# SCHOOL OF BIOTECHNOLOGY

Department Profile: School Of Biotechnology

year of establishment : 2008

UG Intake : 37

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**Department: SCHOOL OF BIOTECHNOLOGY**

- MOLECULAR BIOLOGY LAB

Short description about the Lab

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**Department: SOBT, Molecular Genetics Lab**

# Molecular Genetics Laboratory:

PI: Dr. Md. Anaul Kabir

- Herein MGL, primarily deals with Molecular biolpgy and genetical aspects of two eukaryotic model organisms: ***Saccharomyces cerevisiae*** and ***Candida albicans*.**
- Our goal is to study and explore the fundamentals of gene regulatory mechanims in eukaryotes and corelating their functions to various molecular and biochemical phenomenons.
- One more such paralell domain we investigate is protein folding and mutation studies using Yeast(*S. cerevisiae*) as a model organism.
- Antifungal studies: Pathogenic Model organism: *C. albicans*: used for various gene relugation studies and Antifungal drug's studies with functional genomics aid and invitro studies.

## Molecuar Genetics Laboratory:

PI: Dr. Md. Anaul Kabir

- Yeast Genetics: Molecular Genetics of ***Saccharomyces cerevisiae*** and ***Candida Albicans***
- Genetic Engineering
- Gene Regulation
- Protein Folding
- Antifungal Studies
- Functional Genomics

**Department: SoBT, MGL**

**Details of the Instrument:**

**Instrument Name: 96 well Real time PCR**

**Purpose:** The Biorad 96-Well Thermal Cycler features an easy-to-use color touch screen to simplify setup and use of the system.

A real-time polymerase chain reaction (real-time PCR, or qPCR) is a laboratory technique of molecular biology based on the polymerase chain reaction (PCR). It monitors the amplification of a targeted DNA molecule during the PCR (i.e., in real time), not at its end, as in conventional PCR. Real-time PCR can be used quantitatively (quantitative real-time PCR) and semi-quantitatively (i.e., above/below a certain amount of DNA molecules) (semi-quantitative real-time PCR).

**Department:**

Details of the Instrument:

Instrument Name: **CHEF DR II- System, Biorad**

***Contour clamped homogenous electric field*:**

An eletrophoresis unit capable of effectively resolving the DNA fragments in range of 5kb to 6Mb.

The CHEF-DR II system is optimized for the most popular range of separations with a fixed angle of 120°. This unit can be used for separations of DNA fragments up to 6 Mb by adjusting the run conditions for low voltage and extended run times.

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# DOWNSTREAM PROCESSING LABORATORY

**Department: School of Biotechnology**

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**Department: Downstream processing lab, School of Biotechnology**

- This lab focuses on animal cell culture techniques to find out the small inhibitors that target specific proteins that are involved in cell division.
- More specifically targeting the cytoskeletal and motor proteins to control cell proliferation.
- The other major area that the lab deals with is the proteins that are involved in bacterial cell division.
- This includes over-expression and purification of proteins.

## Downstream processing Laboratory:

PI: Dr. Rathinasamy K

- Research on Anti-cancer drugs.
- Protein over-expression.
- Protein purification.
- Antibacterial studies.

**Department: SoBT, Downstream Processing Laboratory**

- **Details of the Instrument:**
- **Instrument Name: Nikon Eclipse-Ti Inverted Fluorescent Microscope**

**Purpose: For fluorescent and live cell imaging.**

- A powerful inverted microscope system that is ideal for high-end research and live cell imaging.

- The Eclipse Ti- inverted microscope offers improved system speed, increased flexibility, and efficient multi-mode microscopy as part of a fully-integrated microscope system.

- The NIS Elements software is the comprehensive imaging software that provides integrated control of the microscope, cameras, components, and peripherals.

- The microscope is equipped with DAPI, TRITC, and FITC filters for fluorescent imaging.

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**Department: School of Biotechnology**

# PLANT BIOTECHNOLOGY LABORATORY

- 3D bio printer
  - **Cellink BioX**
  - Standalone unit for loading and printing of data
  - 3 programmable printheads
  - Resolution 100µm
  - 4 UV curing modules (365, 405, 485 and 520 nm UV LED)
  - Printbed 4-60 degree Celsius
  - Printhead pneumatic (amb-60 degree Celsius)
  - Thermal printhead for thermoplastics
  - Application
    - Microfluidics
    - Drug discovery
    - Tissue engineering
    - Drug delivery
    - Bioengineering
    - Bioink development



3D bioprinter uses biocompatible bioinks mixed with live animal cells to produce three dimensional structures mimicking invivo tissue arrangements.

