

Resource Persons:

Faculty members from IIT's, NITs, Central Universities, Scientists, Bioinformaticians from Industries and Research Laboratories will deliver lectures and demonstrate the experiments for Hands-On sessions.

Registration is open to:

All the faculty members, research Scholars, PG students from AICTE approved institutions and also for scientists, technical officers, bureaucrats working in government institutions and industry. Number of participants is limited to 50.

No Registration fee will be charged from the participants.

How to Apply:

Eligible candidates may apply online through AICTE-ATAL Portal.

<https://atalacademy.aicte-india.org/>. Candidates are advised to apply early to avoid disappointment. Selected applicants will be intimated through E-mail **on or before 05-01-2024**.

Accommodation:

Accommodation can be arranged in the campus on prior notice, for which the participants will have to bear the subsidized charges and the participants are advised to send the request on or before **15-01-2024** to ensure the accommodation.

For further details, please contact

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Department of Biotechnology

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ATAL FDP

on

“Microbial Metagenomics and Next Generation Sequencing”

5th- 10th February, 2024

Sponsored by

AICTE Training and Learning Academy (ATAL)



Patrons

Prof. M. Sivanandham, Secretary, SVEHT

Prof. S. Ganesh Vaidyanathan, Principal, SVCE

Coordinators

Dr. K. Divakar, Associate Professor/BIO

Dr. E. Nakkeeran, Professor/BIO



Organized by

Department of Biotechnology

SVCE | Sri Venkateswara
College of
Engineering

(An Autonomous Institution - Affiliated to Anna University, Chennai)

Sriperumbudur Tk -602 117, Tamil Nadu, India

About the Institution:

Sri Venkateswara College of Engineering (SVCE) is one of the premier technical institutions in Tamilnadu; the College is situated on the Chennai – Bengaluru National Highway. The college offers 12 UG programs and 7 PG programs. SVCE is an ISO 9001:2015 certified institution and Accredited by “NAAC” with A+ grade.

For more details visit: www.svce.ac.in.

About the Department of Biotechnology

The Department of Biotechnology was established in 2005. The department offers B.Tech and M.Tech Biotechnology programs approved by AICTE. It is also approved as a Research Centre in Biotechnology for MS (by Research) and Ph.D. programs by Anna University, Chennai. The Department has well-established laboratory facilities. The Department received Research Grants (2.85 Crores) from various funding agencies such as SERB, ICMR, AICTE, CTS and also several grants for organizing Short Term Training courses, Workshops, Faculty Development Programs from various funding agencies such as DBT, SERB, ICMR, CSIR and EDII.

Vision of the Department

To produce higher caliber Biotechnologists to attain new heights in bioinformatics and bioprocess technology as per industrial needs and to provide leaders in the field of Biotechnology.

Mission of the Department

1. To progress the department to attain center of excellence in bioinformatics and bioprocess technologies by providing best Undergraduate, Postgraduate, Doctoral programs and R&D activities within a decade.
2. To develop special skilled training programs for graduates to meet the personality characters stipulated by the industries within a period of five years.
3. To build potential biotechnologists capable of dealing with new challenges and socio-ethical implications.

Overview of the FDP

Next-Generation sequencing technologies (NGS) are an essential part of almost all life sciences research and diagnostics. Due to their quantity and especially their complexity, NGS data are typically processed by qualified bioinformaticians. Considering the significance, the faculties and research scholars/students need to update and reorient themselves to meet the rapidly changing genomic data analysis tools. This FDP is designed to bring together the experts working in Metagenomics and Next Generation Sequencing to overcome the inherent lag in teaching and learning of concepts in genomics, high throughput genome sequencing and NGS data analysis. This ATAL-FDP will allow the participants to understand the basics of NGS data processing, including manipulation of raw data, quality control, and removal of low quality sequences, sequence adapters and artifacts.

Objectives of the FDP:

- To explain conceptual framework and create an awareness among the faculty members teaching biotechnology, on the importance of metagenomics and next generation sequencing.
- To catalyze and motivate participants to perform research in the field of metagenomics and next generation sequencing techniques and incorporate the same in teaching curriculum.

Topics covered in the FDP:

- Microbial Metagenomics and its application in bioproduct development.
- Functional metagenomics for bioprospecting of enzymes.
- Metagenomics for surveillance of Antibiotic Resistant Genes.
- NGS technology and platforms: Fundamental Concepts to Applications.
- Hands-on session on DNA sequencing using Oxford Nanopore Sequencer.
- Essential computing skills for NGS bioinformatics.
- Overview and Advances in Clinical NGS Technology.
- NGS technology, algorithms and data formats.
- Hands-on session on sequence data processing: MGnify, MGRAST, HMMER, InterPro, Gene Ontology (GO), FASTQC, Galaxy server and pathway analyses.
- Metagenomics Data Analysis and Population Dynamics analysis.

Expected Outcomes:

After attending workshop, Participants can be able to

- Design experiment to isolate/purify metagenomic DNA from environmental samples.
- Construct metagenomic fosmid library for functional screening of industrial/therapeutic enzymes.
- Get confidence to introduce the metagenomics experiments in the regular teaching in curriculum.
- Perform next generation sequencing using nanopore sequencer and analyze the DNA sequence data.

