



DEPARTMENT PROFILE

"Innovate, Discover, Transform:
BIOTECHNOLOGY FOR A SUSTAINABLE FUTURE

2018-2023

Prepared By:

Department of Biotechnology
St. Edmund's College, Shillong



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www.sec.edu.in





2018-19

Table of Contents

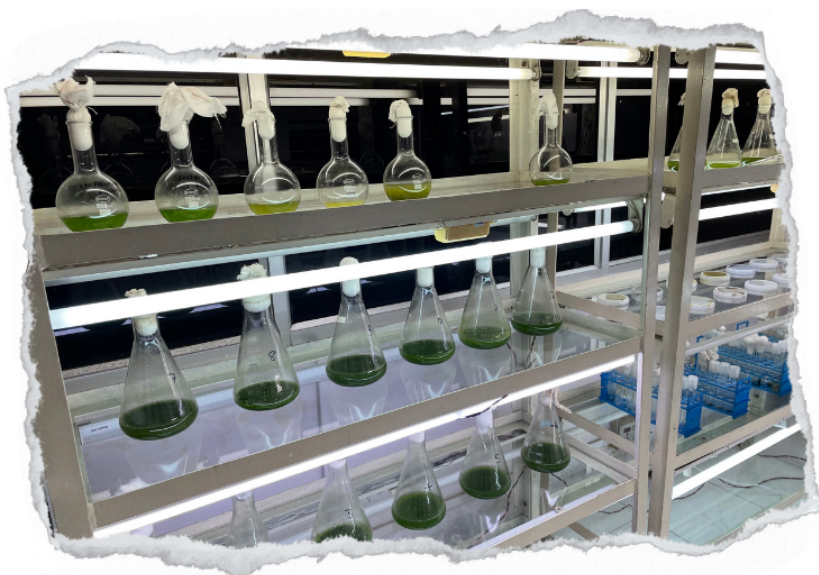
Background/Vision & Vission	01
Faculty Teaching	02
Research Staff	03
Facilities Physical	04
Facilities - Research	05
Skill Development Course Organized	07
Workshops/Seminars/Guest Lectures Organised	08
Inhouse/Outreach Programmes Organized	12
Experiential Learning- Research Project	13
Experiential Learning- Summer Internships	14
Experiential Learning- HRD Training	15
Results - University	16
Student Progression	17
Research Grants	18
Research Publications	19
Faculty Participation in Career Enhancement Programmes	20
Outcome Based Education (OBE)	22
Past Pupil's Reminiscence	23
SWOC Analysis	25
Best Practices	26

Background

The Department of Biotechnology at St. Edmund's College, Shillong was established in 2006. The department has made significant progress and achieved several milestones since its inception.

Over the years, the Biotechnology Department at St. Edmund's College has undertaken various research and development projects. These projects have contributed to advancements in areas such as agricultural biotechnology, environmental biotechnology, and industrial biotechnology.

The Biotechnology Department at St. Edmund's College boasts well-equipped laboratories that provide state-of-the-art facilities for conducting research and practical training. The availability of advanced equipment and instruments enables students and faculty to carry out experiments and explore various aspects of biotechnology.



Our Vision:

- To achieve excellence in biotechnology education at the undergraduate level and produce students who are well informed with passionate thinking for implementing the technologies learnt for the larger benefit of the society.

Our Mission :

- To educate students with an up-to-date and modern course undergraduate curriculum affiliated to NEHU along with a futuristic and global approach thereby promoting intellectual and skill development.
- To provide students with basic and applied concepts of biotechnology having interdisciplinary approach so as to prepare them for different career paths they choose to take.



