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DISCOVERIES FOR A BETTER TOMORROW

Bioinformatics Facilty Newsletter 2023

An Autonomous Institute of the Department of Biotechnology, Government of India

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ABOUT US

We are a team of multidisciplinary researchers, IT experts and technicians dedicated to provide bioinformatics services, training and technical support to researchers and students. The RGCB-Bioinformatics facility is located at the Rajiv Gandhi Centre for Biotechnology Campus II located at Aakkulam. Considering the growing demand for computational approaches to solve biological problems, we are providing various bioinformatics services and training programs at the Rajiv Gandhi Centre for Biotechnology. We offer,

- ☑ Computational infrastructure for performing large-scale biological data analysis (Servers and data storage).
- ☑ Bioinformatics training for researchers and students (Short term and Long term).
- ☑ Essential bioinformatics services such as NGS data analysis (Genome assembly and RNA seq), Structural Bioinformatics (Docking and simulations), Biological sequence analysis (Bacterial and Viral), Phylogenetics, etc.
- ☑ Academic projects to both internal and external students (MSc/B.Tech and Mtech).

TRAINING AND SERVICES

Certificate Program

The certificate program provides a solid base to the use of bioinformatics by providing theory and application training in methods and resources appropriate to all major fields of biological research. It includes best strategies for undertaking bioinformatics analysis, computer programming, statistical methods, data management and reproducibility. Duration: 6 months / 1 year

One Day Training

Participate in online training programs covering the most commonly utilized tools and algorithms in bioinformatics. These sessions will be conducted by RGCB scientists and bioinformaticians with over a decade of research experience. Our diverse array of programs, each led by experts in the field, provides interactive sessions that delve into the core principles of specific modules within bioinformatics

Academic Projects

We offer academic project training opportunities for MSc/BSc/BTech/MTech students, providing exposure to a high-quality international bioinformatics research environment. The projects and dissertations range from 2-3 months to 4-6 months in duration. Applications are accepted throughout the year.

Services

We offer bioinformatics services to help in performing complex data analysis and understanding the information obtained from data mining, next-generation sequencing technologies, molecular docking, and molecular dynamic simulations.

CERTIFICATE PROGRAM IN BIOINFORMATICS

For individuals with a strong drive for success, this one-year certificate program provides an opportunity to gain practical bioinformatics experience. The program combines theoretical knowledge with hands-on training in various techniques and tools essential for diverse areas of biological research, forming a solid foundation in bioinformatics. Divided into two segments, both spanning six months online (Part-A) and six months offline (Part-B), the curriculum covers best practices in bioinformatics analysis, computer programming, statistical analysis, data management, and reproducibility. Participants will receive close supervision from RGCB faculty members, and the program features scheduled lectures by distinguished academicians and scientists.

Classes are virtual mode

6 month Training(Part-A)& 6 month Project(Part-B)

Major emphasis on NGS data analysis

Structural Bioinformatics, programming skill

Eligibility

Students pursuing a BSc / MSc / BTech /MTech degree and graduates in the fields of Life science, Physics, Chemistry, and Computer science are eligible.

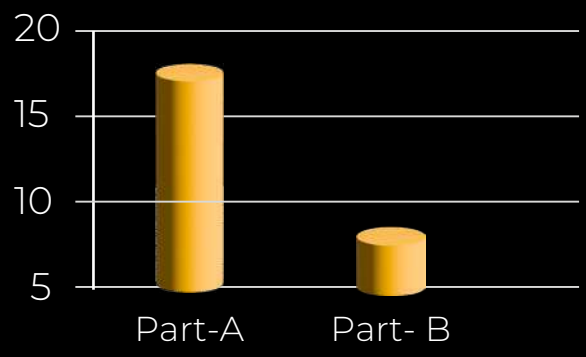
Program Fee

The complete fee amounts to 50,000 INR, covering admission, study materials, access to internal computational facilities, and the consumables used in the Bioinformatics Facility.

