



**JEPPIAAR**  
ENGINEERING COLLEGE

**DEPARTMENT OF BIOTECHNOLOGY**

**PRESENTS**

Assistant professor

**PRATIYOG 2026**

**ESCAPE'26**

**A National level Intercollegiate Symposium**

*5th*

*March*

*2026*

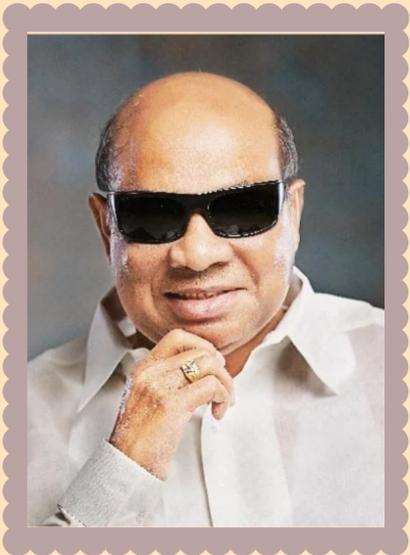
**VOLUME 23**

**ISSUE 1**



“Opening a book is like opening a door to another world — the moment you begin to read, you begin to travel.”

Dedicated to our beloved Founder without  
whom we wouldn't have gotten a chance to  
create this magazine



## **FOUNDER**

**(Late). Col. Dr. JEPPIAAR**

**M. A, B. L, Ph. D**

Late Col. Dr. JEPPIAAR, the founder and chairman of Jeppiaar Educational Trust and Jeppiaar Engineering College started his career as a police constable and by sheer hard work and perseverance, rose to prominence. He was driven with a dream and vision and dedicated his life for establishing quality driven technical education. Late Col. Dr. JEPPIAAR rose to great heights through his hard work and commitment. His philosophy of life includes the much common 3 Cs which are Confidence, Courage and Character. Our beloved Chairman had always said, **“ENTRY IS NOT IMPORTANT, EXIT IS IMPORTANT”**

## **CHAIRMAN AND MANAGING DIRECTOR**

**Dr. M. REGEENA J. MURLI**

**B. Tech, MBA, Ph.D**



Jeppiaar Engineering College, from the day of inception is administered by vibrant and dynamic, Dr. Regeena J. Murli, daughter of iconic Late .Col. Dr. Jeppiaar M.A., B.L., Ph.D. The College Administration is looked upon effectively in the core areas of academics, placements, sports, extra-curricular and hospitality and her pioneering works in developing the Institution is remarkable with much dedication, determination, and hard work. Dr. Regeena J Murli’s vision is to build the Jeppiaar Engineering College into an institution of academic excellence in technical and management education and to make it as a world class university. She is also committed to Philanthropy and the Jeppiaar Sports Academy offers free schooling, sports training and hostel for students.

## **PRINCIPAL**

**Dr. K. SENTHIL KUMAR**

**M.E, Ph.D**



Warm greetings and welcome to Jeppiaar Engineering College, one of the many institutions under the umbrella of Jeppiaar Educational trust. Jeppiaar Educational trust strives hard to transform Jeppiaar Engineering College into a world class institution in the technology and management arena. The college possess a strong blend of state-of-the-art infrastructure intricately intertwined with human resource committed to provide professional education with thrust on creativity and innovation. Our college is one among the best engineering colleges in Tamil Nadu. Jeppiaar Engineering College is committed in the quest of adopting innovative pedagogies to augment and ignite the young minds. Our dedicated bunch of faculty members provide an ample environment for the students to nurture their learning both inside and outside the classrooms.

## **DEAN -ACADEMICS**

**Dr. SHALEESHA A. STANLEY**

**M.Sc, M.Tech, Ph.D., D.Sc**

It's my great pleasure and delight to witness this batch with their cumulative effects have come out with the compilation of department souvenir, ESCAPE '26. Fostering inclusion and awareness of changing practical engineering in education and taking a culturally responsive approach benefits all students. Not only does creating greater variety and freedom of expression help students with different backgrounds and needs succeed, but it encourages acceptance and helps prepare students to thrive in an exponentially diverse world. I wish them all success!



## HEAD (i/c) OF THE DEPARTMENT

**Mr. V. JEYAMANIKANDAN**

**M.Tech., (Ph.D),  
Assistant Professor**



As the Head *In-charge* of the Biotechnology department, it is with great pride and excitement to congratulate this batch students on the preparation of this commemorative souvenir of the event 'ESCAPE 2K26'. This National level symposium is a testament to the dedication and vision of our esteemed students from the 2023-2027 batch who have orchestrated this grand event. Their tireless efforts and unwavering commitment to excellence have been truly commendable, shaping this event into a platform for knowledge exchange and innovation. I extend my heartfelt appreciation to each member of the organizing committee for their remarkable leadership and initiative. May this souvenir serve as a token of our collective achievements and inspire future generations of biotechnologists. Congratulations to the organizers and participants alike for their contributions to this momentous celebration.

## **EDITORIAL NOTE**

With the blessings of Late Colonel Dr Jeppiaar, M.A., B.L., PhD, we are honoured to present the magazine of **ESCAPE'26**. We, the editorial team, have exercised all our skills, made use of the valuable advice from the faculties and have exhibited this magazine, which is embellished with responsibility, carefully examined to bring only the best to the hands of the readers. Our Chairman and Managing Director, Dr M. Regeena Jeppiaar, B.Tech., M.B.A., PhD, is our driving force, who has steered us with a ray of hope in the making of this magazine. We want to extend our heartfelt gratitude to the Head (in charge) of the Department of Biotechnology, Mr V. Jeyamanikandan and the faculty for giving us this wonderful opportunity to showcase our interest and for guiding us in the completion of the ESCAPE '26 magazine. We, the editorial team, have worked hard with our hearts and souls dedicated towards the successful completion of this magazine.

### **OUR SINCERE THANKS TO**

The faculty members, lab instructors and the students of the Department of Biotechnology, Jeppiaar Engineering College.

# EDITORIAL MEMBERS

## FACULTY MEMBERS



**Mr.V.Jeyamanikandhan**  
**Assistant Professor**



**Dr. Jyotsna**  
**Associate Professor**

## STUDENTS



**E.P.Prabhu**  
**2023-2027**



**A.B. Bavadharinee**  
**2023-2027**



**S.Malini**  
**2023-2027**



**S.Roselin Elizabeth**  
**2023-2027**



**P.P.Illakiya**  
**2023-2027**

# CO-ORDINATORS

## STAFFS & STUDENT COORDINATOR

### Staff Co-ordinator

- Dr. Jyotsna

### Student Co-ordinator

- S.SanjaiVaghan(3rd year)

### Editors and designers

- A.B.Bavadharinee (3rd Year)
- E.P. Prabhu (3rd Year)
- S.Roselin Elizabeth (3rd Year)
- S.Malini (3rd Year)
- P.P.Ilakkiya (3rd Year)

### Treasurer

- Madhumitha.E (3rd year)

### PRO

- Merlin Jone Sherley K(3rd year)

### Technical Head

- Ridhusha J (3rd year)

### 1) Paper presentation

- Pargavi Swetha. M (3rd Year)
- ShanmugaPriya.S (2ndYear)
- Dhanusri K (2nd Year)
- K.Nitharsana (2nd Year)
- A. Sumaiya( 2nd year)

### 2) Poster presentation

- Princy santrose (3rd year)
- S.Tharuna (2nd year)
- Pithursan.K (2<sup>nd</sup> Year)
- Abirami (2nd year)
- Brundha (2nd year)