Our Team - Faculty Members



Dr SAMRAT ADHIKARI

Head



Dr Baiakmenlang Manners

Faculty



Dr Gopesh Paul

Faculty



Ms Shekinah Challam

Faculty



Mr Koben John Nongkynrih

Faculty



Mr Erwin Khsiar

Lab Attendant

Our Team - Research Staff



Mr Yogesh Negi
Senior Research Fellow
Advanced Level Biotech Hub
(Funded by DBT, Govt. of India)



Dr Sunil Kumar
Research Associate
Advanced Level Biotech Hub
(Funded by DBT, Govt. of India)



Ms Ninni Suthradhar
Junior Research Fellow
Advanced Level Biotech Hub
(Funded by DBT, Govt. of India)



Mr Bikash Thakuria
Research Assistant
Bioinformatics Centre (Funded
by DBT, Govt. of India)

Facilities - Physical



ICT enabled Classrooms with Video Conferencing Facility



Well equipped laboratories

Facilities - Research



Shaker Incubator



Minus 20 Refrigeration



Minus 80 Refrigeration



Laminar Air Cabinet



Lypholizer



Humidifier



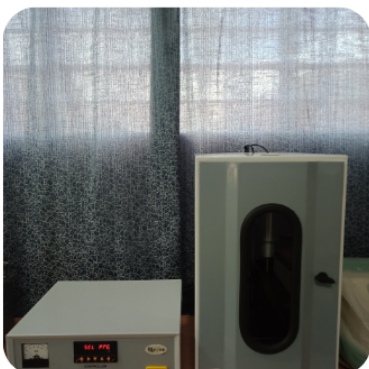
Cyanobacteria Repository



BOD Incubator



ELISA Reader



Ultra Sonicator



Water Sonicator



Centrifuge

Facilities - Research



Thermal Cycler



Dry Heating Block



Spin Centrifuge



Gel Doc Image System



**UV-Vis
Spectrophotometer**



Incubator



Oxygen Electrode



Microscope Image Capture



Waterbath



Ice Cube Machine



Autoclave



**Rotatory Vacuum
Evaporator**

Skill Development Course Organized

13th March - 11th April 2018



One month Skill development course on Value additions to rich diversity in North Eastern region was organized for UF students for one month. National Skill Development Council sponsored this programme in collaboration with IBSB, Imphal and Biotech Park, Lucknow. The programme enhanced individuals' abilities, fostering employability and economic growth through training, education, and practical experience, participants gain valuable skills, boosting their productivity and enabling them to contribute effectively to their communities and industries.

Workshops/Seminars/Guest Lectures Organized

**Workshop on Library Resource Management by Dr D Lahmachuanna, NEHU, Shillong
26th November 2018**



**Seminar on
Bioresources and S & T Interventions for Development of North East India in collaborations with
National Academy of Sciences, India (NASI) as a part of celebration of Prof Meghnad Saha
Memorial Lecture on by Padma Shri Prof. Pramod Tandon, CEO, Biotech park, Lucknow, India
16th November 2018**



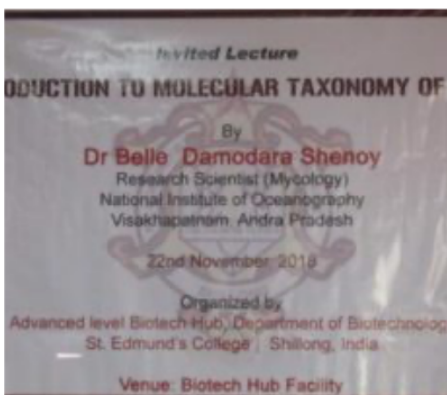
Seminar on

Science for Social Welfare in collaboration with the National Academy of Sciences, India (NASI) as a part of the 150th Anniversary Celebration of "Ba and Bapu by Dr Biman B. Mandal, Associate Professor, Department of Bioscience and Bioengineering, IIT, Guwahati
24th November 2018



Seminar on

Introduction to Molecular Taxonomy of Fungi by Dr Belle Damodara Shenoy, Scientist, National Institute of Oceanography, Goa.
22nd November 2018



**Workshop on
PERL Programming & its application
26th - 28th February 2019**



**Faculty Recharge Programme
3rd - 4th August 2018**



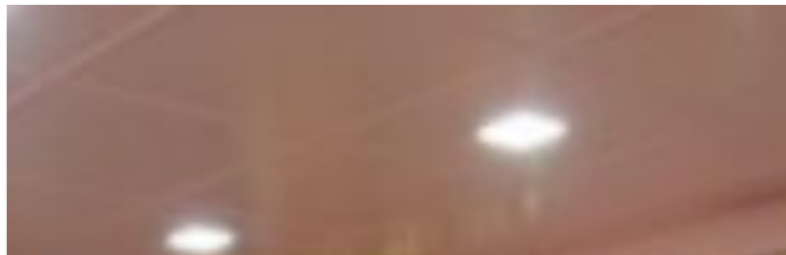
**Conference on
"Fostering Sustainable Development through Science" in collaboration United Nations Club, St.
Edmund's College
15th - 17th September 2018**



