



Vision of the Department

To be a globally recognized centre of excellence in the field of biomedical engineering where learners are nurtured in a scholarly environment to evolve into competent professionals to benefit society

Mission of the Department

- Evolve a curriculum which emphasizes on strong engineering fundamentals with the flexibility to choose advanced courses of interest and gain exposure to tools and techniques in Biomedical Engineering.
- Encourage a teaching-learning process in which highly competent faculty share a symbiotic association with the institutes of repute.
- Facilitate creation and dissemination of biomedical engineering knowledge through a digitally-enabled learning environment.
- Develop academic and infrastructural facilities with modern equipment and other learning resources and encourage reciprocal sharing with other institutes through networking.
- Establish a centre of excellence to enhance academia – biomedical industry partnership and work on collaborative projects.

Programme Educational Objectives (PEO)

- To enable the pursuit of knowledge in the field of Biomedical Engineering and contribute to the profession and employability of the students.
- To engage in research, generate the employment through entrepreneurship and work effectively in multidisciplinary environment.
- To understand the human, social, ethical and environmental context of their profession and contribute positively to the needs of individuals and society.

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- Prof. Komal Lawand

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- Ms. Riddhi Parasnaik

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- Dr. Sanika Suvarnapathaki

- Guest Lectures, Educational Tours and Workshops organized by the department for students and faculty.
- Student Activities organized by BMESI and BMSA

Faculty and Student Achievements

PROF. DR. GAJANAN NAGARE

HEAD OF DEPARTMENT, BIOMEDICAL ENGINEERING

It gives me immense happiness to express my appreciation to the entire department faculty and students that we have been able to conduct several educational events in this semester in the form of Guest Lectures, Educational Tours, Workshops, Seminars etc. This has helped us to foster our connect with the industry and establish a collaborative linkage with them.

Our dept. has active MoU with Capgemini Engineering and this semester we have organized two value added courses namely Regulations and Standards in Medical Devices and Verification and Validation of Medical Devices. The course was delivered by experts from Capgemini Engineering. This has helped us to impart industry relevant skills to our students.

Department organized a workshop on Techniques of Diagnosis and Radiotherapy of Cancer under aegis of Society for Radiation Research (SRR). The workshop was conducted at Kokilaben Dhirubhai Ambani Hospital, Mumbai. We are grateful to SRR for this continued active collaboration with us.

Our student bodies BMESI and BMSA has been very experimental in organizing series of workshops, seminars and training programs for the students and faculty.

Soon end semester examination are going to start for students, I convey my good wishes and hope to see all my students to excel in the examinations.

Thank you





“Your time is limited, don't waste it living someone else's life.”

-Steve Jobs



Workshop on Techniques of Diagnosis and Radiotherapy of Cancer

On September 9th, 2023, Department of Biomedical Engineering organized a workshop on the "Techniques of Diagnosis and Radiotherapy of Cancer" for biomedical engineers. The workshop was organized under the aegis of Society for Radiation Research (SRR). The event took place at Kokilaben Dhirubhai Ambani Hospital (KDAH), Andheri, following coordination between Dr. Badri Pandey, Secretary-SRR and Dr. Sumit Basu, Head of the Department of Radiation Oncology at KDAH. This workshop was coordinated by Prof. Geetha Narayanan, Prof. Priyanka Shrivastava, and Prof. Arunkumar Ram of the department.

The workshop began with an introduction to radiation therapy principles by Dr. Sumit Basu, followed by Dr. Harshavardhan Bhosale discussing the evolution of radiotherapy equipment and treatment modalities. Mr. Shaju Pilakkal explained radiotherapy functions and therapies, including CT, PET scans, and adaptive radiotherapy. Ms. Asmita Doiphode highlighted quality assurance in radiotherapy.

Mr. Debojyoti Dhar covered patient immobilization techniques, emphasizing the importance of error reduction in the radiotherapy process. A tour of the Radiation Oncology Department showcased PET-CT and cancer diagnosis methods. Discussions regarding collaborative projects and future visits concluded the day.