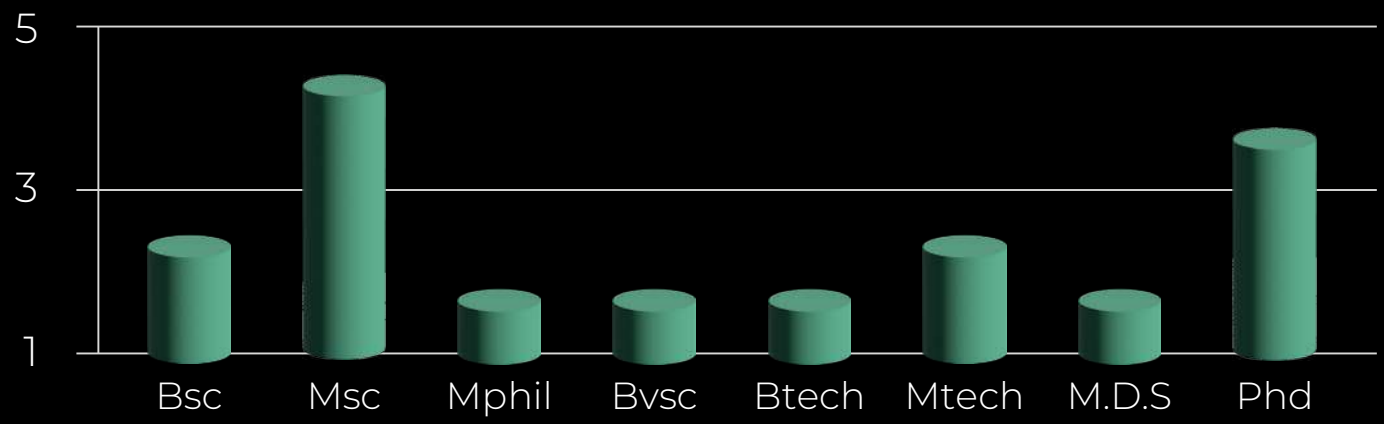
CERTIFICATE PROGRAM IN BIOINFORMATICS

In the year 2023, we received over 38 applications from students across India. After a thorough screening process conducted by the academic committee, 17 students were deemed eligible for the training program, which commenced in June 2023 and is scheduled to conclude in December 2023. The second phase, beginning in January 2024, involves four enthusiastic participants who are engaged in a project at our facility. The students participating in this program hold degrees in various fields, including BSc, B.Tech, M.Pharm, MSc, M.Tech, and PhD.

