CENTRE FOR THE ENVIRONMENT

LABORATORY FACILITIES
No. of Laboratories: 05

- **Research laboratory – I**: (Location: first floor, I block) It is used as workplace by research students to carry out routine laboratory experiments.
- **Research Laboratory – II**: (Location: second floor, I block) It is used as workplace by research students to carry out routine laboratory experiments.
- **Analytical laboratory**: (Location: Research lab-II, second floor, I block) It is equipped with sophisticated equipment essential for environmental research.
- **Computational laboratory**- (Location: Research lab-II, second floor, I block). This facility is accessible to the students for their computer related work. At present 20 computers are available for the users.
- **Institutional Biotech Hub Laboratory** including mammalian cell culture laboratory and silk rearing and culture facility.

MAJOR EQUIPMENT AND FACILITIES ACQUIRED

- Refrigerated shaking incubator
- Analytical balance
- DELL workstation
- Remi centrifuge
- Multiparameter for water testing
- Magnetic stirrer hot plate
- Ultrasonic water bath
- Desktop PC
- Hot air oven
- Lab water purification system

MAJOR AREAS OF RESEARCH AND DEVELOPMENT

- Water and Wastewater Treatment
- Solid Waste Management and Recycling
- Environmental Bioremediation/ Environmental Biotechnology
  - Bio-sorption& Bioremediation of heavy metals
  - Bio-filtration for treating Waste Gases and Green Solvents
  - Removal of Toxic and Recalcitrant Compounds
  - Biodegradation/Bio-detoxification of Toxic Wastes
- Environmental Genomics and Proteomics
- Green Chemistry
- Greenhouse gas Capture and Storage.
- Bio-fuels
- Air pollution- Dispersion, Control & Modeling
- Waste Immobilization
- Soil-water-contaminant Interaction
- Contaminant Transport and Retention in Porous Media
- Environmental History
- Environmental Economics
- Green Design
- Global Warming and Climate Modeling
- Seri-biotechnology and Seri-informatics and other related areas
- Metagenomics, enzymatic technology for treatment of recalcitrant pollutants and Biosensors

MAJOR INITIATIVES AND BREAKTHROUGH IN RESEARCH AND DEVELOPMENT

Following are some of the selected research achievements observed during the reporting period of the ongoing research and development of the centre which has appeared in reputed peer reviewed journals and patent databases.

1. Separation of ions from rejected stream of industrial Wastewater

Patent Number: 358357
Date of grant: 11/02/2021

Researcher: Prof. Mihir Kumar Purkait and Ms. Deepti Nair

The invention is related to removal of ions from the rejected stream of nanofiltration (NF) as a part of wastewater treatment or membrane rejected stream of industrial wastewater of iron/steel industry. It particularly relates to removal of ions especially chlorides and sulphates from the rejected stream of NF as a part of wastewater treatment or membrane rejected stream of industrial wastewater of iron/steel industry using miscible organic solvents. It specifically relates to removal of ions especially chlorides and sulphates from the rejected stream of NF as a part of wastewater treatment or membrane rejected stream of industrial wastewater of iron/steel industry using miscible organic solvents like isopropylamine, diisopropylamine and ethylamine and further reuse of the recovered solvents. The invented process is the simple method called precipitation. Miscible organic solvent is used as a precipitating agent. An optimum solvent ratio and factors affecting the precipitation is determined. As a result of precipitation, salt is precipitated out from the solution. A 0.2 micron membrane is used to separate the precipitated salt. Now the solution is left out with water and organic solvent. Organic solvent is recovered by simple distillation and condensation unit. The recovered solvent is recycled back to the system and used further.

2. Environmentally Benign Synthesis of Sn(II)-based Metal-Organic Framework and its Derivative SnO_2 Nanoparticles for the Decontamination of Water

In summary, the research work has some substantial and promising results in the domain of sustainable environmental chemistry and engineering where environmentally toxic organic compounds or cations/ anions are captured by a series of hydrothermally/ solvothermally synthesized water stable Sn-based metal-organic-framework. Notably, the material synthesis was carried out following facile and greener synthetic route under mild conditions, where the use of toxic solvents was avoided. All the synthesized materials exhibited high thermal as well as aqua stability and were subsequently explored for its water treatment potential. In general, the findings will help understand the relatively underexplored space of Sn(II) as inorganic metal ion for stable composite material synthesis and its potential application in water treatment. Each of the synthesized Sn(II)-MOF unveiled interesting characteristic properties that were exploited in the remediation of toxic environmental pollutants from the aqueous medium.

Reference:
A. Ghosh and G. Das, , ***J.Environ. Chem. Eng***. 2021, **9**, 105288. **(IF= 4.30)**.