### **3) Ideathon**

- Luke Samuel (3rd year)
- Sarveshvaran.A (2nd year)
- Logasundharam (2nd year)
- Mohan (2nd year)

### **Non Technical Head**

- S.Malini (3<sup>rd</sup> Year)

### **1) Frames**

- S.Malini (3rd year)
- Anusuya (3rd year)
- Sanjay (2<sup>nd</sup> Year)
- Samsun Thangadurai. Y (2<sup>nd</sup> Year)

### **2) Designing**

- Ashwin .V (3rd year)
- Bavadharinee A.B (3rd year)
- Luke Samuel (3rd year)
- S.Tharun Krishna (2nd year)
- P.Yogeshwar (2nd year)

### **3) Quest**

- Pooja Shree V. (3rd year)
- Sandra Lauren J (2nd year)
- Kamalika J (2nd year)
- Shreya Jayan (2nd year)

### **4) Arena**

- Anusuya.A (3rd year)
- Yazhini.S (2nd year)
- Yogarani.S (2nd year)
- Mirdula.S (2nd year)
- Hasien.S (2nd year)

## **VISION OF THE INSTITUTION**

To build Jeppiaar Engineering College as an institution of academic excellence in technological and management education to become a world class University.

## **MISSION OF THE INSTITUTION**

- To excel in teaching and learning, research and innovation by promoting the principles of scientific analysis and creative thinking
- To participate in the production, development and dissemination of knowledge and interact with national and international communities
- To equip students with values, ethics and life skills needed to enrich their lives and enable them to meaningfully contribute to the progress of society.
- To prepare students for higher studies and lifelong learning, enrich them with the practical and entrepreneurial skills necessary to excel as future professionals and contribute to Nation's economy



## PROGRAM OUTCOMES (PO)

**PO1** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems

**PO2** Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

**PO3** Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

**PO4** Conduct investigations of complex problems: Use research-based knowledge and research methods, including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

**PO5** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling to complex engineering activities with an understanding of the limitations

**PO6** The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice

**PO7** Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development

**PO8** Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice

**PO9** Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

**PO10** Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions

**PO11** Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments

**PO12** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

# DEPARTMENT OF BIOTECHNOLOGY

## VISION OF THE DEPARTMENT

To pursue excellence in producing bioengineers coupled with research attributes.

## MISSION OF THE DEPARTMENT

**M1** To impart quality education and transform technical knowledge into career opportunities

**M2** To establish a bridge between the program and society by fostering technical education

**M3** To generate societal conscious technocrats towards community development

**M4** To facilitate higher studies and research to have an effective career in entrepreneurship

## PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

**PEO - 1** To impart knowledge and produce competent graduates in the field of biotechnology

**PEO - 2** To inculcate professional attributes and the ability to integrate engineering issues into broader social contexts

**PEO - 3** To connect the program and community by fostering technical education

**PEO - 4** To provide a wide technical exposure to work in an interdisciplinary environment

**PEO - 5** To prepare the students to have a professional career and motivation towards higher education

## ABOUT THE DEPARTMENT

Established in 2002 with B.Tech. Biotechnology programme (full-time – 4 years), and in 2011, started M.Tech. Biotechnology programme (full-time – 2 years). Both the programmes are affiliated to Anna University and accredited by AICTE.

The department has a well-established library with advanced reference books and encyclopedias for varied biotechnology subjects, which makes the department flourish as a centre of learning and education.

The department is blessed with motivating and experienced faculty members with more than a decade of teaching and research exposure who are indeed a matter of pride, and it is not a surprise that many of the students of this department are now shaping up in various areas of industry and research institutes. A high percentage of our students prefer higher studies, which is a prerequisite for exploring the growing advancements of biotechnology. Our department has 2 PhD holders, and 3 faculty members are pursuing doctorates in various universities of their expertise.

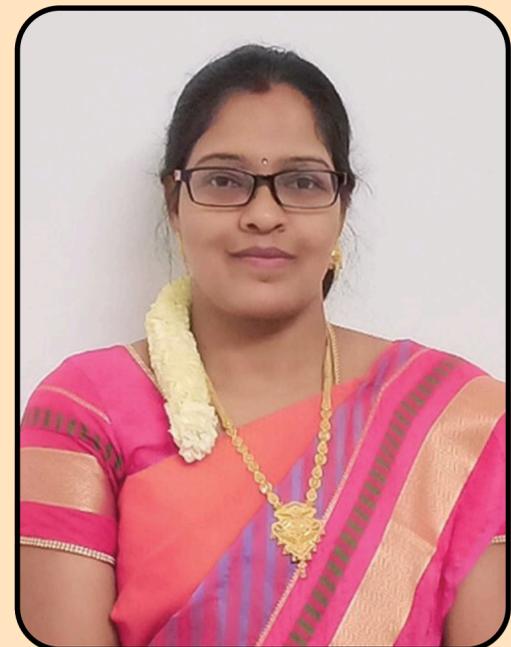


## FACULTY MEMBERS



**Mr. V JEYAMANIKANDAN**

ASSISTANT PROFESSOR & HOD i/c



**Dr. A MUTHULAKSHMI**

ASSISTANT PROFESSOR



**Mr. R S A SORNA KUMAR**

ASSISTANT PROFESSOR



**Dr. JYOTSNA**  
ASSOCIATE PROFESSOR



**Ms. R C AASHIKA**  
ASSISTANT PROFESSOR



**Mr. D SELVARAJ**  
LAB INSTRUCTOR



**Ms. N SARANYA**  
LAB INSTRUCTOR

# BIOTECH SPECTRUM

*Capturing the journey of learning, discovery, and success in biotechnology.*

## BIOCLUB BUZZ

*Empowering students to learn, innovate, and collaborate beyond the classroom.*

### IEEE SB JEC- EMBS

- Saanayazhini - Chairperson
- Belcy Christica - Vice Person
- Anbu- Secretary
- Shreya Maurin- Joint Secretary
- Bavadharinee- Treasurer
- Sanjaivaghan- Executive Member



## IEEE SB JEC- CS

- Sareveshwaran -Executive Member (2nd year)

## ROTARACT

- Bavadharinee - Associate Editorial Head (3rd year)

## NSS

- Dhanushree (2nd year)



## YUVA

- Dhanushree (2nd year)
- Mrindula (2<sup>nd</sup> Year)



# ACHIEVEMENTS

*Celebrating the milestones and successes of our students and faculty.*

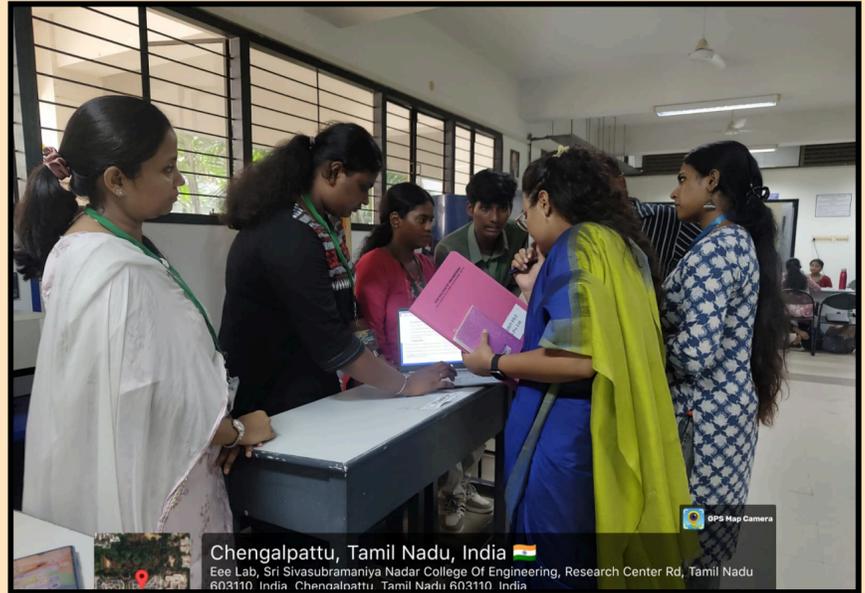


**Sarveshvaran**  
**2nd year**

Sarveshvaran A was awarded a Merit Certificate by the Sports Development Authority of Tamil Nadu for securing a Bronze Medal in the Silambam event at the District Level Competitions conducted under the Chief Minister's Trophy 2024. Representing Kanchipuram District, sarveshvaran A participated in the competition held in September 2024 and achieved third place in the event. This accomplishment reflects my dedication, discipline, and active involvement in sports at the district level.