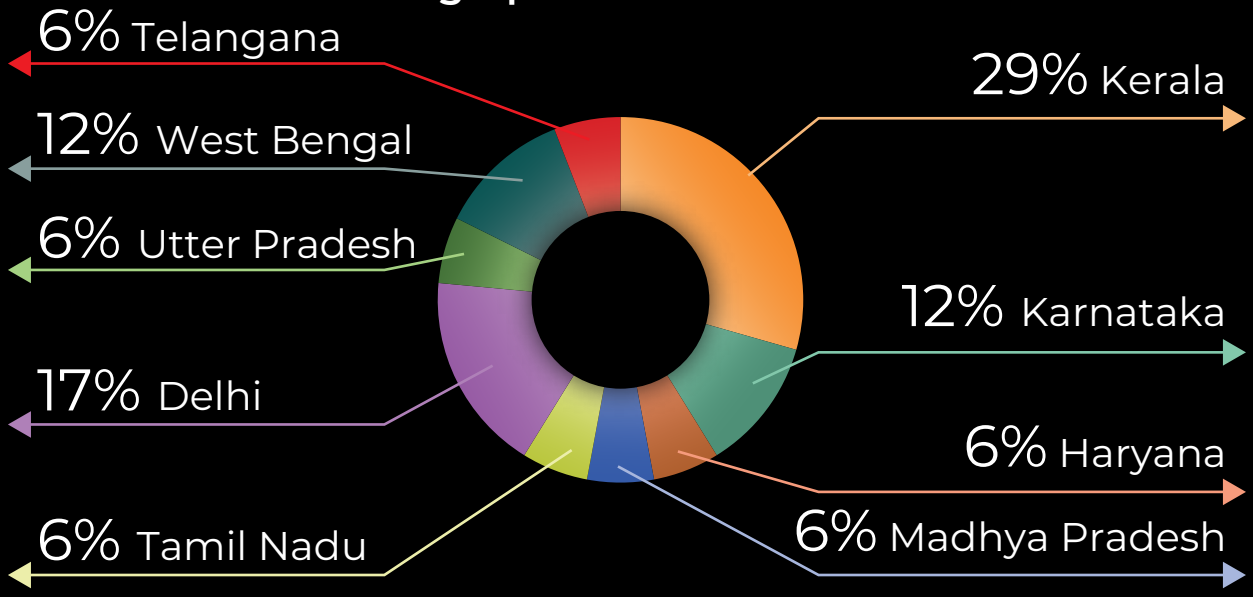
No. of participants



Educational Qualifications



Geographical Distribution



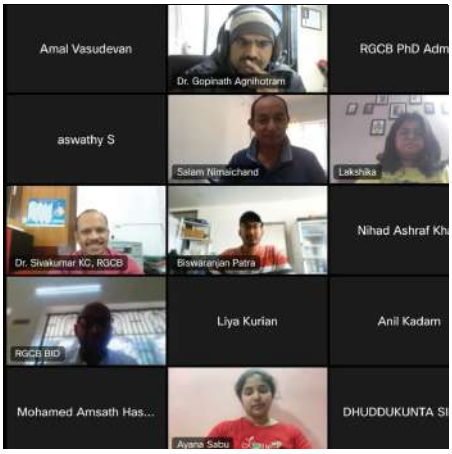
BIOINFORMATICS ONE-DAY WORKSHOPS (Virtual)

Nine online workshops addressing the fundamentals of bioinformatics were held in 2023, spanning different topics from March to December. In addition, 440 participants from various regions of India have taken part in these sessions.

Molecular Modeling Of Proteins And 3d Visualization

- Trainer: Dr. Sivakumar K.C
- No. of participants – 21
- Date: 28-01-2023

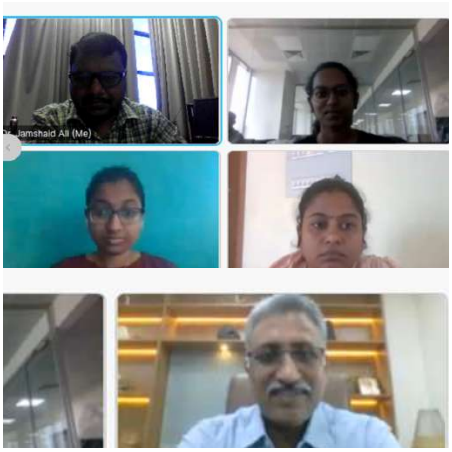
This workshop is intended for those who want to learn about using structural information in protein research and modelling protein structures using homology modelling. Participants will be able to visualize 3D molecular structures of proteins and how they interact with other molecules such as drugs and ligands. The workshop will also teach how to analyse protein structures and create publication-quality molecular images. No prior knowledge of structural bioinformatics is needed, but a basic understanding of protein structure is beneficial.



Introduction To Microbiome/ Metagenome Data Analysis

- Trainer: Dr. Jamshaid Ali
- No. of participants – 34
- Date: 25-02-2023

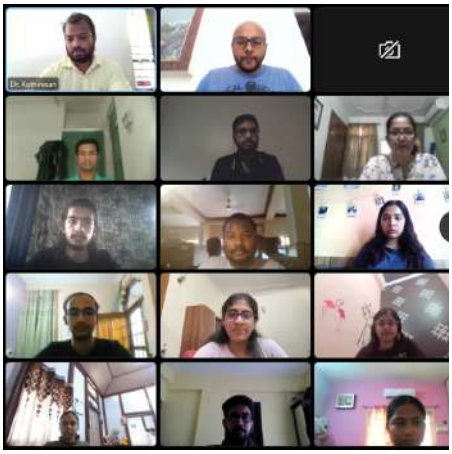
This workshop will introduce the basic concepts of next generation sequencing in general and that of metagenomics/microbiome in particular. The participants will be able to have a clear understanding of NGS, preliminary information of softwares/tools for microbiome & metagenomic data analysis.



