC of 82.40%, and Cohen's Kappa of 81.90%. The report also presents SHAP-based explainability to understand the contribution of features to model predictions.

Overall, the project demonstrates a complete ECG classification framework combining preprocessing, SMOTE, feature selection, scaling, PCA, optimized SVM classification, cross-validation, performance evaluation, visualization, and SHAP explainability. The report identifies future development opportunities including CNN/LSTM-based deep learning, integration with wearable ECG devices, real-time monitoring, and validation using larger clinical datasets.

C. S. Sai Ganesh (VTU27371)

Biosparx 2K26

The Department of Biomedical Engineering, School of Electrical and Communication, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, proudly marked a new beginning with the successful organization of BioSparx 2K26, the department's first-ever techno-cultural event, held on 6 March 2026.

Conceived as a celebration of the diverse talents and potential of students, BioSparx 2K26 brought together technology, innovation, creativity, culture, and entertainment on a common platform. More than just a collection of competitions, the event was envisioned as an opportunity for students to step beyond the conventional classroom environment, explore their interests, showcase their abilities, and connect with students from other institutions.

The day began with an atmosphere filled with enthusiasm and anticipation as participants gathered for a series of technical and non-technical events. The technical segment of BioSparx provided a platform for young innovators to transform their ideas into meaningful presentations and solutions. Project Expo encouraged students to demonstrate their projects and innovative concepts, while Mini Ideathon challenged participants to think creatively, identify problems, and develop practical solutions. Poster Presentation offered an avenue to communicate scientific and technical ideas effectively, and the Tech Quiz tested participants' knowledge, awareness, and quick thinking across various technological domains.

However, BioSparx was designed to celebrate more than technical excellence. Recognizing that creativity and talent extend far beyond academics, the event featured an energetic line-up of non-technical competitions. Fashion Walk, Dance Dynamo, Reels O Mania, and Escape Room added colour, excitement, and entertainment to the celebrations. These events encouraged students to express themselves, work as teams, think spontaneously, and demonstrate confidence in an entirely different setting.

Biosparx 2K26

One of the highlights of BioSparx 2K26 was the participation of students from different institutions, transforming the event into an intercollegiate celebration of talent and youthful energy. With cash prizes of up to ₹45,000, the competitions generated considerable enthusiasm and healthy participation. More importantly, the event created opportunities for students to interact, exchange ideas, appreciate different perspectives, and learn from one another.

The occasion was further honoured by the presence of Dr. Jawad Kumar, Scientist-F, DRDO, as the Chief Guest. His presence added significance to the inaugural edition of BioSparx and inspired students to pursue innovation, scientific thinking, and excellence in their respective fields. Behind the success of BioSparx 2K26 was the collective effort of the department faculty, convenors, student coordinators, volunteers, and the organizing team. From planning the events and coordinating participants to managing the competitions and ensuring their smooth execution, every member of the team contributed to bringing the vision of BioSparx to life.

The first edition of BioSparx was therefore not merely an event; it was the beginning of a new tradition in the Department of Biomedical Engineering. It demonstrated that biomedical engineering is not confined to laboratories, classrooms, and technical knowledge alone—it is also a field driven by imagination, collaboration, communication, creativity, and the courage to explore new possibilities.

As the curtains came down on BioSparx 2K26, the event left behind more than memories of competitions and celebrations. It created new friendships, encouraged new ideas, revealed hidden talents, and established a platform that the department can build upon in the years to come.

BioSparx 2K26 was a beginning—a celebration of minds that innovate, talents that inspire, and a department that continues to grow beyond boundaries.

Biosparx 2K26 - Glimpse





Vel Tech
Vellore Institute of Technology
Approved by the Government of Tamil Nadu



UOC
University of Chennai



NSAC
National Board of Accreditation



VIBE
Vellore Institute of Biomedical Engineering



IEEE EMBS
IEEE Engineering in Medicine & Biology Society

Non Tech Events

- FASHION WALK
- DANCE DYNAMO
- REELS O MANIA
- ESCAPE ROOM

Tech Events

- PROJECT EXPO
- MINI IDEATHON
- POSTER PRESENTATION
- TECH QUIZ

School of Electrical and Communication
Department of Biomedical Engineering
proudly presents
BIOSPARK 2K26

CASH PRIZES UPTO ₹45,000 !!