3. Biological treatment of refinery wastewater: A bio-refinery approach

Bio-fuels for energy generation are one of the alternatives, which require integration with wastewater treatment to keep the economics of the production process low. The present study was therefore focused on treating raw refinery wastewater by *Rhodococcusopacus* for converting it into bio-oil by hydrothermal liquefaction process. For treating the wastewater different operating modes using a bioreactor were investigated, Furthermore, the residual bacterial biomass from the bioreactor was treated by HTL to produce bio-oil which showed excellent for bio-fuel applications. This study demonstrated the application of *R. opacus* for simultaneous wastewater treatment and production of bio-oil for energy application. It also showed that the lipid rich *R. opacus* biomass grown on cheaply available refinery wastewater is highly suited for potential bio-oil production. Overall, this study demonstrated a sustainable

zero waste strategy along with a closed loop integrated approach for refinery wastewater treatment with provisions for resource recovery.

Reference:

Paul, T., Sinharoy, A., Baskaran, D., Pakshirajan, K., Pugazhenthi, G., Lens, P. N. (2020). Critical Reviews in Environmental Science & Technology,(https://doi.org/10.1080/10643389.2020.1820803)**(IF: 8.302)**

4. Synthesis of functionalized silk-coated chitosan-gold nanoparticles and microparticles for target-directed delivery of antitumor agents

We have developed two types of antitumor drug delivery tools using modified biopolymer-derived nanoparticles and microparticles by a green synthesis protocol. Doxorubicin-loaded chitosan stabilized gold nanoparticles and microparticles were synthesized and coated with folate conjugated silk fibroin. Nanoparticles with size 8±3 nm and microparticles with size 900-1000 µm were formed, which can be used for intravenous and oral drug release, respectively. The coated materials showed retarded drug release compared to the uncoated ones.The cytotoxicity assessed in HeLa cell lines demonstrated a maximum dose-dependent decrease in cell viability for the cells treated with the coated materials which are due to the over-expressed folate receptors on the cancer cells that bind to the folic acid conjugated to silk fibroin. It was further supported by the live-cell imaging of the nanoparticles,which unveiled the increased cellular uptake of the coated materials by seven folds than the uncoated ones. Thus, the synthesized coated nanoparticles and microparticles can be effective drug delivery tools for the targeted and long term release of antitumor agents.

Reference

Horo, H., Bhattacharyya, S., Mandal, B., & Kundu, L. M. (2021). *Carbohydrate Polymers*, *258*, 117659. [IF: 7.182]

5. Lignocellulosic biomass to value-added products: Fundamental strategies and technological advancements. Mihir K. Purkait and Dibyajyoti Haldar. (2021) Elsevier, ISBN: 9780128235348. (BOOK)

The book is focused on the fundamental and advanced topics involved with the technologies for the conversion process of lignocellulosic biomass in a very easy to understand manner. Each and every concept's related to the utilization of biomass in the process of conversion is explained elaborately and importance is given to the minute details.The readers of this book will get to know everything on the field of lignocellulosic conversion from its basics to the current research accomplishments.

6. Production of Polyhydroxyalkanoates (PHA) from aerobic granules of refinery sludge and *Micrococcus aloverae* strain SG002 cultivated in oily wastewater

Production of polyhydroxyalkanoates (PHA) biopolymers in aerobic granules having mixed sludge and pure strain inoculum was studied while treating oily wastewater in aerobic granular reactors (AGRs). Small sized (0.71±0.04 mm)*Micrococcus aloverae* strain SG002 granules achieved 81.40±0.2% hydrocarbon removal efficiency accumulating 0.47±0.01 mg PHA/mg cell dry weight (CDW). Changing organic loading (0.6-1.8 kg COD/m^3.day) and high C/N (8-24) stimulated 0.71±0.04 mg PHA/mg CDW yield with 90±1% hydrocarbon removal in the refinery sludge granules. Long and short chain *n*-alkanes (C_{16}-C_{36}, C_6-C_{10}) were mostly transformed into PHAs. Granule extracted PHA was characterized as copolymer P(3HB-*co*-3HV)having 3.5-4.5 of butyrates and valerates (PHB:PHV) ratios.

Reference:

Sayanti Ghosh and Saswati Chakraborty (2020), International Biodeterioration & Biodegradation 155 : 105091. (IF: 4.074)

7. Synthesis of Highly Structured Spherical Ag@Pt Core-shell NPs using Bio-analytes for Electrocatalytic Pb(II) Sensing

We have successful devised a new bio-inspired method for the synthesis of seed-mediated Ag@PtNPs core-shell NPs using the bio-extract of *Psidium guajava* leaves and microwave irradiation. These NPs were successfully decorated on graphite support electrode for the electrocatalytic Pb(II) sensing. The Pb(II) deposition potential and deposition time on the Ag@PtNPs/graphite electrode for the square wave anodic stripping voltammetry were optimized to −1.2 V vs. Ag/AgCl (3 M KCl) and 300 s. The stripping potential was found to be −0.43 V vs. Ag/AgCl (3 M KCl) in 0.1 M acetate buffer solution (pH 5). The compressive lattice strain developed into Ag@PtNPs caused the enhancement of Pb(II) sensing with a sensitivity of 115.5 $\mu A \cdot \mu M^{-1} cm^{-2}$ (5.3 and 34.4 $\mu A \cdot \mu M^{-1} cm^{-2}$ for AgNPs and PtNPs catalysed sensors, respectively). The limit of detection was obtained as 0.8, 2.2 and 12.4 nM for the nanoparticles, respectively. Ag@PtNPs was highly selective towards different HMs, and it catalysed a distinct peak separation of Pb(II) from Cd(II), Cu(II), and Hg(II) ions (0.25−10 μM). Pb(II) present in river water, tap water, and sewage water was effectively determined in the presence of background cations, anions and soluble organics. Therefore, this work provides a platform for developing bio-inspired nanoparticles based electrochemical sensors that can be applied for the detection of HM ions.