Introduction To Molecular Dynamic Simulation

- Trainer: Dr. Kathiresan Natarajan
- No. of participants – 20
- Date: 13-04-2023

This course is designed for students interested in learning the fundamentals of molecular dynamics simulations and gaining practical experience with GROMACS software package. No prior expertise in structural bioinformatics is necessary; however, a fundamental understanding of protein structure is advantageous. Experience with a command-line environment like UNIX is not essential, although it is helpful for inputting the MD simualtions instructions



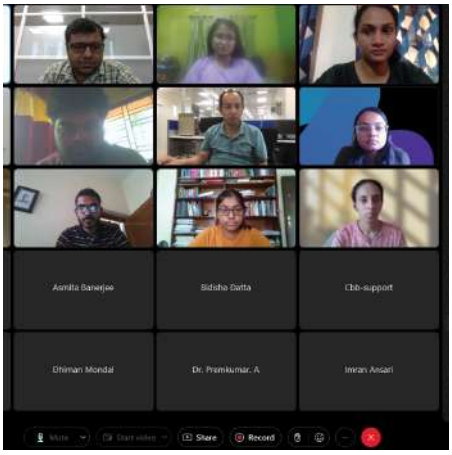
BIOINFORMATICS ONE-DAY WORKSHOPS (Virtual)

Nine workshops addressing the fundamentals of bioinformatics were held in 2023, spanning different topics from March to December. Also, 440 participants from various regions of India have taken part in these sessions.

Python Programming For Beginners

- Trainer: Dr. Jamshaid Ali
- No. of participants – 35
- Date: 25-05-2023

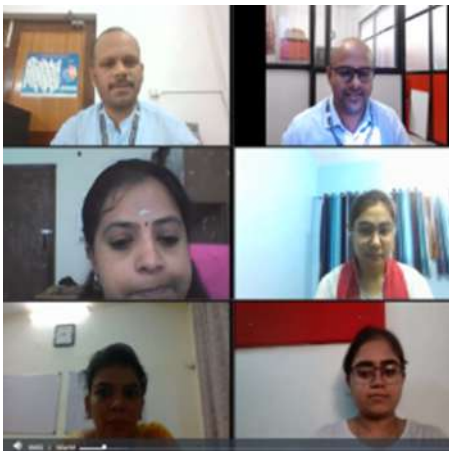
This one day python workshop has been designed for beginners particularly biologists who are interested in learning programming. The participants will learn the basics of python (string, numbers, list, dictionary, tuple & set etc). This foundation though specific for python will also help them to learn other programming languages (like perl & R) in future.



Practices in Molecular Docking

- Trainer: Dr. Sivakumar K.C
- No. of participants – 76
- Date: 24-06-2023

This course is for those interested in learning the theoretical background and a hands-on approach to Molecular Docking. No previous experience in the field of structural bioinformatics is required, but a basic knowledge of protein structure is an advantage.



Protein Structure Modelling and Visualization

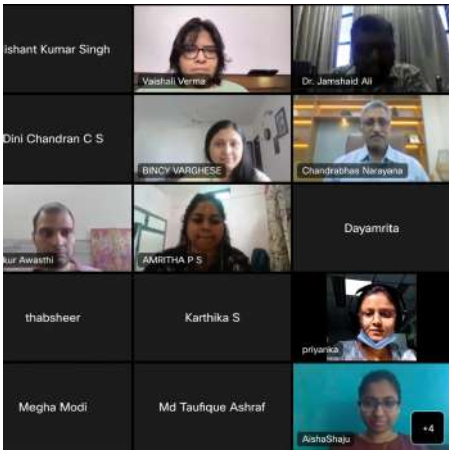
- Trainer: Dr. Kathiresan Natarajan
- No. of participants – 60
- Date: 27-07-2023

This course is for those interested in learning more about the application of structural information in their work and how to model protein structures using homology modeling approach, visual investigation of 3D molecular structures of proteins and their interaction with ligands, substrates, and drugs. Participants will learn how to analyse protein structures and create publication-quality molecular images. No previous experience in the field of structural bioinformatics is required, but a basic knowledge of protein structure is an advantage. Experience with a UNIX-like command-line environment is not required, but it helps to type the commands into the modeling concepts and biology.

BIOINFORMATICS ONE-DAY WORKSHOPS (Virtual)

Introduction To Next Generation Sequencing Data Analysis

- Trainer: Dr. Jamshaid Ali
- No. of participants – 60
- Date: 23-08-2023



This one day workshop has been designed in such a way that the participants will have a very clear basic understanding of next generation sequencing. They will learn how to interpret the quality check reports of raw data. Commonly used terms (like single-end, paired-end, sequencing depth, bad quality tails etc) will be discussed interactively. Basic introduction of few commonly used softwares for NGS along with hands on session for 1 or 2 software(s) will also be helpful and interesting for participants.