Interactive sessions and participant involvement made the workshop highly beneficial, fostering knowledge sharing and networking opportunities. The event concluded with participant feedback and a vote of thanks by the VIT faculty.

About SRR: The Society for Radiation Research is a professional organization comprising scientists, clinicians, students, academia, and industry professionals interested in radiation research. Its objectives include promoting research in various radiation-related fields, facilitating collaboration between different research areas, disseminating knowledge through events and publications, fostering discussions, interacting with the public, government, and regulatory bodies, and encouraging education and careers in radiation research. The society also seeks to integrate with other national and international scientific bodies to advance the field.



Students and Faculty Participants at KDAH



Dr. Sumit Basu speaking on Radiation Therapy in Cancer Management



Visit to the Radiation Oncology Department



Token of appreciation from VIT to the experts at KDAH

Department Staff

PROF. PRIYANKA SHRIVASTAVA
ASSISTANT PROFESSOR



EDUCATION QUALIFICATION:
ME-ELECTRONICS & TELECOMMUNICATION
PhD (Pursuing)

TEACHING EXPERIENCE:
12 YEARS

AREA OF SPECIALIZATION:
SIGNALS AND SYSTEMS
CONTROL SYSTEMS
REHABILITATION ENGINEERING

PROF. KOMAL LAWAND
ASSISTANT PROFESSOR



EDUCATION QUALIFICATION:
ME-INSTRUMENTATION

TEACHING EXPERIENCE:
11 YEARS

AREA OF SPECIALIZATION:
MEDICAL IMAGING
HUMAN ANATOMY & PHYSIOLOGY
DIGITAL ELECTRONICS

Know an Alumna

Dr. Sanika Suvarnapathaki (2015 Batch)



Sanika Suvarnapathaki is an alumna of VIT , passed out in the year 2015 from the Biomedical Engineering Department.

I graduated with my Ph.D. in Biomedical Engineering and Biotechnology from University of Massachusetts in August 2022. I have finished up my training as a postdoctoral scientist at Arizona State University and will be working at Johns Hopkins University School of Medicine as a Neurosurgery Postdoctoral Fellow since July 2023. My research focuses on developing translational biomaterials and tissue engineering strategies for improving human health and supporting tissue healing and regeneration. At Johns Hopkins, I will be using my skills to contribute to cancer genetics and therapeutics. My doctoral research has focused on the development of oxygen-releasing biomaterials for targeting hypoxia induced necrosis in metabolically active tissues. This material has also been shown to be effective in cardiac and cardiovascular tissue engineering, skin healing and regeneration, bone and critical size cranial defect regeneration, and lung tissue engineering applications. I spent a large part of my doctoral training investigating the regenerative potential and therapeutic potential of different polymeric biomaterial platforms. As a postdoc, I have focused on the development of fibrous biomaterials with spatio-temporal control for bone-tendon junction regeneration and rotator cuff repair. I am excited to begin working with the world's best neurosurgery team at Johns Hopkins University School of Medicine to develop techniques to detect, treat, and mitigate brain cancer. With a bench-side to bed-side approach, this opportunity will empower me to use my bioengineering skillset to help patients dealing with this deadly form of cancer with a 5-year survival rate of 33.8%.

My experience at VIT helped me develop a strong foundation and evolve my curiosity of what's possible in the amazing field of Biomedical Engineering. A strong connection with the department's faculty, amazing networks of peers and alumni, has fostered a strong sense of community and belongingness which has continued for many years after graduation. The faculty has been constantly striving to ensure that the students in the department are exposed to a good relevant curriculum, elective subjects and training opportunities. They are regularly in touch with alumni to learn about what changes in the curriculum could help students be caught up on the latest developments in the field. To this effect, they actively have been making efforts to introduce helpful workshops and guest lectures to inspire and educate students. The professors in the department were very supportive of me throughout my graduate school application process and made it possible for me to earn degrees at prestigious universities. They actively have stayed in touch even now and continue to ensure that their students have access to the best opportunities in their chosen endeavours.