Reference
Dash SR, Bag SS, Golder AK. Sensors and Actuators B: Chemical. 2020 Jul 1;314:128062.[I.F. 6.39]

8. A Systematic Review of the Efficacy and Safety of Favipiravir (Avigan) for the Treatment of Novel COVID-19 Infections (**Invited Tutorial Review**)

This review discusses the pathogenicity of the SARS-CoV-2 virus and the possibilities and promising results of
Favipiravir or its activated analog Favipiravir-RTP to treat COVID-19 disease based on its reported mechanism of RdRp inhibition. We have also discussed in detail the possible pharmacokinetic outcomes after being treated with Favipiravir. We have discussed reports and results from variousclinical trials of those conducted in the past with influenza and Ebolainfected patients and the recent trialswith COVID-19 patients. We believe that the information we represent shall be of importance to the scientific community and help conduct experiments and clinical trials. Through this review, we would like to draw attention that Favipiravir is an excellentdrug candidate, which can bring a cure to COVID-19 infection. However, medical practitioners have to be careful before administering Favipiravir in combination with other drugs.Finally, we would like to emphasize that worldwide scientists, particularly drug design oriented chemists should contribute more to the
development of effective and safe drug for COVID-19 beyond Avigan and Remdesivir
.
Reference
Bag SS, Sinha S, Saito I. 2020 Aug 24;8(8). (**Invited Tutorial Review**)

CONFERENCES/WORKSHOPS/SYMPOSIA ATTENDED

Sl. No.	Name of Faculty	Name of Conf./Workshop	Place	Date	International/ National
1.	Prof.SubhenduSekhar Bag	National Webinar on Academic Contribution of Shri ShriAnandamurtiji. Organized by Rajasthan University	Virtual	19/11/2020	National
2.	Prof. SubhenduSekhar Bag	National Webinar on Academic Contribution of Shri ShriAnandamurtiji. Organized by	Virtual	05/11/2020	National

		Renaissance Artists' and Writers' Association, Kolkata.			
3.	Ms. Deepti Nair (Prof. Mihir K. Purkait)	Conference on Advances in Chemical, Biological and Environmental Engineering	Virtual	23/04/2021 - 24/04/2021	International
4.	Ms.Udaratta Bhattacharjee (Prof. Ramagopal VS Uppaluri)	Recent Advances in Translational Research in Food Science and Technology	Virtual	16/10/2020	International
5.	Ms. Tinka Singh (Prof. Ramagopal VS Uppaluri)	Agriculture Research through Knowledge Discovery	Virtual	23/02/2021	National
6.	Ms. Deepti Nair (Prof. Mihir K. Purkait)	Recent Innovations in Chemical Engineering (RICE-2021)	Maulana Azad NIT, Bhopal Virtual	08/02/2021 - 09/02/2021	National
7.	Mr. Prabhat K. Patel (Prof. Ramagopal VS Uppaluri and Dr. Lalit M. Pandey)	Sustainable Energy & Environmental Practices (SEEP 2020)	Virtual NIT Silchar	05/06/2020 - 06/06/2020	National
8.	Mr. Aquib Jawed (Dr. Lalit M. Pandey Dr. King Hang Aaron Lau)	12th Scottish Symposium on Environmental Analytical Chemistry (Online mode)	Organized by Univ of Glasgow, Scotland and Sponsored by Royal Society of Chemistry, Analytical Division, Scottish Region	07/12/2020	International
9.	Mr. Vivek Singh Yadav (Dr. Lalit M. Pandey)	Online workshop on "Generating the Highest Level of Evidence through Systematic Review and Meta-analysis: Best Alternative for Hospital Based Projects During the Current Pandemic Situation"	Virtual (NIPER) Guwahati	28/08/2020 - 29/08/2020	National
10.	Mr. Rahul Verma (Dr. Lalit M.Pandey)	6th Int. Conference on Nanoscience and Nanotechnology	Virtual SRM, Chennai	01/02/2021 - 03/02/2021	International
11.	Ms. PayalMazumder (Prof.AjayKalamdhad)	Trade Waste and Wastewater management		08/05/2020	International
12.	Mr. Ravula Rajasekhar (Prof Tapas K. Mandal)	Recent Innovations in Chemical Engineering (RICE-2021)	Virtual Maulana Azad NIT, Bhopal	08/02/2021 - 09/02/2021	National
13.	Ms. Poulami Datta (Dr. Lalit M. Pandey and Dr. Pankaj Tiwari)	Chemical Research 2020: Int. Conference on Chemical Engineering and Chemistry	Virtual	08/12/2020 - 09/12/2020	International