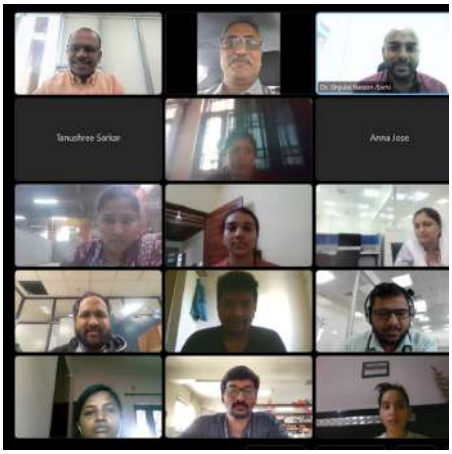
Protein Structure Modelling and Visualisation

- Trainer: Dr. Sivakumar K.C
- No. of participants – 53
- Date: 07-10-2023

This course for those interested learning more about the application of structural information in their work and how to model protein structures using homology modeling approach, visual investigation of 3D molecular structures of proteins, and their interaction with each other, with ligands, substrates, and drugs. Paricipants will learn how to create publication quality molecular images. No previous experience in the field of structural bioinformatics is required, but a basic knowledge of protein structure is an advantage. Experience with a UNIX-like command-line environment is not required. But it helps to type the commands into the modeling concepts and biology.

Introduction to RNA-Seq Analysis

- Trainer: Dr. Sivakumar K.C
- No. of participants – 81
- Date: 28-12-2023



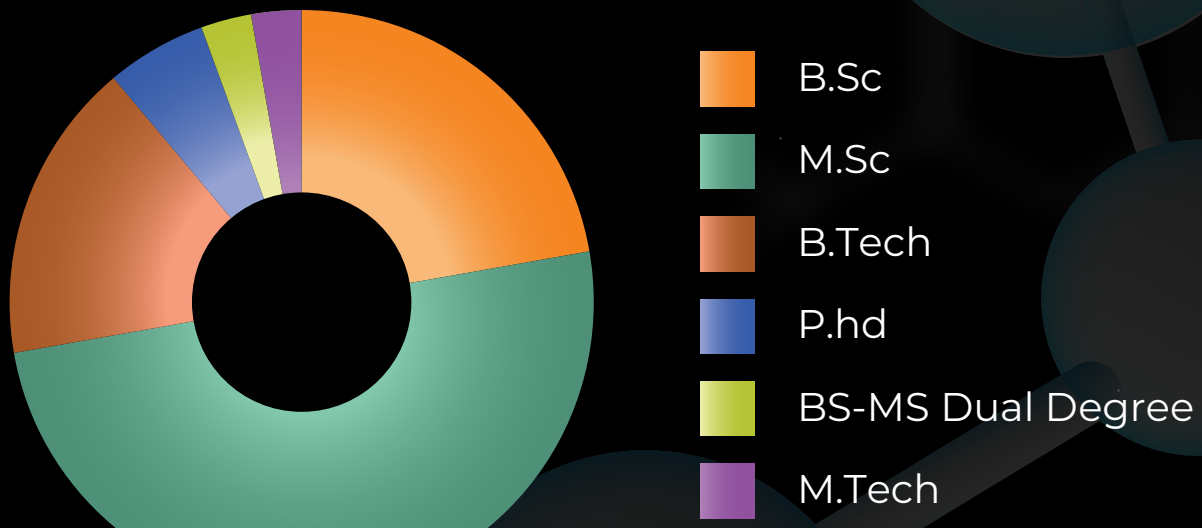
This interactive RNA-Seq data analysis workshop provides practical training in vital bioinformatics techniques for deriving insights from transcriptomic sequencing data, tailored specifically for beginners with limited computational experience. By the end, participants will become familiar with essential skills like data quality control, read alignment, quantification, differential expression analysis, and visualization to unlock findings from RNA-Seq experiments.

ACADEMIC PROJECTS

In the year 2023, a diverse group of 36 students from various universities across India visited bioinformatics facility to undertake research projects on a range of topics. These students, hailing from different academic backgrounds and institutions, brought with them unique perspectives and expertise, enriching the collaborative environment at the facility.

Throughout their time at the facility, the students engaged in intensive research activities, collaborating with mentors and peers. They had access to state-of-the-art computational resources and tools, enabling them to perform sophisticated analyses and generate meaningful results. These projects not only enhanced the students' technical skills and knowledge but also fostered a deeper understanding of the practical applications of bioinformatics.