Outreach/Inhouse Programmes Organized

To Popularize Bioscience as a
Career (Rural Areas))
11th September, 2018
21st August 2018

Capacity building, sensitization and
popularization of Biotechnology for
Higher secondary schools of
Shillong
23rd June 2018
28th July 2018
1st September 2018
19th May 2018
14th July 2018



Experiential Learning - Research Projects

Title	Name of Students	Duration	Project Guide
Maintenance of cyanobacterial culture	Trideep Deka Preet Kumar	6 months	Dr Samrat Adhikari
Evaluation of anti-oxidative stress response in cyanobacteria culture treated with Congo Red.	Sanchari Bose Sonia Hajong	6 months	Dr Samrat Adhikari
Molecular characterization and cloning of cyanobacteria smtA and smtB genes in E.coli DH-5 α	Barnalee Baruah	6 months	Dr Samrat Adhikari
Protein extraction and purification of azo-reductase enzyme from heterocystous cyanobacteria	Nayanika Kalita	6 months	Dr Samrat Adhikari
A study on the transcriptomics analysis of the smt A & smt B metallothien gene in 5heterocystous cyanobacteria	Payelina Sanyal Saurav Thapa	6 months	Dr Samrat Adhikari

Experiential Learning - Summer Internship

Name of the Institute/Companies	Name of Students	Duration	Internship Guide
Epygen Biotech Pvt. Ltd, Navi Mumbai, Maharashtra, India saptarishipaul@epygen.com	Sorforaz Lashkar Fleming L Nonglait	15 Days	Dr Saptarishi Paul
Division of Animal Health, ICAR Research Complex for NEH Region, Barapani, Meghalaya akpuro@gmail.com	Ibakrymen Marbaniang Naphisabiang Kharpuri Larisa Lyngdoh Jahdiel Wanchand Rilajuban Lalthong Banropdor Ryndong	15 Days	Dr Akelu Puro
PatientMD, Inc. GD2, Rajdanga Main Road, 1st Floor Kolkata 700107	Mary Saikia Indrani Mazumdar	15 Days	Dr Partho Das
Leucine Rich Bio Pvt. Ltd, 283, 3rd Floor, M. K. Puttalingaiah Road Padmanabhanagar, Bangalore-560 070,	Devatrisha Purkayastha Sibange Paul Lawanbiang Nitya Pants	15 Days	Mr Prabath K M
Advanced Biotech Hub Department of Botany NEHU, Shillong	Evaki N Areng Liza Flenda Nongbri Ailindaris Syiem Susana Nongrum Joslyn Lallawmtling	15 Days	Prof N. K Churungoo

Experiential Learning - HRD Training

Name of the Participating Institute	Name of Students	Duration	Internship Guide
Department of Biotechnology Lovely Professional University Punjab	Piyali Sarkar	1 month	Dr Samrat Adhikari
Department of Biotechnology AMITY University Noida	Deboleena Das	1 month	Dr Samrat Adhikari