14.	Ms. Poulami Datta (Dr. Lalit M. Pandey and Dr. Pankaj Tiwari)	"5th International Conference on Bioenergy, Environmental and Sustainable Technologies	Virtual Arunai Engineering College, Tamil Nadu	29/01/2021 - 30/01/2021	International
15.	Ms.Udaratta Bhattacharjee (Prof. Ramagopal VS Uppaluri)	Innovation Food Processing Technologies. Value addition, Food Safety and Security	Virtual Madhya Pradesh	29/06/2020 - 01/07/2020	International
16.	Ms.Udaratta Bhattacharjee (Prof. Ramagopal VS Uppaluri)	Green Technology in Food Processing	Virtual West Bengal	15/09/2020	National
17.	Ms.Udaratta Bhattacharjee (Prof. Ramagopal VS Uppaluri)	Sustainable Energy & Environmental Practices (SEEP 2020)	Virtual NIT Silchar	05/06/2020 - 06/06/2020	
18.	Ms.Udaratta Bhattacharjee (Prof. Ramagopal VS Uppaluri)	Agriculture Research through Knowledge Discovery	Virtual EBSCO information Sevices, Massachusetts) online	23/02/2021	National

INVITED LECTURES OF FACULTY: IN INDIA, ABROAD

Sl. No.	Name of Faculty	Name of Lecture	Name of Inst./Org.	Place	Date
01	Prof. Utpal Bora	Career Counselling and orientation program for higher secondary, graduate and scholarship applicants Title of the lecture: "Academics and Career"	SUHRID(MLA-LAD	Office of the MLA, Tamulpur LAC, Assam	06/09/2020
02	Prof. Utpal Bora	Online resource person in Refresher Course on "Disaster Management and Emergency Response (IDC) -05 Title of the Lecture: "Environmental Impact Assessment and Disaster Risk Reduction"	UGC-HRDC, Gauhati University	Gauhati University	10/10/2020
03	Prof. Utpal Bora	"Research Orientation Program" Title of the Lecture: "Research Ethics and Integrity"	Maharishi Markandeshwar Deemed University,Haryana	Mullana, Haryana	26/10/2020 - 31/10/2020
04	Dr.KrishnaPada Bhabak	Chemistry and Biology of Organochalcogen Compounds	Webinar conducted by NIT Manipur on 'Diversity in Catalytic Approaches')	Manipur (virtual)	27/10/2020 - 31/10/2020
05	Dr. Subhendu Sekhar Bag	Microvitum –In Quest Of An Unified Theory Of Natural Science	National Webinar on Academic	Virtual	19/11/2020

			Contribution of Shri ShriAnandamurtji. Organized by Rajasthan University		
06	Dr. Subhendu Sekhar Bag	Microvitum –A Possible Holistic Theory To Fill The Gaps In Science!	National Webinar on Academic Contribution of Shri ShriAnandamurtji. Organized by Renaissance Artists' and Writers' Association, Kolkata.	Virtual	05/11/2020
07	Prof. RamagopalVS Uppaluri	Pedagogy associated to Research Methodology	TEQIP	IIT Guwahati	06/11/2020 - 10/11/2020
08	Prof.Sanjukta Patra	Algae in environmental restoration and biomass valorization: An ecofriendly sustainable process	Indo-Sri Lanka International Webinar (ISW-21)- "Global trends in Algal Research: Environmental Restoration, Biomass Valorization and Sustainability	IIT Delhi virtual	08/03/2021 - 09/03/2021
09	Prof. RanjanTamuli	Environmental Genomics and Genome Editing	IIT Guwahati	Guwahati virtual	23/02/2021 - 27/02/2021
10	Prof. Utpal Bora	International Virtual Conference on "Biotechnology Towards Nutritional Security and Human Health, (ICBNH-2021)" Title of the Lecture:"Technology& Policy in Food Security"	Department of Biotechnology, Rama Devi Women's University, Bhubaneswar	Bhubaneswar (virtual)	04/03/2021 - 06/03/2021
11	Prof. Ajay Kalamdhad	Vermicomposting: hands on training	IIT Guwahati: Regional Coordinating Institute (RCI), Shishugram	Guwahati	09/11/2020

VISITORS FROM OTHER INSTITUTES/UNIVERSITIES/ORGANISATIONS/INVITED LECTURES

Sl. No.	Name	Name of Inst./Univ./Org.	Purpose/ Name of Lecture	Date
1	Dr. Jayanta Biswa Sarma	National Health Service, UK	Invited speaker "Online TEQIP-III workshop on "Environmental Genomics and Genome Editing"	23/02/2021 - 27/02/2021
2	Dr. Dinesh Kumar Principal Scientist	ICAR-Indian Agricultural Statistics Research Institute, New Delhi	Invited speaker " Online TEQIP-III workshop on "Environmental Genomics and Genome Editing"	23/02/2021 - 27/02/2021
3	Dr. Mir Asif Iquebal Senior Scientist	ICAR-Indian Agricultural Statistics Research Institute, New Delhi	Invited speaker "Online TEQIP-III workshop on "Environmental Genomics and Genome Editing"	23/02/2021 - 27/02/2021