# HACKATHON HIGHLIGHTS

*Exploring innovation and teamwork through hackathon challenges*



***Students Bavadharinee and Ridhusha of the 3<sup>rd</sup> year are presenting the TECH Hackathon at SSN College of Engineering***

Development of enzyme-conjugated silver nanoparticle (AgNP) beads was carried out for the degradation of synthetic dyes and industrial effluents. The work involved nanoparticle synthesis, enzymatic conjugation, and characterization using spectroscopic techniques to evaluate efficiency and stability. The project demonstrated an eco-friendly and innovative approach for wastewater treatment and environmental remediation. Findings were successfully presented at SSN Green Hackathon 2.0, a 24-hour innovation challenge, highlighting its potential for sustainable industrial applications.

# KNOWLEDGE CONNECT



***Distinguished speaker Dr. A. Mubarak Ali shared his expertise on Plasma Process-Mediated Value Added Products***

The guest lecture on Plasma Process–Mediated Value-Added Products highlighted how plasma technology is emerging as a green, energy-efficient, and sustainable tool in biotechnology, environmental remediation, agriculture, and material science.

Plasma, often referred to as the fourth state of matter, consists of ionized gases containing reactive species (electrons, ions, radicals, UV photons). Unlike conventional chemical methods, plasma processes often operate at low temperatures and require fewer chemicals, making them environmentally friendly.



***Guest Lecture on the topic “Design Thinking for Innovations” by Dr.S.Gayathri***

On 24th February 2026, We had an inspiring guest lecture on “Design Thinking for Innovations” by Dr. S. Gayathri, Head Program & Manager – Incubation, MaDeIT Innovation Foundation, Indian Institute of Technology Madras, enlightened students on transforming ideas into impactful innovations and inspiring young minds to think creatively and solve real-world problems. This session emphasized the importance of understanding users’ needs, challenges, and expectations before developing a product. It highlighted how identifying real-world problems and empathizing with users are essential steps in creating innovative, practical, and impactful solutions. Overall, it sparked entrepreneurial spirit and problem-solving skills among students.

# INDUSTRY INSIGHTS

*Exploring real-time industrial processes and innovations in biotechnology.*



## ***Industrial Visit at Modern Bakers***



On 18th February 2026, we had the opportunity to visit Modern Bakers as part of our Industrial Visit. It was an exciting and insightful experience where we got to see how bakery products are manufactured on a large scale. We learned about the complete production process, quality checks, and packaging methods, especially for products associated with Parle Products. Watching the machinery in action and understanding the teamwork behind every product visited truly engaging. The experience helped us connect our classroom knowledge with real-world industry practices. Overall, it was both educational and memorable for everyone involved.

# FACULTY CORNER

## BRIDGING BIOLOGY AND TECHNOLOGY: INDUSTRY-READY TOOLS FOR BIOTECHNOLOGY STUDENTS

~**Mr. V. Jeyamanikandan, Assistant Professor and Head in-charge, Department of Biotechnology**



Biotechnology today is no longer confined to microscopes and laboratory benches. It has evolved into a powerful interdisciplinary field where biology meets computation, statistics, and digital technologies. From decoding genomes to designing drugs and managing clinical trial data, modern biotechnology professionals are expected to be comfortable not only with experimental techniques but also with software tools and data-driven platforms. In the current industry landscape, employers look for graduates who can analyze biological data, manage large datasets, interpret sequencing results, and present meaningful insights using computational tools. Whether one aspires to work in genomics, proteomics, pharmaceutical industries, clinical research organizations, biotech startups, or IT-enabled life science companies, technical proficiency in relevant software and programming languages has become essential.

The following tables present a curated list of widely used tools, programming languages, and industry platforms across IT, Genomics & Proteomics, Clinical Research, and Biotech Data Analytics sectors. Each tool plays a specific role - from sequence alignment and variant analysis to statistical modeling and data visualization - collectively shaping the skill profile of a future-ready biotechnologist.

This overview aims to guide undergraduate students toward building a strong technical foundation that complements their biological knowledge and enhances their career opportunities.

## IT INDUSTRY (RELEVANT FOR BIOTECHNOLOGISTS)

<i>Software / Language</i>	<i>Application</i>	<i>Industry Use</i>	<i>Official Learning Platform</i>
<b>Python</b>	Data analysis, AI/ML, automation	Bioinformatics pipelines, analytics	<a href="https://www.python.org">https://www.python.org</a>
<b>R</b>	Statistical computing, visualization	Biostatistics, genomics	<a href="https://cran.r-project.org">https://cran.r-project.org</a>
<b>SQL (MySQL, PostgreSQL)</b>	Database querying & management	Biological data storage	<a href="https://www.mysql.com">https://www.mysql.com</a>
<b>Java</b>	Backend development, enterprise apps	Bioinformatics frameworks	<a href="https://www.oracle.com/java">https://www.oracle.com/java</a>
<b>Git &amp; GitHub</b>	Version control	Research collaboration	<a href="https://git-scm.com">https://git-scm.com</a>
<b>Power BI</b>	Business intelligence dashboards	Data reporting	<a href="https://learn.microsoft.com/power-bi">https://learn.microsoft.com/power-bi</a>
<b>Tableau</b>	Data visualization	Industrial analytics	<a href="https://www.tableau.com/learn">https://www.tableau.com/learn</a>
<b>MATLAB</b>	Computational modeling	Systems biology	<a href="https://www.mathworks.com">https://www.mathworks.com</a>

## GENOMICS INDUSTRY TOOLS

<i>Tool</i>	<i>Application</i>	<i>Industry Use</i>	<i>Official Website</i>
<b>NCBI BLAST</b>	Sequence similarity search	Gene identification	<a href="https://blast.ncbi.nlm.nih.gov">https://blast.ncbi.nlm.nih.gov</a>
<b>Ensembl Genome Browser</b>	Genome annotation	Comparative genomics	<a href="https://www.ensembl.org">https://www.ensembl.org</a>
<b>UCSC Genome Browser</b>	Genome visualization	Variant interpretation	<a href="https://genome.ucsc.edu">https://genome.ucsc.edu</a>
<b>Galaxy Platform</b>	NGS workflow analysis	Sequencing data analysis	<a href="https://usegalaxy.org">https://usegalaxy.org</a>
<b>GATK</b>	Variant calling	Clinical genomics	<a href="https://gatk.broadinstitute.org">https://gatk.broadinstitute.org</a>
<b>BWA / Bowtie</b>	Sequence alignment	NGS pipelines	<a href="http://bio-bwa.sourceforge.net">http://bio-bwa.sourceforge.net</a>
<b>PLINK</b>	GWAS analysis	Population genetics	<a href="https://www.cog-genomics.org/plink">https://www.cog-genomics.org/plink</a>

## CONCLUSION

The future of biotechnology belongs to professionals who can seamlessly integrate biological understanding with computational expertise. Mastering key software tools and programming platforms is not merely an added advantage - it is becoming a fundamental requirement in research laboratories, healthcare analytics, pharmaceutical industries, and biotech enterprises.