Educational Qualifications



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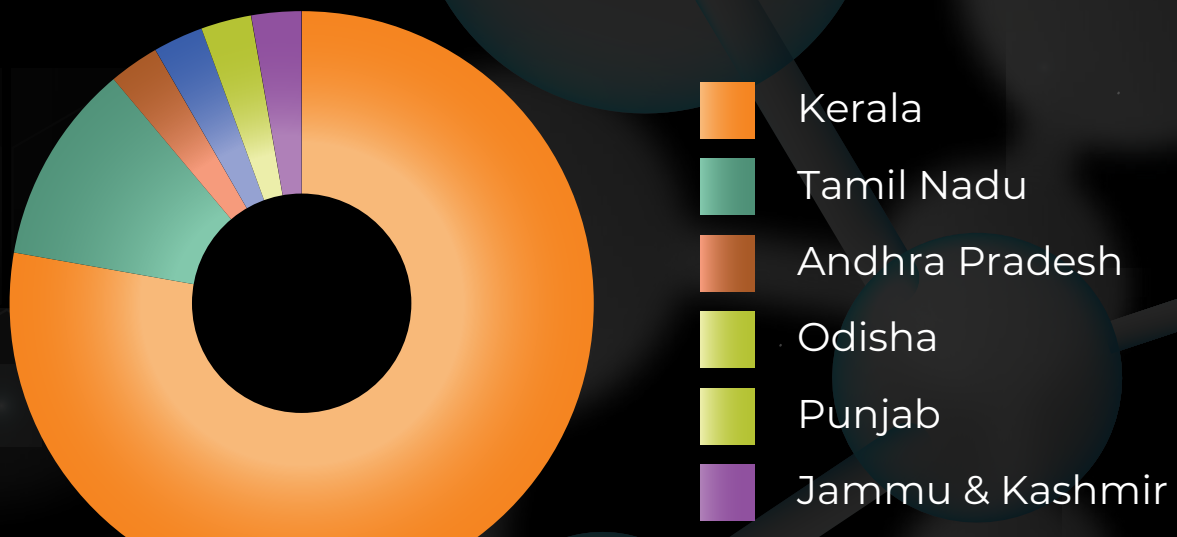


SUMMER TRAINING PROGRAM

The one month training program covering different modules of bioinformatics. Students will be provided with mini-projects from different disciplines to develop analytical skills. In the year 2023,we had 10 students from various parts of India.

The applications are invited from January till March and the program is offered in May / June of every year.

BIOINFORMATICS SERVICES

Our team of bioinformaticians possesses expertise in computer programming, structural bioinformatics, and genomics, equipping them for thorough and extensive big data analysis. Utilizing a blend of custom-built and open-source software, our analyses are tailored to meet your specific research requirements. Our bioinformatics services transform raw data into comprehensive analyses and customized figures, accompanied by support for data interpretation. We offer precise and customized solutions to researchers in the following areas

- Molecular Docking
- Protein Mutation design and Structural analysis
- Protein 3D Structure modelling
- Molecular Dynamics Simulations
- Functional annotations
- NGS analysis and denovo assembly
- RNA-Seq analysis
- Phylogenetic analysis
- Metagenomics
- Heatmaps/3D plots/Interactive charts

Talk to our bioinformatician

Want more information about our bioinformatics services or interested in bioinformatics analysis of your data? Please feel free to submit a service inquiry on our portal.
https://rgcb.res.in/cbb-services.php