SEMINARS/WORKSHOPS/CONFERENCES/SHORT-TERM COURSES ORGANISED

Sl. No.	Name of Faculty (Convener/ Co-ordinator, etc.)	Name of Sem./Wor./Con.	Funded By	Date	International/ National	No. of participants
01	Prof. Chandan Das	Workshop on "Recent Advances in Food Engineering in NE India"	KIT-TEQIP, CET, IIT Guwahati	17/12/2020 - 19/12/2020	National	25
02	Dr. Deepmoni Deka	60-IIRS Outreach programme on Application of geoinformatics in ecological studies	DOS-GOI (Distance learning programme)	13/07/2020 - 24/07/2020	National	11
03	Dr. Deepmoni Deka	61-IIRS Outreach programme on Satellite Photogrammetry and its applications	DOS-GOI (Distance learning programme)	29/06/2020 - 3/07/2020	National	25
04	Dr. Deepmoni Deka	63-IIRS Outreach programme on Remote Sensing applications in agricultural water management	DOS-GOI (Distance learning programme)	03/08/2020 - 07/08/2020	National	21
05	Dr. Deepmoni Deka	64-IIRS Outreach programme on Basics of remote sensing, geographical information systems and global navigation satellite system	DOS-GOI (Distance learning programme)	17/08/2020 - 20/11/2020	National	11
06	Prof. Utpal Bora	Workshop on "Environmental Genomics and Genome Editing"	KIT-TEQIP, CET, IIT Guwahati	23/02/2021 - 27/02/2021	National	40

PATENTS

No. of Patents Applied: 01
No. of Patents Granted: 01

Sl. No.	Name of Faculty and co researcher	Name	Date Applied/Granted	Application No.
01	Prof. Mihir Kumar Purkait and Ms. Deepti Nair	Separation of ion from rejected stream of industrial waste water	Applied 27/11/2018 Published 11/02/2021	201831044754

Report on the TEQIP sponsored online workshop on "Environmental genomics and genome editing"

TEQIP-III sponsored workshop on "Environmental genomics and genome editing" organised by Centre for the Environment, IIT Guwahati was successfully held from 23 February to 27 February 2021 through online mode. The purpose of the workshop was to introduce faculty members and young researchers from India to the exciting area of genomics and genome editing technologies and their applications in environmental research. This workshop aimed to make the participants learn key concepts and familiarized with the developments in techniques and tools of genomics and genome editing. It was also intended to make the participants aware of the scopes and potential applications of these technologies in ecology and environmental research. The five-day workshop included theoretical lectures on metagenomics and genome editing along with a hand-on-training on metagenomics data analysis with bioinformatics.

There were around 50 participants from different TEQIP III mapped and non-TEQIP institutes across India registered for the workshop. It was attended by 23 faculty members and 25 research scholars. There were six faculty members and one research scholar from non-TEQIP institution who participated in the workshop.

The inauguration ceremony of the workshop was jointly organised with another TEQIP Cell event, short-term course on "Intellectual Property Rights for Academic and Research Institutions" on 23rd February 2021 at 9.15 AM. The inauguration event started with a welcome address by Prof. Utpal Bora, co-ordinator, "Environmental genomics and genome editing" and Head of the Centre for the Environment. The gathering was also addressed by Prof. Karuna Kalita, co-ordinator for "Intellectual Property Rights for Academic and Research Institutions". The guest of Honour of the event, Prof. Hemant B. Kaushik, Head of Centre for Educational Technology (CET), IIT Guwahati in his speech highlighted the various activities undertaken by CET. The Chief Guest of the inauguration ceremony was Prof. T. G. Sitharam Director, IIT Guwahati. He motivated the participants and wished the organisers a successful workshop and a short-term course in his speech. Prof. S. Senthilvelan, Head of Department of Mechanical Engineering and Prof. G. Krishnamoorthy, Dean of Industrial Interactions and Special Initiatives (IISI) also addressed the participants. Prof. Karuna Kalita delivered the vote of thanks for the event.

The lecture sessions of the workshop started at 10:00AM on 23th February, 2021 and it ended on 27 February at 5:30PM.Four sessionswere conducted on each day of the workshop. There were a total number of 20 sessions of one and half hours each which included 6 theoretical lectures on genome editing, 7 theoretical lectures on metagenomics and 6 hand-on-training and practical sessions on metagenomics data analysis. The theory lectures on genome editing and it's application in environmental research was delivered by Prof.Utpal Bora. The theory lectures on various aspects of environmental metagenomics were delivered by in-house experts Prof. RanjanTamuli from Department of Biosciences and Bioenginering, IIT Guwahati, Dr.Jayanta Biswa Sarma, Honorary faculty of Centre for the Environment, IIT Guwahati and external expert Dr. Dinesh Kumar, Principal Scientist, ICAR- Indian Agricultural Statistics Research Institute, New Delhi. There was also a special lecture session on pedagogy delivery by Prof.Ananthakrishnan Srinivasan, Department of Physics, IITGuwahati. The practical sessions

on hand-on-training on metagenomics data analysis were conducted by external experts Dr. Dinesh Kumar and Dr. Mir Asif Iquebal from ICAR- Indian Agricultural Statistics Research Institute, New Delhi.They were assisted by Jon Jyoti Kalita, Adhiraj Nath and Biju Bharali PhD students from IIT Guwahati.