By gradually learning and practising these tools during undergraduate studies, students can confidently transition from academic learning to industry expectations. Developing skills in data handling, statistical analysis, genomics workflows, and visualisation techniques enables students to contribute meaningfully to innovation and problem-solving.

In essence, a successful biotechnologist of tomorrow combines curiosity in biology with confidence in technology. The journey begins with learning the right tools - and continues with applying them to create impactful scientific solutions.

# ZEBRAFISH: “THE TINY TITAN TRANSFORMING DRUG DISCOVERY”

~Dr. Jyotsna  
Associate Professor  
Department of Biotechnology



In the dynamic world of modern medicine, the tiny zebrafish (*Danio rerio*) is making a remarkable impact. Once a common aquarium fish, it has become a powerful vertebrate model in drug discovery due to its nearly 70% genetic similarity to humans and strong overlap with disease-related genes.

## What makes zebrafish exceptional?

- It's a transparent embryo, allowing scientists to observe organ development, blood flow, tumour growth, and even neural activity in real time
- Unlike traditional mammalian models, zebrafish embryos develop externally, and rapidly, major organs form within just three days
- Enabling faster and more cost-effective screening of potential therapeutic compounds

Pharmaceutical industries increasingly rely on zebrafish for high-throughput drug screening. Hundreds of embryos can be housed in multi-well plates, each exposed to different drug candidates, enabling rapid assessment of toxicity, efficacy, and side effects.

Beyond cancer studies and personalised tumour modelling, zebrafish are widely used to investigate cardiovascular diseases, neurodegenerative disorders such as Alzheimer's and Parkinson's, metabolic diseases like diabetes, and rare genetic conditions. Advanced technologies, including CRISPR-Cas9 gene editing, fluorescent transgenic models, and AI-based imaging, have further strengthened their role in translational research. Their extraordinary ability to regenerate heart, spinal cord, and retinal tissues also offers insights into future regenerative therapies. Small yet immensely significant in scientific terms, zebrafish are transforming human disease modelling and accelerating the future of drug discovery.

# FOOD AND DIET



**~Dr. A. Muthulakshmi**  
**Assistant Professor**  
**Department of Biotechnology**

A healthy, balanced diet provides essential nutrients to prevent chronic diseases and maintain energy, focusing on a variety of foods including vegetables, fruits, whole grains, lean proteins, and healthy fats. Key principles include filling half your plate with produce, selecting whole grains, drinking water, and minimizing salt, sugar, and processed foods.

## **Core Components of a Healthy Diet**

- \* **Vegetables & Fruits:** Aim for at least 5 portions daily, focusing on variety and color.
- \* **Whole Grains:** Choose whole wheat, oats, brown rice, and quinoa over refined grains.
- \* **Protein:** Include lean meat, fish, eggs, dairy, and plant-based sources like legumes, lentils, and nuts.
- \* **Healthy Fats:** Use unsaturated oils (olive, canola) and limit saturated/trans fats found in processed foods.
- \* **Hydration:** Drink 6 to 8 glasses of water daily, avoiding sugary beverages.

## **Practical Dietary Guidelines**

- \* **The Plate Method:** 50% vegetables/fruits, 25% whole grains, 25% protein.
- \* **Nutrient Density:** Prioritize nutrient-dense foods over high-calorie, low-nutrient options.
- \* **Limit Additives:** Reduce daily salt intake (under 2,300 mg) and minimize sugar-sweetened foods.
- \* **Cooking Methods:** Use, steaming, stewing, or baking instead of deep-frying.
- \* **Age-Specific Needs:** Children under 2 require different fats, while adults should limit saturated fat to 20-30g daily.

**Benefits of Healthy Eating** A balanced diet supports a healthy immune system, prevents noncommunicable diseases like diabetes and heart disease, and promotes gut health.

# FUNDING FOR BIOTECH STARTUPS IN INDIA



~**Mr. R.S.A. Sorna Kumar**  
**Assistant Professor**  
**Department of Biotechnology**

Funding for biotech startups in India is primarily driven by the Biotechnology Industry Research Assistance Council (BIRAC), offering grants like the Biotechnology Ignition Grant (BIG) (up to ₹50 Lakhs). Other key sources include government schemes (SBIRI, BIPP, SPARSH), state-level funds (KITVEN), and private equity, supporting sectors like BioPharma, Agri, and BioIndustrial.

## Key BIRAC Funding Schemes (Government)

- **Biotechnology Ignition Grant (BIG):** Flagship program for early-stage startups, providing up to ₹50 Lakhs as grant-in-aid.
- **Small Business Innovation Research Initiative (SBIRI):** Supports early-stage, pre-proof-of-concept research.
- **Biotechnology Industry Partnership Programme (BIPP):** Supports high-risk, translational research.
- **Social Innovation Programme for Products: Affordable & Relevant to Societal Health (SPARSH):** Focuses on social innovation.
- **BIRAC SEED Fund:** Provides seed funding to entrepreneurs.
- **LEAP Fund (Launching Entrepreneurial Driven Affordable Products):** Helps in taking products to the market.

## State & Specific Funds

- **KITVEN Fund-3 (Biotech):** Karnataka-based venture capital fund for biotechnology and life sciences (₹1 Crore - ₹3.50 Crores).
- **Gujarat Biotech Venture Fund (GBVF):** Managed by GVFL.
- **BioNEST incubators:** Supported by BIRAC to provide infrastructure and seed funding, such as the Crescent Innovation & Incubation Council (CIIC).

## Private & Institutional Investors

- **Reliance Life Sciences (RLS):** Invests in R&D-focused biotech startups.
- **Indian Angel Network & Unicorn India Ventures:** Active investors in the sector.
- **Artiman Ventures:** Early-stage investor in technology/biotech.

## Key Focus Areas for Funding

- **BioPharma:** Vaccines, diagnostics, medical devices.
- **BioIndustrial:** Enzymes, bio-based chemicals.
- **BioAgri:** Biofertilizers, GM crops.
- **BioIT:** Bioinformatics and AI in biotech.