My biggest advice for my juniors would be to keep an open mind. Remember that you are training to earn a degree in one of the most powerful disciplines in the world. The field of Biomedical Engineering has so much more to offer than just medical devices or biomedical electronics. Biomedical Engineering or Bioengineering and Biotechnology are often used interchangeably throughout the world because of the vast overlap and highly interdisciplinary nature of the field. It is one of the greatest fields you could be a part of that has revolutionized healthcare across the world in so many ways. One key skill to learn is to read and understand peer reviewed scientific literature. This will help you stay abreast of the latest developments in the field. Learn to develop good communication skills; they are your greatest asset and will help you market yourself effectively in the job market. Network with your alumni and peers as they will be reliable guides and advocates to help you navigate either the job market or graduate school effectively. Most importantly, don't be afraid to ask questions! Critical thinking is the steppingstone and an essential life skill for success across the board. The field is ever evolving and there is a lot more to learn than you think! I wish you all the best navigating your undergraduate years and am always happy to support you in every way I can.

Hospital Visit to Anatomy & Physiology Department, G. S. Medical College

A visit to G.S. Medical College was organized for the students of second year biomedical engineering from 22nd August 2023 to 25th August 2023. The objective of the activity was to provide SE Biomedical students with a comprehensive understanding of various human anatomical systems and their physiology. This educational visit to G.S. Medical College included lectures by expert doctors and hands on live demonstrations.

The scope of the visit aimed to enhance students' knowledge of anatomy and physiology, enabling them to apply this understanding to medical equipment. The activity was targeted to second year biomedical students.

The schedule included visits to the Anatomy and Physiology departments. In the Anatomy Department, lectures covered topics such as the skeletal system, muscular system, respiratory system, cardiovascular system, alimentary system, urinary system, reproductive system, and nervous system. Expert doctors, including Dr. Sarika Dakare, Dr. Juned Labbai, Dr. Parvez Chowki, Dr. Sarita Margam, facilitated these sessions.

In the Physiology Department, lectures focused on topics like total white blood cell (WBC) count, total red blood cell (RBC) count, hemoglobin estimation, and blood groups. Various doctors, including Dr. Manish Dhadse, Dr. Laxmikant Borse, Dr. Samadhan Mitkari, Dr. Esha Angane, Dr. Aritra Sanyal, Dr. Ramakrishna Kamath, Dr. Sana Shaikh, and Dr. Anjali Kale, conducted these informative sessions to enrich the students' knowledge in these areas.

The overall visit was coordinated by Prof. Bhavika Khatri from the department.



Students and Faculty Participants at G.S. Medical College

Interactive session on UG Project Outcomes

The "UG Project Outcomes" session aimed to provide third and final-year biomedical students with valuable insights into the outcomes of their final year and mini projects, emphasizing the opportunities to enhance their professional knowledge and skills. This interactive session was organized by the Final Year Project Quality Assurance Committee (FYPQA) on 11th September 2023. Dr. Y.S. Rao, the speaker, commenced the session with a discussion on project assessment and motivation, highlighting the importance of research outcomes in the context of Industry 4.0.

Dr. Rao delved into the characteristics of Industry 4.0, emphasizing digitalization, the Internet of Things (IoT), and data analytics. He also addressed the challenges faced during project execution and the importance of learning from them. Furthermore, he stressed the significance of understanding the broader impact of project outcomes on organizations, communities, and industries.

The session concluded with a vote of thanks to the speaker. Students gained a comprehensive understanding of project outcomes, including deliverables and their tangible results, thereby enhancing their professional skills and knowledge.

This session was coordinated by Prof. Bhavika Khatri and Prof. Geetha Narayanan from the department.



Students and Faculty Participants attending the Session

Guest Lecture on “Chest Imaging: Physiology to Artificial Intelligence”

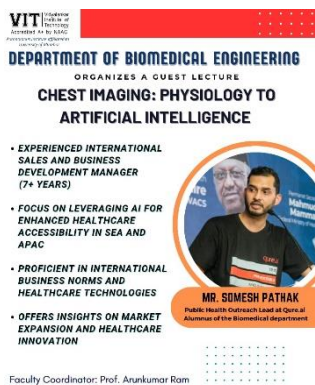
On September 13, 2023, Mr. Somesh Pathak, Public Health Outreach Lead at Qure.ai, delivered a guest lecture on “Chest Imaging: Physiology to Artificial Intelligence” for third year biomedical engineering students. This guest lecture was coordinated by Prof. Arunkumar Ram from the department.