RESULTS - University Examination

University Toppers



Ms Barihun Thyrniang
Fourth Position



Mr N Joneto Singh
Sixth Position



Mr Dominic Lyngdoh
Fifth Position



Mr Richborn Kharlukhi
Eight Position



Ms Evarisha L Lyngdoh
Tenth Position

Appeared: 29
Passed: 29

100 %
SUCCESS

Students Progression- UG-PG


Name of the Student	Name of Programme Admitted	Name of the Institute Joined
Dominic Lyngdoh Richborn Kharbuki Joel Paul Warlarpih N Joneto Singh Barihun Thyrniang Maindashisha Wanniang Evarisha L Lyngdoh Lavinia Shullai Nicole S Ryndon Stevenson Khonglah	MSc Biotechnology & Bioinformatics	Department of Biotechnology & Bioinformatics, North Eastern Hill University, Shillong
Zakir Hussian Vishal Das Neha Paul Abidingson Nongsiej	MSc Biotechnology	Department of Biotechnology Assam Don Bosco University Assam
Bipasa Paul	MSc Forensic Science	D Y Patil University, Pune, Maharastra
Prasanna Sharma Upreti	MSc Biotechnology	St. Anthony's College Shillong
Dachngain Shullai	MSc Biotechnology	Department of Biotechnology Pondicherry University Pondicherry
Franky Laloo	MSc Plant Molecular Biology	Department of Plant Molecular Biology, University of Delhi

Research Grants

Name of the research project/ endowment	Name of the Principal Investigator	Year of Award	Amount Sanctioned	Duration of the project	Name of the Funding Agency
Establishment of Bioinformatics Centre for Biology Teaching under BTIS NET, India	Dr Samrat Adhikari	2008	₹ 91.0 L	11 years	Department of Biotechnology (DBT), Govt. of India
STAR Status Scheme (6 Departments- Physics, Chemistry, Botany, Zoology, Biochemistry & Biotechnology)	Dr Samrat Adhikari	2017	₹ 117.0 L	3 yrs	Department of Biotechnology (DBT), Govt. of India
STAR College Scheme (4 Departments- Electronics, Mathematics, Environment Science & Computer Science)	Dr Samrat Adhikari	2017	₹ 47.0 L	3 yrs	Department of Biotechnology (DBT), Govt. of India
Advanced Levels Biotech Hub (Phase I)	Dr Samrat Adhikari	2017	₹ 78.55 L	3 yrs	Department of Biotechnology (DBT), Govt. of India

Glimpses of Activities



 **EM International**

Shopping Bag (Items)

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Asian Journal of Microbiology, Biotechnology & Environmental Sciences Paper

Vol 20, Issue 3, 2018; Page No.(982-987)

Back

A STUDY ON THE PHYSIOLOGICAL, BIOCHEMICAL AND LIPID CONTENT BEHAVIOUR OF MICROALGA CHLORELLA SP. IN RESPONSE TO IRON (III)

YOGESH NEGI, JONETO NONGMAITHEM, FRANKIE J. LALOO AND SAMRAT ADHIKARI

Abstract

Microalgae are potent organisms for biofuel production and their productive ability can be further enhanced when exposed to various environmental stress conditions. To identify the appropriate conditions suitable for high biomass and lipid productivity, *Chlorella* sp. was isolated from iron leaching areas and cultivated under various Fe^{3+} concentrations at pH 6.8. Highest growth and biomass productivity was reported for the group supplemented with $12\mu\text{M}$ FeCl_3 . Further, with the optimal iron concentration identified, the cells were subjected to both Fe^{3+} ($12\mu\text{M}$) and pH stress (5 and 8). The results showed that the total lipid content for *Chlorella* sp. cultured with $12\mu\text{M}$ FeCl_3 at pH 8.0 and those grown at pH 5.0 stress achieved 52.8% and 38.8% biomass by dry weight and was 7.3 and 5.3 times respectively higher than the control group at pH 6.8. The physicochemical abilities of these cells at $12\mu\text{M}$ Fe^{3+} was also analyzed to assess the effect of iron on these microbial cells.

Faculty Participation in Career Enhancement Programs



DR SAMRAT ADHIKARI

Dr S Adhikari was nominated by DBT, Govt. of India to attend the National Workshop on Nation Science Teacher Congress (NSTC) at 4th India International Science Congress, Lucknow



Annual BTIS NET Coordinators Meeting
M S University, Tirunelveli, Tamil Nadu
February 2-3, 2018, DBT, Govt. of India

Annual Biotech Hub Coordinators Meeting
NERIST, Aizawl, Arunachal Pradesh
February 7-8, 2018, DBT, Govt. of India

Annual STAR College meeting
Gargi College
New Delhi, May 6-8 2018
DBT, Govt. of India