- Microvolume UV-Vis Spectrophotometer
  - **Nanodrop One**
  - Quantify and qualify DNA, RNA, and protein samples in seconds with only 1-2 µL
  - Can be used for full spectral data
  - Light source: Xenon Flash
  - Wavelength range: 190nm to 850nm
  - Minimum sample volume: 1µL
  - dsDNA min conc.: 2ng/µL, BSA: 0.06mg/mL

The Nanodrop Spectrophotometer is generally used to assess UV/visible light-based DNA, RNA, or protein quantities. These macromolecules in solution can have their absorbance spectra or individual wavelengths measured.

# LABORATORY DETAILS

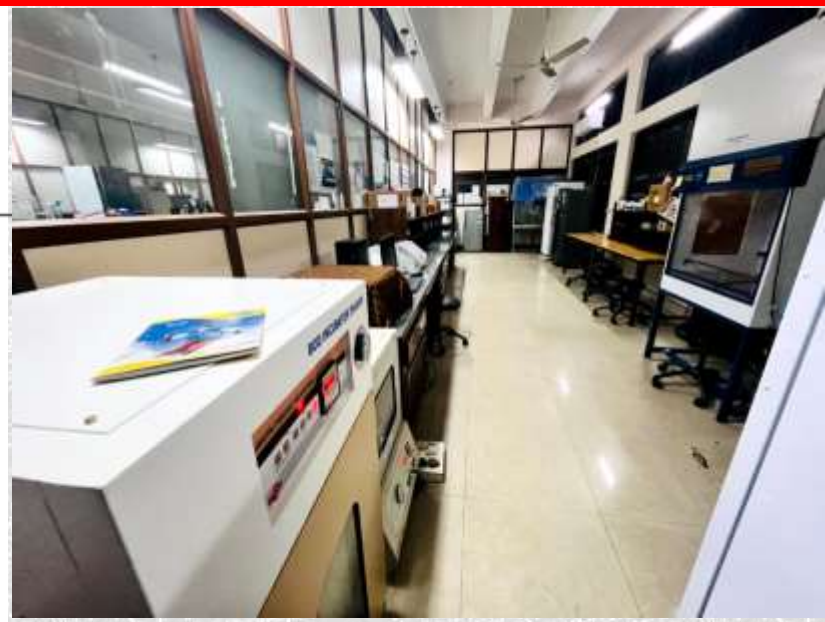
- **Department : School of biotechnology**
- **Laboratory : Microbiology**

- Microbiology Laboratory

PI: Dr. Suchithra T.V.

## Areas of research :

- Bio-prospecting
- Microbial Enzymes
- Bioplastics
- Biodiesel
- Bioinspired Hydrogel
- Biocement
- Bioleather
- Antimicrobial agents
- Microbial fuel cell
- Bioremediation
- Chemical synthesis



- Herein Microbiology lab we are mainly focusing on bio-prospecting studies which incudes exploration of natural resources for economically valuable products such as bioplastic, biocement and bioleather using several microorganisms
- And the research expanded to the areas of chemical synthesis and their antimicrobial studies (antifungal and antibacterial), production of bioinspired hydrogel of medical importance, investigation on renewable alternatives for energy such as microbial fuel cells and biodiesel
- We are also working on bioremediation and biodegradation studies

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**Department: School of Biotechnology**

# BIOPROCESS LABORATORY

# Bioprocess Laboratory, School of Biotechnology

## Major Equipment's

- High Performance Liquid Chromatography (HPLC-Shimadzu)
- Thermal Cycler (GeneAtlas)
- Lyophilizer (ESCO)

Bioprocess Laboratory

PI: Dr. A. Santhiagu

- Microbial production of enzymes, antibiotics, biopolymers, vitamins and bio-chemicals
- Development of recombinant microbial strains for enhanced bio-production
- Modeling and simulation of bioprocesses
- Bioremediation
- Drug Design and development

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**Department: School of Biotechnology , Biochemistry lab**

- This lab focuses on Biochemistry experiments designed for UG students - qualitative tests for carbohydrates and amino acids, quantitative determination of carbohydrates and proteins, SDS-PAGE electrophoresis, and paper chromatography of amino acids
- The current research is centered around the field of neuroscience
- cell culture techniques - for studying the effects of drugs in a stroke cell model

**Biochemistry Laboratory:**

PI: Dr. Rajanikant G. K

- Research on neuroscience

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**Department:**

Conference Hall Image

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**Department: Computer Science and Engineering**

- Conference hall/ Seminar/Discussion room details

Seminar Hall Image

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**Department:**

- Conference hall/ Seminar/Discussion-room details

Discussion Room Image