The lecture began with a brief introduction to Qure.ai, a pioneering AI solution provider that transforms radiology with deep learning technology. Mr. Somesh then discussed the pivotal role of chest X-rays in developing AI/ML models for tuberculosis prediction. He bridged the gap between medical physiology and cutting-edge technology, shedding light on the transformative potential of AI in healthcare.

Mr. Somesh also shared his experience of transitioning from a career in international business of medical devices to artificial intelligence. Students were enthralled to listen to his journey and raised many questions, which he answered comprehensively.

At the end of the session, feedback was taken from students on a scale of 1-5. The average feedback score was 4.7, indicating that the session was very well-received.

Overall, the guest lecture was a success. Mr. Somesh Pathak delivered a highly informative and engaging presentation, and students learned a great deal about the use of AI/ML in chest imaging for tuberculosis diagnosis and monitoring. They also gained insights into emerging career opportunities in the field of AI for medical imaging.



Glimpses of the guest lecture delivered by Mr. Somesh Pathak

Educational Tour to Masina Hospital

On September 16, 2023, third and final year biomedical students visited Masina Hospital, Byculla, as part of an educational tour. The objective of the tour was to help students bridge the gap between theoretical knowledge and real-world application by familiarizing them with advanced medical equipment and technologies used in diagnostics, treatment, and patient care. This visit was coordinated by Prof. Arunkumar Ram and Prof. Bhavika Khatri from the department.

Mrs. Kiran Mehra, Manager Biomedical Engineer, Masina Hospital, provided an informative introduction regarding the various departments within the hospital and their respective locations. Students started the visit with the casualty room, where they saw many instruments such as BP apparatus, SpO2, ECG Machine, Defibrillator, Portable Ventilator, and Patient Monitor. Then they visited the Cosmetology department, where they saw different machines like LASER and Hydra Facial. Next, they visited the ICU, where they saw Ventilator, Ultrasound Machine, Syringe Pump, and Defibrillator.

Students interacted with healthcare professionals and learned about patient care and medical technology. They gained valuable insights into the real-world application of medical equipment and technologies.



Students and Faculty Participants attending the educational tour at Masina Hospital

Student Activities organized by BMESI & BMSA

- Convener: Prof. Priyanka Shrivastava

Seminar on "Organ Donation Awareness"

A seminar on "Organ Donation Awareness" was organized by the BMESI-VIT chapter on 12th September 2023, aimed to promote organ donation. Guest speaker Ms. Meera Suresh discussed the importance of organ donation, types of deaths for donation, and the Human Organ Transplantation Act. She highlighted the significance of skin donation and the role of organizations like ZTCC and ROTTO. The talk covered hand transplants, celebrity endorsements, and the potential to save multiple lives through organ and tissue donation. Awareness was emphasized, with one donor capable of saving up to 8 lives.



Ms. Meera Suresh delivering a session on "Organ Donation Awareness"

Interaction with NGOs

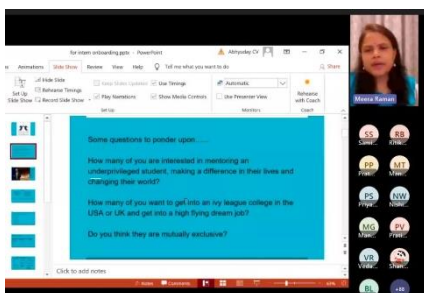
The BMESI-VIT chapter organized an event called "Interaction with NGOs" on 6th September 2023. The event featured two sessions. In the first session, Ms. Priya introduced the audience to Energetix, an organization working on critical issues like child marriages, youth suicide, and stress. She highlighted the benefits of volunteering for Energetix, including stress management and promoting happiness. In the second session, Ms. Priti Chatterji and Ms. Husana presented The Movement India Organization's work in education, mental health, and anti-human trafficking. The event aimed to inspire social responsibility and empower students to make a positive impact.