The valedictory function of the workshop was held at 5:45PM on 27 February 2021. The guest of honour of the event was Dr. Dinesh Kumar. The chief guest of the event was Prof.Ananthakrishnan Srinivasan. The event was also attended by Dr.Sarika Jaiswal and Dr. Mir Asif Iquebal from ICAR- Indian Agricultural Statistics Research Institute, New Delhi as invited guests. The event started with participants sharing their feedback on the workshop followed by speeches by Dr.Jaiswal, Dr.Iquebal, Dr. Kumar and Prof. Srinivasan. The event came to an end with vote of thanks delivered by Prof. Utpal Bora.

Report on the TEQIP sponsored workshop on "Recent Advances in Food Engineering in North-East India"

TEQIP III sponsored Workshop on "Recent Advances in Food Engineering in North-East India" was organized by Centre for the Environment, IIT Guwahati during 17-19th Dec, 2020. At the very onset course coordinator Prof. Chandan Das gave an overview of the objective and technical sessions of the event. The main aim of the course is inter-disciplinary approach to address conventional and frontier research problems in food science and technology with special emphasis upon translational research themes applicable for the North-eastern region of India. The lectures were delivered by eminent experts from IITs, Tezpur University and Guwahati University Institute of Science & Technology.

Lectures on application of supercritical fluid in the food processing, separation of high value bioactives from herbs and plants; fermented dairy products, pine apple juice clarification and *Rebaudioside A* separation by membrane; grain processing giving emphasis on rice are delivered during the sessions.

Research pedagogy was elaborated extensively which will definitely help the researchers, leafy vegetable mix soup formulations was presented nicely. In the application point of view, the operation of single as well as double screw extruder were demonstrated by using video; polymeric hydrogel film using digital micrometre film applicator was demonstrated. The course was designed to benefit faculty members as well as young researchers. The goal was to provide theoretical knowledge as well as hands-on training with special focus on their applications.

AWARDS AND HONOURS

- Dr. Subhendu Sekhar Bag: Elected as Chartered Chemist (CChem) by Royal Society of Chemistry, Londan, UK
- Dr. Subhendu Sekhar Bag: Received the Global Faculty Award 2020 (GFA20IN0767) from AKSEducation Awards AKS Worldwide Pvt. Ltd.
- Dr. Subhendu Sekhar Bag: Received the Dr. A. P. J. Abdul Kalam Lifetime International Award from IRDP Group of Journal

STUDENTS' ACHIEVEMENTS

- Jinat Aktar: Best Poster in 6th Int. Conf on Nanoscience and Nanotechnology (virtual) at SRM Institute of Science and Technology
- Poulami Dutta: Best oral presentation at Arunai Engineering College, Tamil Nadu, India
- Himadree Das: Prime Minister's Research Fellow (Lateral entry, May 2020 scheme) from MHRD, Govt of India
- Aniket Banerjee: Prime Minister's Research Fellow (Lateral entry, May 2020 scheme) from MHRD, Govt of India

- Sayantan Sinha: Member of the Royal Society of Biology (MRSB), London, UK
- Sayantan Sinha: Certificate of Honor for Best Research Paper Presentation from IIT Guwahati in association with Indian International Science Festival, GOI
- Sayantan Sinha: DST-BRICS Young Scientist Fellow from BRICS-YSF & DST, GOI
- Sayantan Sinha: InSc Research Excellence Award from Institute of Scholars

SPECIAL MENTION

- Dr. Jayanta B Sarma, Lead Consultant Microbiologist, Mid Yorkshire Hospitals, NHS trust, Wakefield England has been appointed as Honorary faculty in Centre for the Environment, IIT Guwahati from 21/10/2020.
- Prof. Subhendu Sekhar Bag has received the prestigious award CChem designation from the Royal Society of Chemistry for his outstanding academic, professional, research contributions in the field of Chemical Sciences and Chemical Biology. Honorable Minister of Education Dr. Ramesh Pokhriyal Nishank congratulated Prof. Bag for this great achievement. The Ministry of Education also congratulated Prof. Bag for this outstanding achievement.
- Dr. Jyoti Kainthola has been awarded best thesis award from Centre for the Environment in the year 2020. She carried out her research work under the guidance of Prof. Ajay Kalamdhad and Prof. V.V. Goud. She has published 8 research articles (first author) in reputed peer reviewed journals along with one book chapter during her PhD period.
- Prof. Utpal Bora of Department of BSBE, IIT Guwahati has joined as new Head of Centre for the Environment on 01 February, 2021 for a period of 3 years.