# MICROBIAL TECHNIQUES IN WASTEWATER TREATMENT

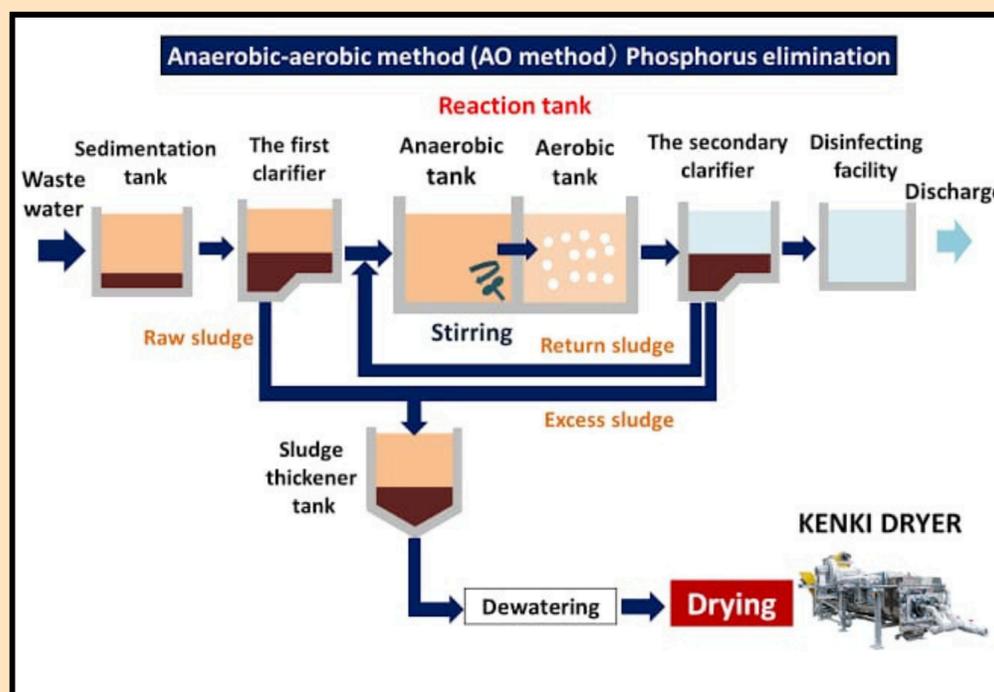


~Ms. Aashika

Assistant Professor

Department of Biotechnology

Microbial wastewater treatment is mainly classified into aerobic and anaerobic processes based on the presence or absence of oxygen. In aerobic treatment systems, microorganisms require oxygen to degrade organic matter. One of the most widely used methods is the Activated Sludge Process, where wastewater is aerated in large tanks containing microbial biomass. The microorganisms oxidize organic pollutants into carbon dioxide, water, and new cells. After aeration, treated water is separated from sludge in a clarifier. Other aerobic systems include trickling filters, where wastewater passes over a bed of media coated with microbial biofilm, and rotating biological contactors, which use rotating discs to support microbial growth and ensure oxygen supply.



Anaerobic treatment, on the other hand, occurs in the absence of oxygen and is especially useful for high-strength industrial wastewater and sludge treatment. In anaerobic digestion, microorganisms break down complex organic compounds through stages such as hydrolysis, acidogenesis, acetogenesis, and methanogenesis. This process produces biogas, mainly composed of methane and carbon dioxide, which can be used as a renewable energy source.

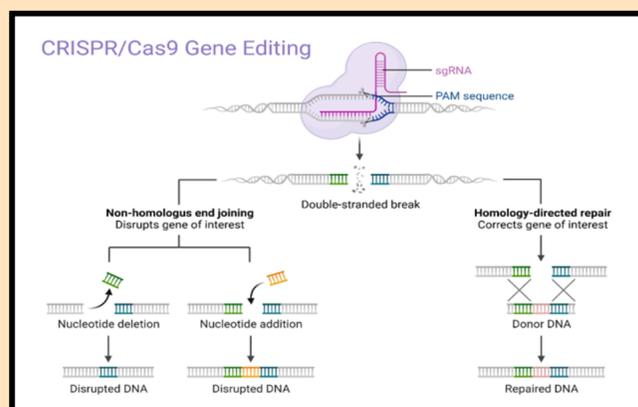
## STUDENT'S CORNER

### BIOTECHNOLOGY BREAKTHROUGHS: SHAPING THE SCIENCE OF TOMORROW



~Bavadharinee  
(3<sup>rd</sup> year)

Biotechnology is entering a golden era, where innovations once confined to science fiction are becoming everyday scientific realities. At the forefront is CRISPR-Cas gene editing, a revolutionary technology that allows scientists to precisely modify DNA, offering hope for treating genetic disorders such as sickle cell anaemia, cystic fibrosis, and certain inherited cancers. These 3D biological models mimic real human tissues and are now being used to study diseases, test drug safety, and even personalise treatments. Together, these advances are reducing dependence on animal models and accelerating the journey from laboratory discovery to clinical therapy.



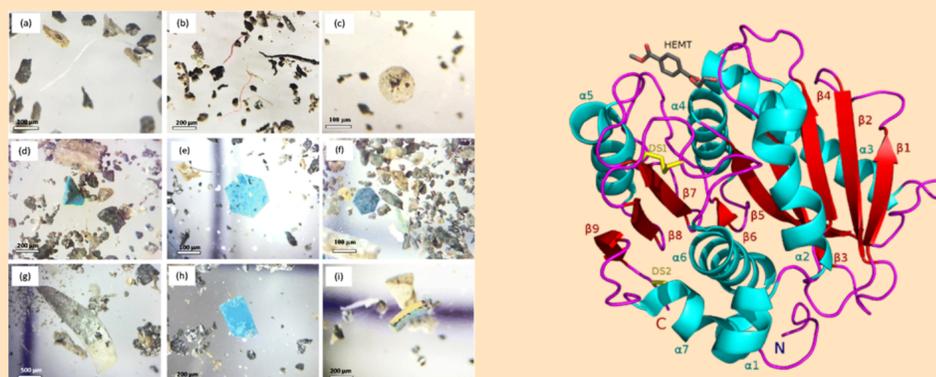
The COVID-19 pandemic also propelled mRNA vaccine technology into global prominence, demonstrating how rapidly biotechnology can respond to emerging health crises. Beyond infectious diseases, mRNA platforms are now being explored for cancer immunotherapy and rare disease treatment. In parallel, sustainable biotechnology is gaining momentum through innovations such as lab-grown meat, bio-based plastics. Artificial intelligence is further enhancing biotechnology by analysing massive biological datasets, predicting drug-target interactions, and optimising experimental design. As biotechnology continues to merge with digital tools and engineering principles, it is not only transforming healthcare but also reshaping agriculture, environmental sustainability, and industrial production—truly defining the future of science and society.

# ENZYMES AND EVERYDAY ACTION: COMBATING MICROPLASTIC POLLUTION FOR A GREENER PLANET

~J.Ridhusha  
(3<sup>rd</sup> year)



Microplastic pollution has emerged as a silent environmental crisis, infiltrating oceans, freshwater systems, soil, and even the human food chain. These tiny plastic fragments originate from the breakdown of larger plastics, synthetic textiles, cosmetic products, and industrial waste. While conventional cleanup methods are limited and energy-intensive, biotechnology offers a promising green alternative through enzyme-based degradation. Certain microorganisms produce specialised enzymes such as PETase, cutinases, and laccases that can break down plastic polymers like polyethene terephthalate (PET) into simpler, biodegradable compounds. Recent advances in protein engineering and synthetic biology have enhanced these enzymes to function more efficiently under environmental conditions, making large-scale bioreactor-based plastic recycling increasingly feasible and supporting a sustainable circular economy.



**Figure: Microscopic view of microplastic particles illustrating their small size and widespread environmental presence. 2. 3D view of Enzymes**

However, technological innovation alone cannot solve the microplastic crisis—prevention is equally crucial. Reducing single-use plastics, choosing biodegradable or plant-based alternatives, avoiding products containing microbeads, and using reusable bags, bottles, and containers can significantly limit plastic entry into ecosystems. Washing synthetic clothes less frequently and using microfiber-catching filters can reduce microplastic release into wastewater. Proper waste segregation, recycling, and community awareness programs further prevent plastic leakage into natural habitats. By combining enzyme-driven biotechnological solutions with responsible consumer behaviour and sustainable policy measures, society can move toward a cleaner environment—transforming the fight against microplastics into a collaborative effort between science and everyday action.