Paper Presentation in National & International Conferences

Bikash Thakuria, Devatrisha Purkayastha, Samrat Adhikari (2018); An in-silico approach in studying the anti-cancerous property of bioactive compounds found in *Taxus wallichiana*. At the "International Conference on Bioinformatics (InCoB)", organised by Jawaharlal Nehru University, 6-8th September, 2018

Ninni Sutradhar, Sunil Sharma, Yogesh Negi, Baiakmenlang Manners, Samrat Adhikari (2018) Screening of bioactive compounds from plant *Lantana camara*, *Rumex nepalensis* and *Chromolaena odorata* for anti-microbial activity; Oral Presentation at the "12th Annual Convention of ABAP & International Conference on "Biodiversity, Environment and Human Health: Innovations and Emerging Trends" 12th-14th November, 2018, Mizoram University

Sunil Sharma, Yogesh Negi, Samrat Adhikari (2018)
Molecular cloning and characterization of metallothionein locus *smtA* and *smtB* in heterocystous filamentous cyanobacteria; *Nostoc sp.* Oral Presentation at the "12th Annual Convention of ABAP & International Conference on "Biodiversity, Environment and Human Health: Innovations and Emerging Trends" 12th-14th November, 2018, Mizoram University



DR BAIKMENTLANG MANNERS

**Paper Presentation in
National &
International Conferences**

Baiakmenlang Manners and Pratap Jyoti Handique (2018) ;
Phytochemical screening and Antioxidant activity of leaf extracts of
Myrica esculenta; Oral Presentation at the "12th Annual Convention
of ABAP & International Conference on "Biodiversity, Environment
and Human Health: Innovations and Emerging Trends" 12th-14th
November, 2018, Mizoram University



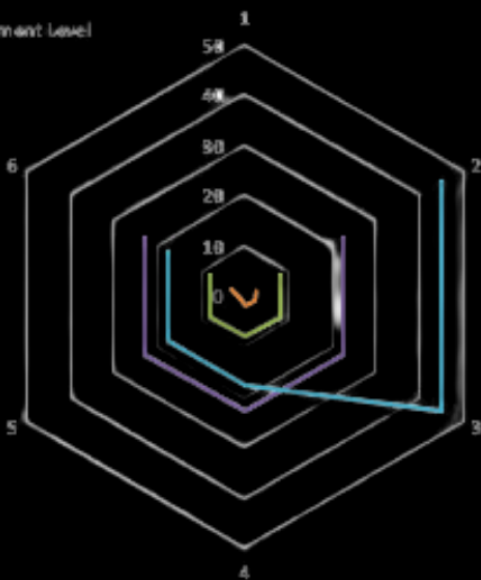
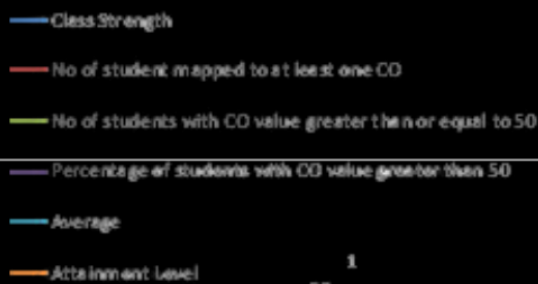
DR GOPESH PAUL