Program Report

ATAL-FDP on Microbial Metagenomics and Next Generation Sequencing

Date: 5th to 10th February, 2024

Sponsor: AICTE Training and Learning Academy (ATAL)

Coordinators: Dr. K. Divakar and Dr. E. Nakkeeran

The ATAL-FDP on “Microbial Metagenomics and Next Generation Sequencing” was held from February 5th to 10th, 2024, organized by the Department of Biotechnology at SVCE and sponsored by AICTE Training and Learning Academy (ATAL). The primary objective of the program was to provide participants with a comprehensive understanding of microbial metagenomics and the application of Next Generation Sequencing (NGS) techniques in various fields such as biotechnology, clinical diagnostics, and environmental sciences.

Session-wise details:

Day 1 (05/02/2024):

Inauguration: The program commenced with an inaugural session where the objectives and expectations of the ATAL-FDP were outlined.



Session 1: Dr. C. Tamilselvan, Managing Director of Bioscience Research Foundation, delivered a lecture on “Metagenomics – GLP Perspective,” providing insights into the regulatory aspects of metagenomic research.



Session 2: Dr. Joseph Selvin, Professor of Microbiology at School of Life Sciences, Pondicherry University, discussed “Metagenomic Approaches to Explore and Exploit Marine Microbiomes: Bioactive Leads and Ecological Perspectives,” focusing on the potential applications of marine microbiomes in drug discovery and ecological conservation.



Hands-on Practical session: Participants engaged in a hands-on practical session on MGnify, an online platform for the analysis of metagenomic data by Dr. K. Divakar, ASP/BIO.



Day 2 (06/02/2024):

Session 3: Dr. V Naveen Kumar, Founder and Director of ImmuGenix Biosciences Pvt Ltd Chennai, conducted a session on “Metagenomic Analysis Tools and Techniques,” providing an overview of various bioinformatics tools used in metagenomic analysis.



Dr. Sushma Padmaja, Head of Clinical Genomics at Kyvor Genomics, Inc., Chennai, delivered a lecture on “Current Trends of NGS in Clinical Diagnostics,” highlighting the latest advancements in NGS technology and its applications in clinical settings.



Hands-on Practical session: Participants gained practical experience in using the Galaxy Server for metagenomic analysis.



Day 3 (07/02/2024):

Session 4: Session 5: Dr. GR. Gopi, Chief Operations Officer at Fermentech GSV Private Limited, Thanjavur, discussed “NGS and Industrial Biomanufacturing with Case Study from Nisin Biosynthesis and dsRNA Feed Inputs,” showcasing the application of NGS in industrial biomanufacturing processes.

Session 6: Dr. N. Manoj, Professor at the Department of Biotechnology, IIT Madras, presented on “Evolutionary History of the Neuropeptide S Receptor System: A Bioinformatics Study,” exploring the evolutionary dynamics of neuropeptide receptors through bioinformatics analysis.



Hands-on Practical session: Participants explored the MGRAST and InterPro platforms for metagenomic analysis.



Day 4 (08/02/2024):

Session 7: Dr. Asim Bikas Das, Associate Professor at the Department of Biotechnology, National Institute of Technology Warangal, discussed “Analysis of Next-generation Sequencing Data for Precision Therapy: Role of Artificial Intelligence and Network Medicine,” emphasizing the role of AI and network medicine in analyzing NGS data for precision therapy.



Session 8: Dr. Prakash Saudagar, Associate Professor & Head of the Department of Biotechnology, National Institute of Technology Warangal, presented on “Genomic Analysis of Enzymes of Redox Metabolism,” discussing the genomic approaches to study enzymes involved in redox metabolism.



Hands-on Practical session: Participants learned to use the DIAMOND tool for metagenomic sequence analysis.

Day 5 (09/02/2024):

Industrial Visit: Participants visited M/s ImmuGenix Biosciences Pvt Ltd. Chennai, gaining insights into industrial applications of metagenomics and NGS.



Session 9: Prof. S Ganesh Vaidyanathan, Principal of SVCE, discussed “National Education Policy,” highlighting the implications of the national education policy on biotechnology education and research.



Day 6 (10/02/2024):

Session 10:

Dr. Alok Das, Assistant Professor at the Department of Life Sciences, RDW University, Bhubaneswar, delivered a lecture on "Insights into the Microbiome of the Microplastic Dominated Zones Across the Coasts of The Bay of Bengal, India through Metagenomics Approach," shedding light on the ecological impact of microplastic pollution using metagenomic analysis.



Reflection Journal: Participants engaged in discussions on recent research articles related to microbial metagenomics and NGS. Participants consolidated their learnings from the shared articles and discussed about the learnings from the program.

The final day included MCQ assessments, feedback collection, and interactive discussions, followed by a valedictory session to conclude the program.



The ATAL-FDP on Microbial Metagenomics and Next Generation Sequencing provided the participants a platform to learn about these advanced topics in a detailed way. Through a combination of theoretical sessions, hands-on practical experiences, industrial visits, and interactive discussions, participants gained valuable insights and skills necessary for conducting research and applying metagenomics and NGS techniques in various domains. The program received positive feedback from participants, indicating its success in achieving its objectives of fostering learning, collaboration, and innovation in the field of biotechnology.

Coordinators

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