# ARTIFICIAL INTELLIGENCE : IS IT TRANSFORMING HUMAN BRAINS?

~Merlin Jone Sherley K  
(3<sup>rd</sup> year)



Artificial Intelligence (AI) is one of the most fastest growing field in the world of innovations. Though, it has rapidly transformed biotechnology as well as several other fields, but how reliable and effective are its results?

The answer lies in how AI is designed and validated

Artificial Intelligence is not physically changing the human brain in a biological sense—at least not directly- but it is influencing how our brains function and adapt. The human brain is highly plastic, meaning it constantly reorganizes itself based on experience.

With increasing interaction with AI systems—smart assistants, recommendation algorithms, automated decision tools—our cognitive habits are evolving. Studies suggest that heavy reliance on digital technologies may affect attention span, memory retention, and problem-solving approaches. For example, when information is instantly accessible through AI-powered search tools, the brain may focus less on memorization and more on information retrieval strategies. This shift reflects adaptation rather than damage, similar to how writing reduced the need for oral memory in ancient times. At the same time,

AI is positively transforming neuroscience and brain health. Brain-computer interface research and AI-driven neuroimaging analysis are helping scientists better understand neurological disorders such as Alzheimer's, Parkinson's, and epilepsy. AI tools can detect subtle brain activity patterns that humans might miss, enabling earlier diagnosis and personalized treatments. Educational AI platforms are also reshaping learning methods, potentially enhancing cognitive engagement when used wisely. Ultimately, AI is reshaping how we think, learn, and process information-not by rewiring our brains artificially, but by influencing the environments in which our brains develop and function. The key lies in balanced, mindful use to ensure technology augments rather than diminishes human intelligence.

## WAVES OF AI IN BIOTECHNOLOGY



~**Pithursan.K**  
(2<sup>nd</sup> year )

Artificial Intelligence (AI) is transforming modern biotechnology by accelerating research, improving healthcare systems, and enhancing agricultural practices. AI refers to computer systems capable of learning from data, analysing complex patterns, and making accurate predictions. With the ability to process vast amounts of biological data in a short time, AI has become a powerful tool in solving some of the most challenging problems in life sciences.

One of the most significant applications of AI in biotechnology is drug discovery. AI systems can rapidly screen thousands of chemical compounds, predict their effectiveness, and store and analyse large datasets efficiently. Advanced AI models have also revolutionised protein structure prediction, enabling scientists to understand biological mechanisms more clearly and design targeted therapies. In genomics and personalised medicine, AI helps analyse genetic information to identify disease risks, suggest precise treatments, and detect diseases at early stages. AI-based diagnostic tools are now assisting medical experts in identifying diseases more accurately and at earlier stages than traditional methods. However, along with its benefits, AI raises ethical concerns such as data privacy, security risks, and the misuse of sensitive medical information. Therefore, while AI continues to create waves in biotechnology, its application must be guided by strict ethical standards and responsible usage. With proper regulation and innovation, AI has the potential to reshape the future of biotechnology for the betterment of humanity

## SOCIAL MEDIA: EMPOWERMENT WITH RESPONSIBILITY



~Shreya Jayan  
(2<sup>nd</sup> year)

Social media has become an important part of modern life, making communication faster and more convenient. It has greatly transformed the way people learn and interact. Students can access online tutorials, educational videos, and informative articles to improve their knowledge and skills. It also helps people stay connected with family and friends who live far away, strengthening relationships despite physical distance. Moreover, many entrepreneurs use social media platforms to promote their businesses, share innovative ideas, and reach a wider audience. It has created new opportunities for learning, creativity, and career growth.

However, despite its many benefits, social media also has several drawbacks. One major concern is addiction, as many people spend excessive time scrolling, which affects their academic performance and productivity. Issues such as hacking, misuse of personal data, online harassment, and cyberbullying can cause stress and anxiety, especially among youngsters. The spread of fake news and misinformation can also create confusion and disturb society. Therefore, social media should be used wisely and responsibly. Maintaining a balance between online and offline life will help individuals enjoy its advantages while avoiding its negative effects.

## FOREST ECOSYSTEMS AS REGULATORS OF CLIMATE AND ENVIRONMENTAL STABILITY

~Tharuna.S  
(2<sup>nd</sup> year)



A forest is a vast natural ecosystem covered with trees, plants, and diverse wildlife. It is one of the most valuable natural resources on Earth, providing shelter to countless animals and birds while supporting an extraordinary variety of plant life. Forests play a crucial role in maintaining ecological balance by absorbing carbon dioxide and releasing oxygen, which is essential for all living beings. They regulate climate, prevent soil erosion, conserve water, and support rainfall patterns. The Amazon Rainforest, often called the “lungs of the Earth,” is the largest rainforest in the world and produces a significant amount of oxygen while storing vast quantities of carbon. In addition, forests provide food, medicines, timber, and livelihood to millions of people around the globe

However, rapid deforestation due to urbanization, industrial expansion, and excessive logging is causing severe environmental pollution and climate change. When trees are cut down, stored carbon is released into the atmosphere, increasing greenhouse gases and contributing to global warming. Deforestation also leads to soil degradation, loss of biodiversity, disrupted rainfall cycles, and increased air and water pollution. To prevent these harmful effects, we must promote afforestation and reforestation, reduce the use of paper and wood products, adopt sustainable forestry practices, and spread environmental awareness. Protecting forests is not just about conserving trees—it is about safeguarding our planet, reducing pollution, and ensuring a healthier and more sustainable future for generations to come.

## ROOTS AND REFLECTIONS



~Nitharsana.K  
(2<sup>nd</sup> year)

Down the memory lane, the days rolled up with gleeful laughter, delightful events, innocence filled hearts, lamenting yet learning through hardships- life sounded like peace can be found in simple things as well.

'Childhood'- this word holds a plethora of emotions me. Whatever you learn at this era of age will forever be engraved in our heart. I've had the opportunity to meet different shades of people all along my way and the insights I got from each individual is an unpaid lesson. Dance has been my first love ever since my childhood. It was my first joy, source of happiness and evoked the sense of responsibility at a very young age. My mother has been a morale support in holding up my passion up until now.

During this Era, friendship felt refreshing, made stronger connections and valued each and every person from my heart. Playing was the only criteria that fell into this category back then. But later as the years rolled by, several things have got to add upon this and started making much more sense than before. Through conversations you get to understand a person's personality and through team works you upskill the art of adaptability. The thought that this kind of bond would survive on expectations gradually changed that it would last only on understanding.

Everything does not demand constant reassurance rather it peacefully rests in mutual respect. You shouldn't panic when distance happens between the two, shouldn't crumble when both of their life gets busy. Real connection is not about how often you speak, its about how deeply you trust. This introspection about friendship came a bit later in my life and I firmly believe that even if months pass without a conversation and when you meet again, there's no sense of awkwardness and you immediately pick up from your last talk, last laugh and memory- that shows how strongly you have build your bond in those years. Learning this is important in your life as it not only builds a good friendship, it enhances and aids you to build yourself as a better person. I got to understand this through my most crucial phase of my childhood from my guru- who was like a sister to me.

My dad often says, "Silence is not weakness- it is strength and emotional maturity". I feel that our words are more powerful than we think. We often associate loudness with power, the one who argues fiercely must be right and the one who stays silent has nothing to say. But when they choose to speak, their words carry weight and purpose. Speaking at the right time matters.