Odyssey 2023-24

The Biomedical Students Association (BMSA VIT) organized "Odyssey 2023-24" on 13th August 2023. The event welcomed incoming first-year biomedical students with fun games and activities, fostering camaraderie and interaction. BMSA leaders encouraged the new students, and ice-breaking activities helped build connections. "Odyssey" successfully created a supportive and friendly atmosphere, setting the stage for the first-year students' academic journey in the biomedical field. The event's organizers, faculty, and senior students were thanked for their efforts, with hopes for the students' active participation in the biomedical community at VIT.



Odyssey 2023-24



Session by Aasha Infinite Foundation

Session by Aasha Infinite Foundation

The event, hosted by the Biomedical Students Association (BMSA) and Industry Institute Interaction (III) Committee on 10th August 2023, introduced the Aasha Infinite Foundation, an NGO promoting literacy across India. Led by Ms. Meera Raman, the organization's mission is "Each One, Teach One." They offer opportunities for volunteers to contribute to the various operational divisions such as Marketing, HR, Communications, and Academic Dept. Their initiatives include Fund Raising, Distribution of Books, and internships in areas like Project Management and Education. The event concluded with a Q&A session, welcoming new volunteers.

Movie Screening-Sci-Fi Kaleidoscope

The Biomedical Students Association (BMSA) hosted the Sci-Fi Kaleidoscope Movie Screening on 14th September 2023. The event aimed to blend science fiction with education. It featured the movie "The Martian," emphasizing engineers' problem-solving skills and determination. The screening was followed by closing remarks and feedback collection, marking the event's success. A photo session was arranged to celebrate the committee's hard work. The event provided an engaging platform for students to explore the futuristic realms of science.



BMSA Team with convener Prof. Priyanka Shrivastava

Student and Faculty Achievements

Publications



1. Kunal Adsule, Aditya Maluskar, Gajanan Nagare and Arunkumar Ram, "A Simplified Procedure Development of Asynchronous Pacemaker Circuit", 7th International Conference on Computing, Communication, Control and Automation (ICCUBEA-2023), IEEE Conference, Pimpri Chinchwad College of Engineering, Pune, 18-19 August 2023.
2. Abhay Barge, Khushi Shah, Girish Gidaye, "A systematic approach to optimize Feature Extraction Technique for COVID-19", 7th International Conference on Computing, Communication, Control and Automation (ICCUBEA-2023), IEEE Conference, Pimpri Chinchwad College of Engineering, Pune, 18-19 August 2023.

Reviewer for IEEE Conferences: Dr. Gajanan Nagare

1. 3rd International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME), 19-21 July 2023, Spain.
2. International Conference on Electrical, Computer and Energy Technologies (ICECET 2023), 16- 17 November 2023, Cape Town South Africa.
3. IEEE Conference- 1st DMIHER(DU) International Conference on "Artificial Intelligence in Education and Industry 4.0" (IDICAIEI), 27th - 28th November 2023
4. International Journal of Bioinformatics Research and Applications (IJBRA- Inderscience- Scopus Indexed Journal)
5. International Journal of Environmental Science and Development (IJESD)- (Scopus indexed Journal)

Faculty Participation in Workshops/Training Programs/MOOCs etc.



1. Prof. Geetha Narayanan completed a course on "Academic Excellence and Classroom Management" offered by Nation Institute of Technical Teachers Training (NITTR).
2. Prof. Geetha Narayanan completed a Guided Project on "Image Classification with tensor flow" offered by Coursera.
3. Prof. Arunkumar Ram completed a 1-week Seasonal School on "Revolutionary Solutions for Biomedical Signal and Image Analysis using AI" offered by IEEE Signal Processing Society Gujarat Chapter.
4. Prof. Arunkumar Ram completed a distance learning course on "PCT: Patent Cooperation Treaty" offered by World Intellectual Property Organization (WIPO).