CHIEF GUEST
Dr. Jawad Qumar
Scientist - F
DRDO

WITH THE BLESSINGS OF
Col.Prof.Vel Dr.R.Rangarajan
Founder President & Chancellor
Dr. Sagunthala Rangarajan
Foundress President
Prof. Dr. Rajat Gupta
Vice-Chancellor

CONVENORS
Dr. R.S. Valarmathi
Dean S&EC
Dr. D. Balasubramaniam
Associate Professor - HOD S&EC

FACULTY COORDINATORS
Dr. G. Saranya, Asso.prof
Dr. Thiyaam Deepa Beeta, Asso.prof
Dr. E. Madheswari, Asst.prof
Dr. A. Padmanabha Sarma, Asst.prof

REGISTER NOW
MAXIMUM OF 6 EVENTS!
₹1,100 FOR INTERNAL (+ GST)
₹2,500 FOR EXTERNAL
(MAX 3 PARTICIPANTS)
<https://veltech.edu.in/home/biosparx/>

MARCH 6TH
9.00AM TO 4.00PM


SCAN HERE!!!

STUDENT COORDINATORS
A. Yugandhar, Ph: 91+6301810522
K. Priyanka
M. Ashfaq Khan, Ph: 8925040676
P. Charishma

A large audience of students and faculty members is seated in a hall, facing a stage. The hall is decorated with colorful streamers and lights. A large screen is visible in the background.

A woman in a blue and orange sari is presenting a large, ornate plaque to a man in a blue vest and white shirt. They are standing in front of a backdrop that reads "Vel Tech Vellore Institute of Technology School of Electrical and Communication Department of Biomedical Engineering".

A group of students are working on a project. They are gathered around a table, looking at a large display board. The display board has a red and white design. The students are wearing casual clothing.

A large audience of students and faculty members is seated in a hall, facing a stage. The hall is decorated with colorful streamers and lights. A large screen is visible in the background.

A chalkboard with a drawing of a rocket and the text "ESCAPE ROOM". The drawing is done in white chalk on a dark background. The text "ESCAPE ROOM" is written in a stylized font. There are also some smaller drawings and text on the board.

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Biosparx 2K26- Glimpse



Medical Camp

The Department of Biomedical Engineering, School of Bio Engineering, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, organized a Free Medical Camp in association with Anderson Diagnostics & Labs on 30 April 2026 at Engineering Hive, Rooms 7001 and 7002. The camp was conducted from 9:30 AM to 4:30 PM with the objective of promoting health awareness and encouraging preventive healthcare among the participants. The camp provided a range of essential health screening and consultation services. Participants were offered random blood glucose testing, blood pressure measurement, height and weight assessment with BMI calculation, dietitian consultation, eye screening, and dental screening. These services helped participants assess important aspects of their general health and gain awareness about the importance of regular health check-ups.

The programme began at 9:30 AM with a welcoming address, followed by the lighting of the lamp and Tamil Thai Vazhthu. This was followed by a thematic address by the Head of the Department, a special address by the Dean of the School of Bio Engineering, an institutional address, and the introduction of the Chief Guest. The medical camp officially started at 9:55 AM.

The event was coordinated by the faculty and student coordinators of the Biomedical Engineering Department. Their involvement contributed to the smooth organization and successful conduct of the programme. Overall, the medical camp was a valuable initiative that combined health screening, awareness, professional consultation, and community-oriented healthcare, while providing Biomedical Engineering students with practical exposure to organizing a healthcare-related event.

Medical Camp

Convenors :

Dr. D. Balasubramaniam

Associate Professor & HoD, Department of Biomedical Engineering

Dr. Jagajjani Rao K.

Dean, School of Bio Engineering

Faculty Coordinator :

Dr. E. Madeshwari

Assistant Professor, Department of Biomedical Engineering

Student Coordinators :

C. Shanmukha Sai Ganesh – 3rd Year, BME

P.A.S. Uma Sai – 3rd Year, BME

S. Nivash – 2nd Year, BME

G. Abinaya – 2nd Year, BME



The poster for the Medical Camp is titled "FREE MEDICAL CAMP" and is organized by the School of Bio Engineering, Department of Biomedical Engineering, in association with Anderson Diagnostics. It lists the services available: Glucose (Random Blood Sugar), Blood Pressure, Height, Weight & BMI, Dietitian Consultation, Eye Screening, and Dental Screening. The camp is held on 30th APR 2026, Thursday, from 09.30 AM to 04.30 PM. The venue is Engineering Hive, Floors - 1002. The poster also lists the convenors: Dr. D. Balasubramaniam (Associate Professor - HoD BME) and Dr. Jagajjani Rao K. (Dean - SBEE). The faculty coordinator is Dr. E. Madeshwari (Assistant Professor - BME). The student coordinators are C. Shanmukha Sai Ganesh (3rd yr - BME), P.A.S. Uma Sai (3rd yr - BME), S. Nivash (2nd yr - BME), and G. Abinaya (2nd yr - BME). The poster includes logos for Vel Tech University, VIBE, and Anderson Diagnostics.



Gallery