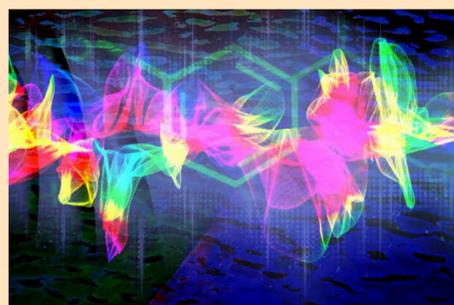
Lastly, I must say that in the echoes of my childhood and the lessons of silence, I found not just friendship but myself.

# UV–VIS SPECTROSCOPY FOR INDUSTRY AND ENVIRONMENT

~**Sarveshvaran.A**  
**2<sup>nd</sup> year**



UV–Visible spectrophotometry plays a vital role in biotechnology across industrial, environmental, and research sectors due to its reliability, rapid analysis, and non-destructive measurement capability. In industrial biotechnology, it is widely used to monitor microbial growth (by measuring optical density), enzyme kinetics, protein concentration, nucleic acid quantification, and product formation during fermentation processes. Biopharmaceutical industries depend on UV–Vis analysis for quality control of vaccines, antibiotics, recombinant proteins, and other biologics. The instrument enables real-time process monitoring, ensuring product consistency, purity, and regulatory compliance. Its accuracy in detecting biomolecules makes it indispensable in drug development, clinical diagnostics, and bioprocess optimisation.



In environmental biotechnology, UV–Visible spectrophotometry is a crucial tool for early detection of water and wastewater contamination. It is used to measure parameters such as nitrate, phosphate, chemical oxygen demand (COD), and organic pollutants. Additionally, it assists in estimating total suspended solids (TSS) and assessing turbidity by analysing light absorption and scattering caused by particulate matter. Spectral changes can signal microbial contamination, industrial discharge, or harmful algal blooms at an early stage. Due to its rapid response and capability for continuous monitoring, UV–Vis spectrophotometry supports pollution control, environmental risk assessment, and sustainable resource management. Overall, its versatility and accuracy make it an essential analytical instrument bridging biotechnology, industry, and environmental protection.

# “REFLECTIONS OF THE SOUL”

~Sandra Lauren.J  
(2<sup>nd</sup> year)



.Who Am I?  
Whenever I stand before the mirror,  
A quiet question rises within me —  
Who am I?  
If I were a flower,  
I would spread fragrance without choosing who deserves it.  
If I were a tree,  
I would offer shade even to the one who throws stones at me.  
If I were the sun,  
I would shine without discrimination,  
Lighting every path,  
Warming every life.  
If I were the moon,  
I would glow gently in the darkest nights,  
Reminding the world that even borrowed light  
Can comfort a restless heart.  
The lion teaches courage.  
The owl teaches wisdom.  
The ant teaches tireless effort.  
The elephant teaches intelligence and memory.  
The turtle teaches patience.  
The monkey teaches joy.  
Nature gives us countless lessons —  
The wind blows in all directions without complaint.  
The rain falls on every roof without expectation.  
The river flows, nourishing lands it will never own.  
Yet I ask myself —  
Am I learning from them?  
Am I someone who gives without calculating returns?  
Do I act with kindness without waiting for applause?  
Do I help without expecting gratitude?  
For unlike nature,  
Humans often measure every action,  
Weigh every favor,  
And expect something in return.



But perhaps,  
To truly know who I am,  
I must rise above selfish desires,  
And become someone who gives,  
Serves,  
Loves,  
And uplifts —  
Without conditions.  
Maybe I am not just a name,  
Not just a face in the mirror,  
But a choice —  
A choice to be kind.  
A choice to be generous.  
A choice to make someone's life brighter.  
And when I can give without expecting,  
Act without selfishness,  
And love without limits —  
Then I will finally know  
Who I am.



## LEARNING BEYOND CAMPUS

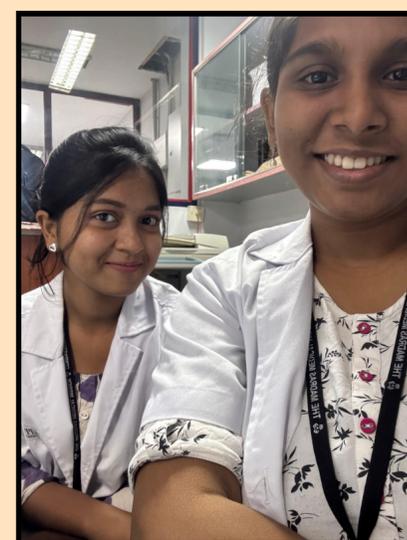
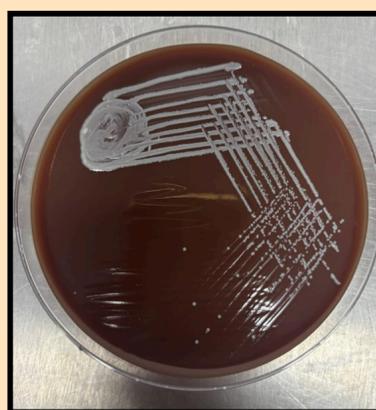
*Students exploring biotechnology practices through internships and training.*



*Third-year students completed an internship at SSN College on “Analytical Techniques in Water Treatment.”*

Internship at SSN Engineering College, Chennai, hands-on experience was gained with advanced analytical instruments such as XRD, UV-Vis, FT-IR, SEM, TOC, and Cyclic Voltammetry. The internship was carried out as part of a seven-member team, creating a collaborative and engaging learning environment. Responsibilities included sample analysis, data interpretation, and preparation of technical reports. Participation in paper presentations and technical events further enhanced scientific communication and analytical thinking.

Completed a comprehensive internship in the Microbiology Department at Madras Medical Mission Hospital, gained hands-on experience in clinical microbiology, sample processing, diagnostic testing and operation of advanced laboratory equipment. This internship deepened my understanding of infectious disease diagnostics and hospital-based microbiological workflows.

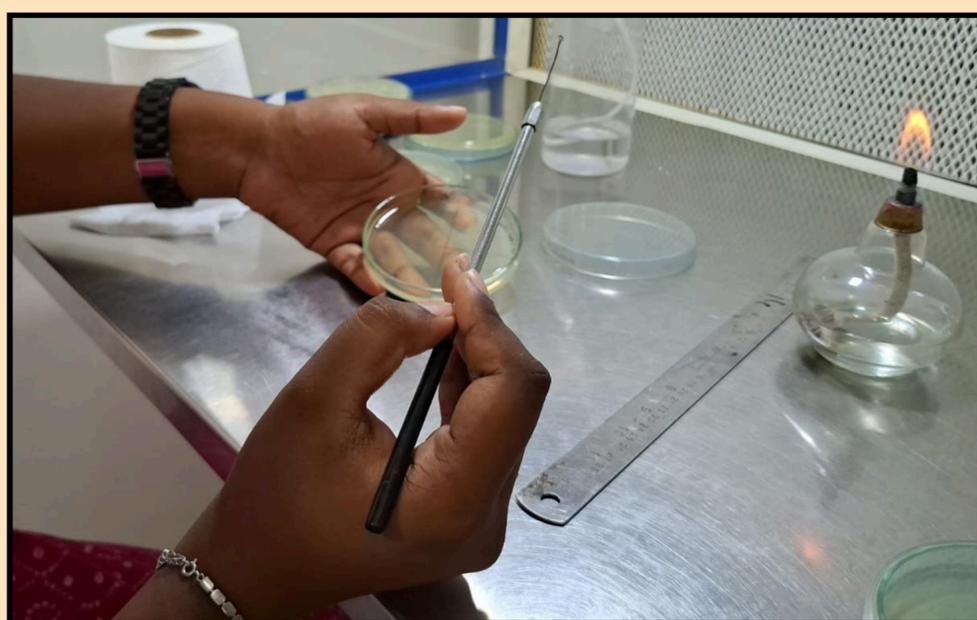


*Students Merlin Jone Sherley and Poojashree completed their internship at Madras Medical Mission Hospital.*

Clinical Research training was completed at Azidus Laboratories, Chennai, with exposure to the principles and workflow of bioequivalence studies and clinical trial operations. Knowledge was gained in clinical trial design, conduct, and operational procedures. Experience was obtained in clinical documentation, regulatory compliance, and implementation of Good Clinical Practice (GCP) guidelines. Understanding was developed regarding ethical considerations involved in human clinical trials.