FACULTY MEMBERS

Sl. No.	Name	Name of the University/Institute /Org PhDdegree received from	Designation	Areas of Interest
1.	Bag S. Subhendu	IIT Kharagpur	Professor	Chemical Biology, Environmental Nanotechnology. Bionanotechnology, Nanomedicine, Sensor development, Bioorganic Chemistry and Chemistry of Unnatural Nucleic Acid and Peptides
2.	Barua Anamika	University of Leeds, UK	Professor	Socio-economic understanding of climate risk and resilience, urban living and sustainable cities
3.	Bhabak Pada Krishna	Indian Institute of Science, Bangalore, India	Assistant Professor	Design and Synthesis of Potential Bio-active Organic Compounds, Anti-cancer and Antioxidative Properties of Synthetic Organic Compounds, Selective Fluorescent Delivery Agents for Anti-cancer Compounds, Understanding their Behavior at Cellular Environment
4.	Bora Utpal	Institute of Genomics & Integrative Biology, Delhi (degree awarded by GGS Indraprastha University, Delhi).	Professor	Biodiversity, Ecology, Environmental Informatics, Environmental Policy
5.	Chakraborty Saswati	IIT Mumbai	Professor	Water and Wastewater Treatment, Biodegradation of Industrial Wastewater and Removal of Heavy Metals from Wastewater

6.	Chaturvedi Rakhi	University of Delhi, Delhi, India	Professor	Micro and Clonal-propagation of elite medicinally and economically valuable plants for mass multiplication, In vitro Double-haploid and Triploid production, Cytological and Histological studies of in vitro raised cultures to understand their development and origin, Somatic-embryogenesis for synthetic seed production, Protoplast isolation and regeneration for single cell cloning and isolation of mutants, Selection of elite cell lines for high yield of Secondary Metabolites of industrial importance
7.	Das Chandan	IIT Kharagpur	Professor	Membrane based separation technology, Bioremediation using *SpirulinaPlatensis*, blue-green microalgae, Supercritical fluid extraction for the production of peonidin, peonidin 3-glucoside and cyanidin 3-glucoside from black rice and 6-gingerol, vitamin C content, essential oil content from ginger of North East India of North East India, Natural products, namely, aloe vera, polyphenol, stevia, lycopene extraction and purification
8.	Das Gopal	IIT Kanpur	Professor	Supramolecular, Bioorganic chemistry and Biomineralization.
9.	Dasu V. Venkata	IIT Madras	Professor	Bioprocess development (upstream to downstream), Metabolic Engineering, Bioenergy.
10.	Dutta M. K.	Gauhati University	Professor	Microeconomics, Agricultural Economics, Environmental Economics, Econometrics
11.	Dutta Subashisa		Professor	Satellite Remote Sensing and GIS for Water resources Management, Computational river hydraulics and its applications, Watershed and Irrigation Management
12.	Ghosh Pranab Kumar	IIT Kharagpur	Professor	Water treatment for domestic and industrial use, Domestic and Industrial wastewater treatment and Sludge treatment by physicochemical and biological process.
13.	Gokhale Sharad	IIT Delhi	Professor	Urban Vehicular Pollution,Industrial Stack Pollution,Indoor Air Pollution,Environmental Impact Assessment, Air Quality Modeling
14.	Golder K. Animes	IIT Kharagpur	Professor	Electro- and bio-remediation of heavy metals, Physiochemical water treatment techniques, Homogeneous and heterogeneous catalytic AOPs, Extraction and separation of value added chemicals from natural sources
15.	Goud Vaibhav V.	IIT Kharagpur	Professor	Heterogeneous Reactions, Bio-energy and Green Engineering, Bio lubricant, Utilization of Lignocellulosic Biomass for Fuel/Chemicals, Supercritical Fluids
16.	Goyal Arun	IIT Kanpur	Professor	Molecular Biology, Protein Engineering, Structural and Functional Proteomics of Carbohydrate