PEOPLE

Prof. Chandrabhas Narayana

FASc, FRSC, FNASc,
Director

Dr. Shijulal Nelson Sathi

Scientist C & Co-ordinator

Dr. Kathiresan Natarajan

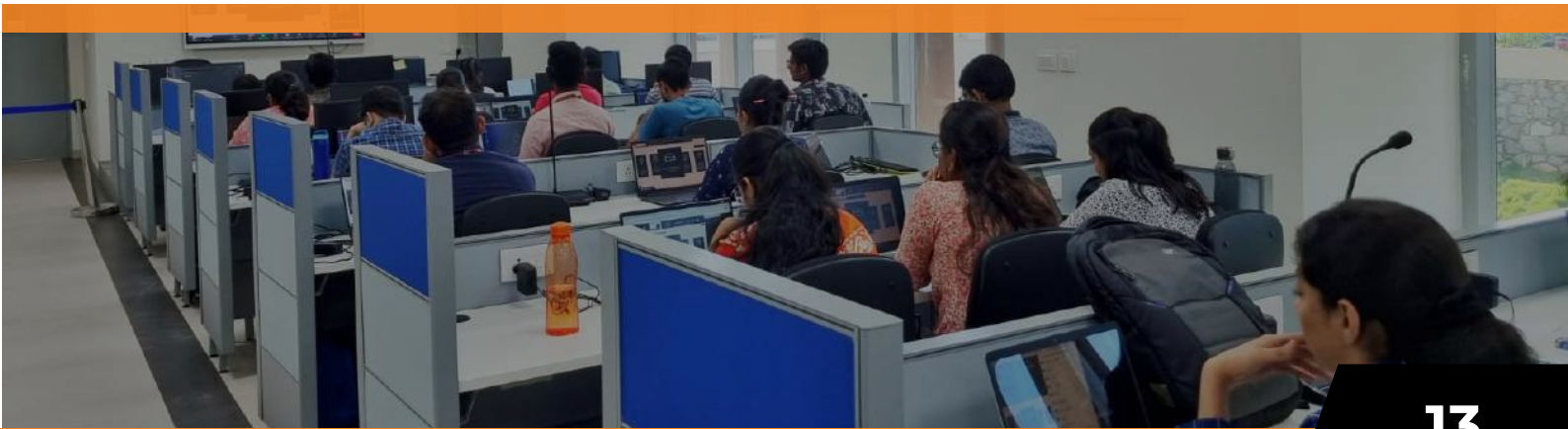
Scientist C

Jamshaid Ali PhD

Deputy General Manager

K C Sivakumar PhD

Senior Manager



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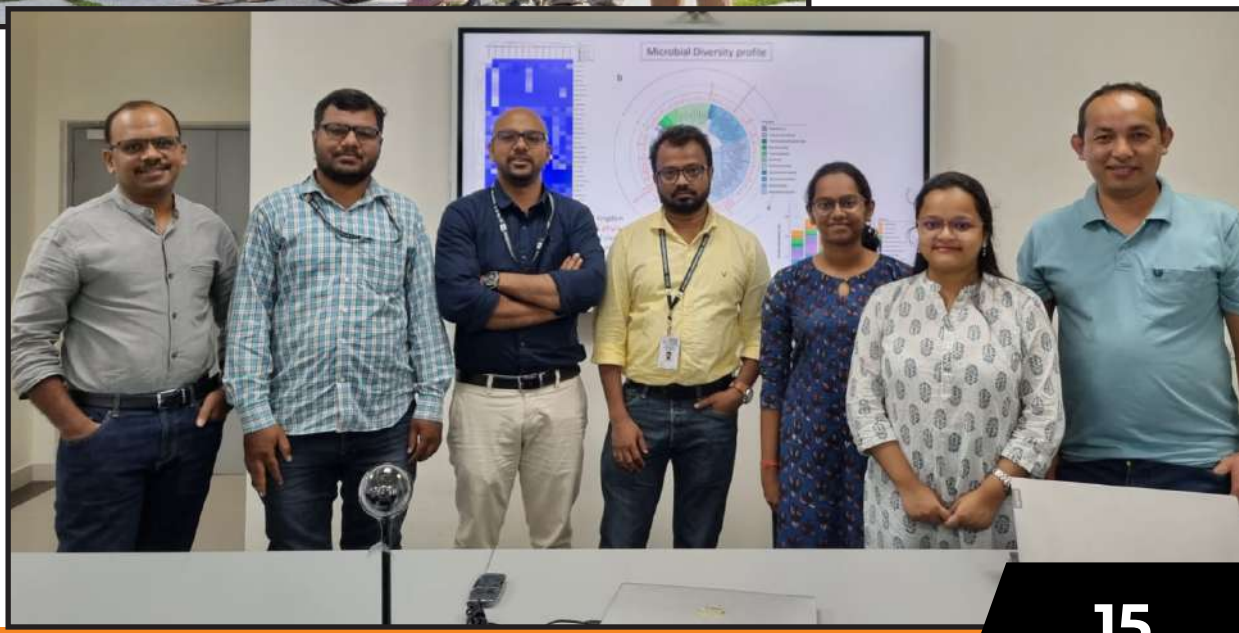

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