Student Participation in Ideathon

Our final year students Ms. Karuna Padwal, Ms. Tejaswi Yelgonda, Mr. Abel Dsouza and Mr. Rahul Patil participated in the Bio/Health/MedTech Ideathon organized by the Andhra Pradesh Medtech Zone (AMTZ), Vizag, on 19th August 2023. This event brought together some of the brightest minds in the fields of biotech, bioengineering, biomedical, pharmacy, and healthcare, all dedicated to finding innovative solutions to today's most critical challenges. They presented their innovative idea during the ideathon, focusing on the subject Innovative Health Kiosk Project: Transforming Healthcare Access. In an era where health awareness and accessibility to healthcare resources are paramount, the Health Kiosk aims to bridge the gap. This cutting-edge solution integrates technology with healthcare, offering individuals quick and convenient access to vital health information. This kiosk will measure key health metrics, provide personalized health recommendations, and even connect users with healthcare professionals when needed. By combining user-friendly design with the power of data-driven insights, this Health Kiosk is poised to revolutionize the way individuals engage with their well-being.



STUDENT ARTICLE



“Review on Bioconductor and BioJulia” -Ms. Riddhi Parasnaik (T.E. Biomedical)

Over this past month or so, I had taken up a challenge- to learn something that is outside of my comfort zone, be it learning a new language or a software. I am much more inclined towards Bioinformatics, so I decided to give some open-source software a try. Open-Source software basically has a source code which then makes it publicly accessible so that anyone can inspect, modify and enhance the software. I personally think that learning or using some open-source software is efficient as you get to know about the shortcomings and further developments that can be made to make the experience more optimum and efficient. This also enables us an opportunity to get to platforms such as GSoC (Google Summer of Code) and make the experience comfortable for everyone, as well as spread the word about such software to the world.

Now coming back to the topic, I have learned and am still learning two software: One is Bioconductor and the other is BioJulia. Both software are used for the analysis and comprehension of the genomic data generated by wet lab experiments in molecular biology. The only difference between these two is that Bioconductor is based primarily on the statistical R programming language, whereas BioJulia is based on the Julia programming language.

Note that for both the software I used, I analysed the covid-19 data that is available on the Joh Hopkins GitHub for the analysis of the spread of covid-19 all over the world, and for the genome sequence for covid-19 I have referred the NCBI library.

Starting off with Bioconductor- this is the first software related to Bioinformatics I have ever used. Starting with installation of the software- it was quite tiresome, as compared to BioJulia. The installation takes a lot of time, and the process itself is ambiguous. R is more developed than Julia, and thus there are a greater number of repositories that R has than Julia. These repositories are useful for various purposes, as we can not only get the genome sequence (using FASTA) but we can also analyse the data of that disease (using Tidyverse).

To talk about BioJulia- this is the software that I got to know about when I started learning Julia. BioJulia was the first ever package created, and so later in the recent years the developers realized that the datatype and algorithm specific packages made more sense, and so the monolithic BioJulia package got split up into many other packages like:

- Bio.Seq became BioSequences.jl
- Bio.Align became BioAlignments.jl
- Bio.Intervals became GenomicFeatures.jl
- Bio.Structure became BioStructures.jl
- Bio.Var became GeneticVariation.jl
- Bio.Phylo became Phylogenies.jl
- Bio.Services became BioServices.jl
- Bio.Tools became BioTools.jl

BIOCONDUCTOR	BIOJULIA
• R-based	• Julia-based
• Stable Release: 3.16 / 2 November 2022	• Stable Release: v0.3.1/ 28 February 2022
• Open-Source Software.	• Open-Source Software
• 2183 packages in the newer version (3.16)	• 8768 Packages (overall)

The installation was very easy with BioJulia. Upon installing the BioJulia packages, all the other packages can also be installed that are necessary for the domain of computational biology. The installation is also simple. Julia is not that much of a well-developed language, so the number of repositories is also less.

Both software are good and efficient as per their use, however it is seen that the scope of Julia is far lesser than that of the R language. R is extensively used in the domain of Bioinformatics with Python, Perl and more, so it is but natural that the scope of R is much more in this domain. Usability-wise, BioJulia is much more efficient than Bioconductor, but it all dials down to the development that would be made in the upcoming years with respect to the software.

THE EDITORIAL TEAM

PROF. ARUNKUMAR RAM
Chief Editor