***Bavadharinee and Luke Samueal have completed training programme at Azidus Laboratories.Pvt.Ltd***



***Ridhusha completed internship at Avigen Biotech Pvt Ltd***

Hands-on experience in screening, optimizing, and partially purifying protease enzymes extracted from bacteria, followed by partial purification of it for industrial applications. Hair removal for the leather industry at AVIGEN BIOTECH PVT LMTD



***Princy Santrose and Anusuya had internship at Strides Pharma Science Limited***

During the internship at Strides Pharma Science Limited, Puducherry, gained practical exposure to pharmaceutical manufacturing and quality control practices. Understood the importance of Good Manufacturing Practices (GMP) in maintaining product safety and consistency. The internship helped me learn the workflow of tablet production, including dispensing, granulation, compression, coating, and packaging.



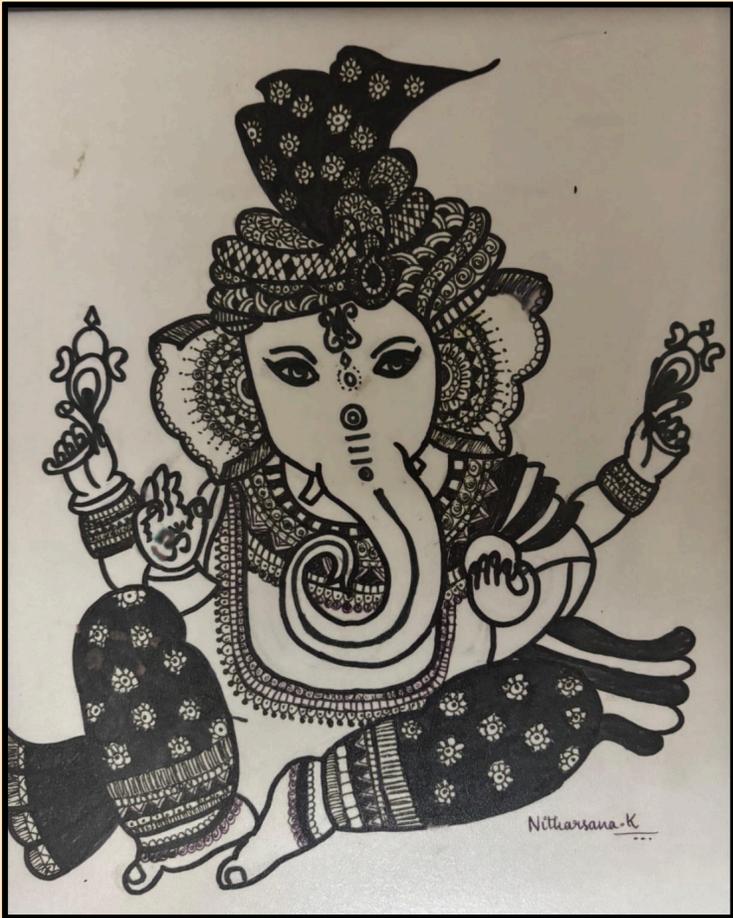
***Pithurusan, Tharun Krishna and Sarveshvaran completed Internship at ALS Testing Services***

Intern, ALS testing services, TICEL Bio park – Chennai analysed pharmaceutical samples (capsules, syrups, and raw materials) using HPLC, dissolution & disintegration testing. Done suspension culture, media preparation and sterilization methods. Attained practical knowledge on operating an autoclave, serial dilutions, and streaking methods (simple and quadrant streaking). This comprehensive exposure has significantly enhanced my technical skills and understanding of laboratory practices.

# SUSTAINABLE DEVELOPMENT GOALS



# ART WORKS



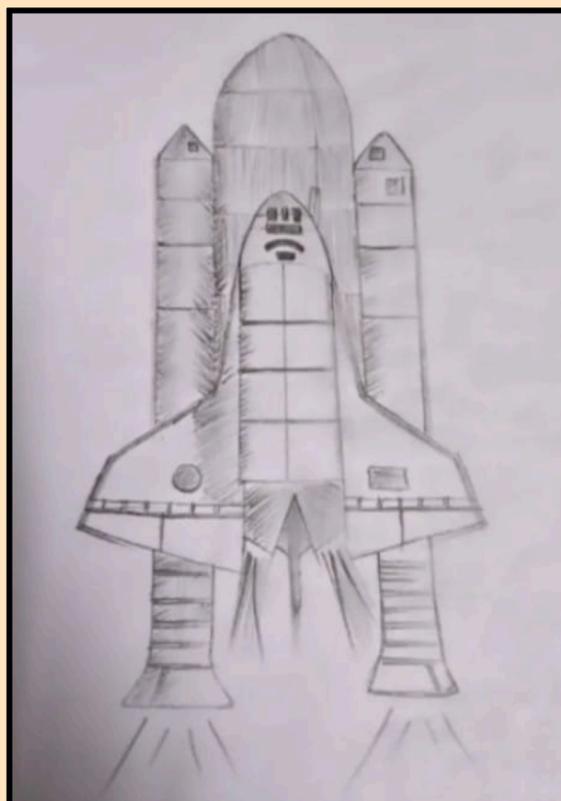
~Nitharsana  
2<sup>nd</sup> year Biotechnology



~Pithurusan  
2<sup>nd</sup> year Biotechnology



~Samsun Thangadurai  
2<sup>nd</sup> year Biotechnology



~Hasein  
2nd Year Biotechnology

# SNAPSHOTS

*Cherishing the joyful moments and togetherness shared by our students*



# PONGAL CELEBRATION



## *Department of Biotechnology celebrating Pongal on 13<sup>th</sup> January 2026*

A vibrant and joyous celebration held on 13th January 2026 transformed our campus into a hub of color, culture, and cheer. The Pongal 2026 festivities beautifully reflected the spirit of gratitude, prosperity, and togetherness that this harvest festival represents.

The campus came alive with students and staff dressed in traditional attire, showcasing the rich cultural heritage of Tamil Nadu. The aroma of freshly prepared Pongal, the rhythmic beats of traditional music, and the warmth of shared smiles created an atmosphere filled with festive enthusiasm.

Through cultural activities, decorations, and collective participation, the celebration fostered unity and cultural pride among everyone present. Pongal 2026 was not just a festival, but was a heartfelt expression of thankfulness to nature and a reminder of the values of harmony, tradition, and community bonding that define our cultural roots.

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DEPARTMENT OF  
*Biotechnology*  
2023-2027



**JEPPIAAR ENGINEERING COLLEGE**

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VIII. Example of artificial  
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