**Orientation Course , UGC-HRDC, NEHU, Shillong
February 2-22, 2018**

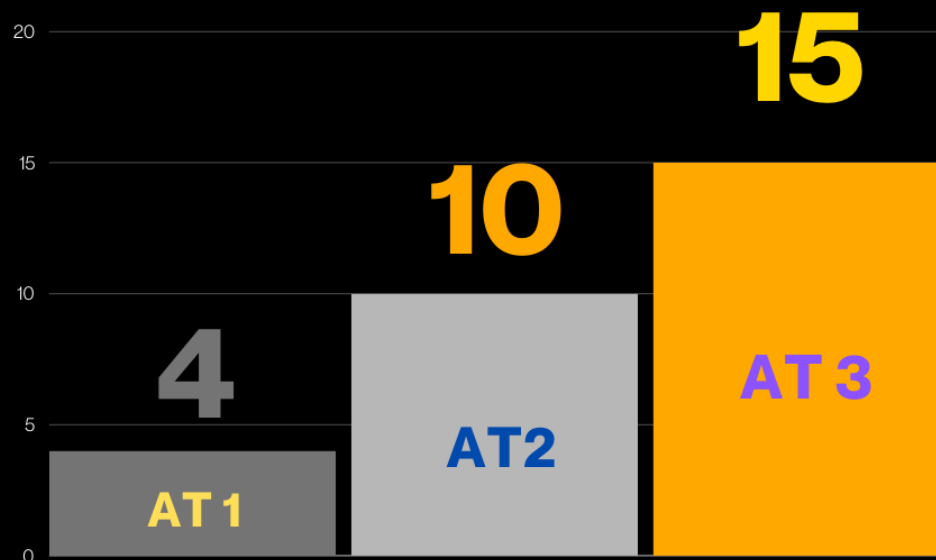
Outcome Based Education ↘

Learning Outcome

The learning outcome for sixth-semester students is evaluated based on the Course outcome and programme outcome framed as per the UGC LOF guidelines and Bloom's learning indicators. The student's performance was analyzed based on direct and indirect assessment with 3 being the highest attainment level followed by 2 as medium and 1 being the least. The graphical representation is appended



CO-PO Mapping



AT - Attainment Level

Past pupils' Reminiscence



The Department of biotechnology, St Edmund's College Shillong, offers a good quality education as the dept. has trained faculty members and is well-equipped with numerous biotechnology tools.

The dept. offer college students an opportunity to learn and to get some practical work experience in this field through their summer training programs.

Nicole S Ryndong



The faculty, with their vast knowledge, consistently delivers outstanding results and supports students tirelessly. Despite the already impressive infrastructure, there's always room for enhancement. The summer training programs offered to students in various institutions, industries, hospitals, and research labs are invaluable. The annual presentations for final-year students play a pivotal role in nurturing future scientists and researchers, proving highly beneficial.

Nongmaithem Joneto

Past pupils' Reminiscence



College life at Biotechnology Department in St. Edmunds' College, holds a special place in my heart, as it is a time I truly cherish. Akin to the way Adenine and Thymine form a bond, also Cytosine and Guanine another, a friendship bonds were formed between me and some of my classmates, now lifelong friends.

The lessons taught by our teachers were not only theoretical but also practically, thanks to the hands-on training provided by the department. As a result, I gained not only new friends but also valuable knowledge and life lessons. These experiences have left an indelible mark on the pages of my life's story.

Barihun Thyрниang

STRENGTHS

- Dedicated Faculty
- Good Student to equipment ratio
- Well equipped infrastructure
- Good Student to teacher ratio
- One-to-one conduct of practicals
- Well equipped R&D facilities
- DBT STAR STATUS Department
- Major funding from various government and non government agencies

WEAKNESS

- Curriculum Design
- Limited Industry- academia interface
- Limited Alumni participation
- Time constraints for research due to academic engagement

OPPORTUNITIES

- Avenues for internships/placements
- MOAs with universities/industry
- Research collaborations

CHALLENGES

- Bolster Research Capabilities
- Industries connectivity
- More skill development activities
- Attract industries for training students
- Bioentrepreneurs

SWOC Analysis

Best Practice

Empowering Biotech Innovators through Skill Development Course

- ✓ Active student participation
- ✓ One month training
- ✓ Bioenterpreneurship temperament
- ✓ Signing of MOU with Biotech Park, Lucknow



The Practice

In response to the rapidly evolving biotechnology landscape, industry saturation, and limited employment opportunities, the Department of Biotechnology organized a Skill Development Course in collaborations with Biotech Park, Lucknow, IBSD, Imphal and DBT, Govt. of India, New Delhi aimed at cultivating entrepreneurial skills and mindset among students. This program equipped participants with expertise in team building, project management, strategic planning, and decision- making, thereby preparing them to successfully launch and lead biotech ventures.

Impact

The program's success is exemplified by Ms. Seilydor Sohkia, a participant who won the prestigious CM's Entrepreneurship Award for her startup, EcoRI, which innovatively transforms waste plastic into products like flower pots and baskets.



Glimpses of Activities