				active enzymes and other industrial microbial enzymes.
17.	Jawed Mohammad	IIT Kanpur	Professor	Biological Processes, Anaerobic Wastewater Treatment, Heavy Metal Removal and Recovery, Water Treatment and Supply, Domestic & Industrial Wastewater Treatment
18.	Kalamdhad Ajay	IIT Roorkee	Professor	Solid waste management, mechanical composting and vermicomposting, analysis of solid wastes, water and waste water Treatment
19.	Kundu Lal Mohan	LMU Munich, Germany	Associate Professor	Nucleic Acid / Peptide Chemistry, DNA / RNA Damage and Repair, DNA Hybrid Materials.
20.	Mahanta Chandan	JNU, New Delhi	Professor	Water Quality, Sediment Dynamics in Fluvial Systems, Environmental Impact, Risk Assessment and Management, Environmental Geo-informatics, Engineering Geology.
21.	Majumder Subrata Kumar	IIT Kharagpur	Professor	Process Intensifications in Chemical Processes, Intensification in environmental process system, Micro-nano bubble science and technology and its applications, Microchannel-based and Jet driven gas-aided extraction, Mineral Beneficiation, Enhanced Oil Recovery by Micro-nanobubble , Multiphase Flow and Reactor Development
22.	Mandal Bishnupada	IIT Kharagpur	Professor	Separations with chemical reaction, Molecular based membrane separation, Modeling and simulation of separation processes, Environmental pollution control.
23.	Mandal Tapas Kumar	IIT Kharagpur	Professor	Multiphase flow & Measurement in multiphase flow, Bio-diesel
24.	Mohanty Kaustubha	IIT Kharagpur	Professor	Bio separation, Biofuels, Biological wastewater treatment, Membrane technology, Ionic liquids
25.	Moholkar S. Vijay	University of Twente, Netherlands	Professor	Bubble dynamics, CFD, Sono-process engineering, Bio-mass gasification
26.	Mukherjee Chandan	Max-Planck Institute for Bioinorganic Chemistry, Muelheim, Germany	Professor	Oxidation Catalysis , Molecular Magnetism, Synthesis of Single-Molecule Magnets (SMMs), MRI Contrast agents, Water Oxidation Chemistry
27.	Pakshirajan Kannan	IIT Madras	Professor	Biological removal and recovery of inorganic compounds from wastewaters; Biological treatment of industrial wastewaters; Biodegradation of xenobiotic, Biofuels and other Biotechnological Products: Production; Process design, kinetics and optimization; Environmental applications
28.	Pandey M. Lalit	IIT Delhi	Associate Professor	Surface and interfacial science particularly in the area of Bio-interfaces and

				Biomaterials ***(****Design of Biocompatible surfaces****)***
29.	Patra Sanjukta	Central Food Technological Research Institute, Mysore	Professor	Enzyme and microbial technology, Metagenomics, Biosensors, Environmental Biotechnology
30.	Patel K. Bhisma	IIT Kanpur	Professor	Bio-Organic Chemistry and Newer Methodologies, Green Chemistry, Heterocyclic Chemistry
31.	Pugazhenthi. G	IIT Kanpur	Professor	Membrane Separation Process, Polymer Nanocomposite, Nanomaterials, Adsorption, Wastewater Treatment
32.	Purkait M. K.	IIT Kharagpur	Professor	Membrane Technology , preparation/fabrication of ceramic/ polymeric membranes and their application in RO, NF, UF and MF), Treatment of Industrial Effluent Surfactant mediated separation, Responsive materials for environmental, biological and chemical separation
33.	Ramesh A.	CFTRI, Mysore	Professor	Nanobiotechnology, Chemistry-Biology Interface for Developing Antibacterials and Sensors
34.	Ray Manabendra	IIT Kanpur	Professor	Design and synthesis of coordination complexes or assemblies of complexes with chiral ligands to use as chiral host to facilitate binding and separation of chiral molecules.
35.	Saini K. Gurvinder	Andhra University, Vishakapatnam	Professor	Fungal Biotechnology
36.	Sarma Arup Kumar	Gauhati University	Professor	Modeling & simulation in Free Surface Flow, Heuristic Method in Reservoir Optimization, GIS based Watershed Modeling
37.	Sastri V. Chivukula	University of Hyderabad	Professor	Biomimetic Chemistry and Chemical Biology
38.	Senthilmurugan S	IIT Delhi	Associate Professor	Modeling & Optimization of Novel Processes, Process Design & Operation of Membrane Separation Processes, waste water treatment for Process Industries, Novel Desalination Technologies, Smart Water Grid, Waste to Energy
39.	Sivaprakasam K. Senthil	Central Leather Research Institute, Chennai, India.	Associate professor	Biocalorimetry, Bio-Process Analytical Technology (BioPAT) (synthesis of recombinant proteins and value-added bioproducts), Real-time monitoring and control of bioprocess systems (BioPAT) (Biocalorimetry, Dielectric Spectroscopy and Exhaust Gas Analyzer), Mathematical modeling of bioprocess systems, Monitoring and control of environmental bioprocess systems leading to value-added products
40.	Tamal Banerjee	IIT Kanpur	Professor	Phase equilibria of ionic liquids, Molecular simulations, Global optimization, Statistical thermodynamics.
41.	Tamuli Ranjan	Centre for Cellular and Molecular	Professor	Environmental impact on cell signaling, genetics and DNA repair

		Biology, Hyderabad, Degree awarded by JNU, New Delhi.		
42	Tiwari Pankaj	University of Utah, Salt Lake City, USA, 2012	Associate Professor	Conventional and unconventional energies, Reservoir Engineering, Complex organic solids, Biomass conversion, Pyrolysis process, Kinetic analysis.
43	Uppaluri Ramagopal VS	University of Manchester, England	Professor	Electroless Plating, Evolutionary Engineering Optimization, Low Cost Ceramic Membranes, Microfiltration, Bio-systems Engineering, Polymer-natural fiber composites.