

CHANDAN MAHATA

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CAREER SUMMARY

A highly motivated, analytical, and investigative Chemical Engineer turned into a Biotechnologist with hands-on experience from lab scale to pilot scale fermentation, currently pursuing a doctoral degree in Agricultural & Biological Engineering at the University of Illinois at Urbana-Champaign.

RESEARCH INTEREST

Bioprocess & bioproduct development, metabolic engineering, waste valorisation & bioenergy generation, CO₂ sequestration & resource recovery, sustainable feed/food production

EDUCATION

University of Illinois at Urbana-Champaign (UIUC)

August 2023 – Present

Urbana, Illinois, United States of America

Doctor of Philosophy, Agricultural & Biological Engineering

Thesis (provisional): Precision fermentation for the production of high-value commodities using genetically modified microorganisms.

Advisor: Prof. Vijay Singh

Indian Institute of Technology (IIT) Kharagpur

July 2017 – October 2021

Kharagpur, West Bengal, India

Master of Science (Research), Biochemical Engineering

Thesis: Process intensification for biofuels production from organic waste: a biorefinery approach

Advisor(s): Prof. Debabrata Das & Prof. Subhabrata Ray

National Institute of Technology (NIT) Durgapur

July 2011 – July 2015

Durgapur, West Bengal, India

Bachelor of Technology, Chemical Engineering

Thesis: Growth study of micro-bubble in an inviscid, incompressible fluid in Natural Circulating Boiling Loop (NCBL)

Advisor: Dr. Swapan Paruya

JOURNAL PUBLICATIONS ([GOOGLE SCHOLAR](#) Citation 400+, H-index 10)

- Liu M., **Mahata C.**, Wang Z., Kumar S., Zheng Y. (2024) Comparative exploration of biological treatment of hydrothermal liquefaction wastewater from sewage sludge: Effects of culture, fermentation conditions, and ammonia stripping. *Journal of Environmental Management* 349, 119527 [Link](#)
- **Mahata C.**, Dhar S., Ray S., Das D. (2023) Biohydrogen production from starchy wastewater in upflow anaerobic sludge blanket (UASB) reactor: Possibilities toward circular bioeconomy. *Environmental Technology & Innovation* 30, 103044 [Link](#)
- **Mahata C.**, Mishra S. Dhar S., Ray S., Mohanty K., Das D. (2023) Utilization of dark fermentation effluent for algal cultivation in a modified airlift photobioreactor for biomass and biocrude production. *Journal of Environmental Management* 330, 117121 [Link](#)
- Khan S., Das P., Thaher M., AbdulQuadir M., **Mahata C.**, Al-Jabri H. (2023) Utilization of nitrogen-rich agricultural waste streams by microalgae for the production of protein and value-added compounds. *Current Opinion in Green and Sustainable Chemistry* 41, 100797 [Link](#)
- Khan S., Das P., AbdulQuadir M., Thaher M., **Mahata C.**, Sayadi S., Al-Jabri H. (2023) Microalgal feedstock for biofuel production: recent advances, challenges, and future perspective. *Fermentation* 9(3), 281 [Link](#)
- Khan S., Das P., AbdulQuadir M., Thaher M., Nagappan S., **Mahata C.**, H. Hawari A., Al-Jabri H. (2022) A comparative physicochemical property assessment and techno-economic analysis of biolubricants produced using chemical modification and additive-based routes. *Science of The Total Environment* 847, 157648 [Link](#)

- **Mahata C.**, Das P., Khan S., Thaher M., AbdulQuadir M., Nagappan S., Al-Jabri H. (2022) The potential of marine microalgae for the production of food, feed, and fuel (3F). *Fermentation* 8(7), 316 [Link](#)
- Nagappan S., Das P., Thaher M., AbdulQuadir M., Khan S., **Mahata C.**, Al-Jabri H. (2021) Digestibility of nutrients and energy in microalgae for aquatic organisms. *Sustainability* 13(23), 13211 [Link](#)
- Nagappan S., Das P., AbdulQuadir M., Thaher M., Khan S., **Mahata C.**, Al-Jabri H., Vatland A. K., Kumar G. (2021) Potential of microalgae as a sustainable feed ingredient for aquaculture. *Journal of Biotechnology* 341, 20 [Link](#)
- **Mahata C.**, Dhar S., Ray S., Das D. (2021) Effect of thermal pretreated organic wastes on the dark fermentative hydrogen production using mixed microbial consortia. *Fuel* 284, 119062 [Link](#)
- **Mahata C.**, Dhar S., Ray S., Das D. (2021) Flocculation characteristics of extracellular polymeric substance (EPS) obtained from anaerobic sludge extracted by different methods on microalgae harvesting for lipid utilization. *Biochemical Engineering Journal* 167, 107898 [Link](#)
- Yadav S., Singh V., **Mahata C.**, Das D. (2021) Optimization for simultaneous enhancement of biobutanol and biohydrogen production. *International Journal of Hydrogen Energy* 46 (5), 3726-3741 [Link](#)
- **Mahata C.**, Ray S., Das D. (2020). Optimization of dark fermentative hydrogen production from organic wastes using acidogenic mixed consortia. *Energy Conversion and Management* 219, 113047 [Link](#)

BOOK CHAPTER

- **Mahata C.**, Das D. (2022) Current status and prospects of biohydrogen production. In *Microbial Biotechnology for Renewable and Sustainable Energy*, Springer-Nature [Link](#)

INVITED TALKS

- **Mahata C.** 'Biohydrogen: a step toward sustainable future' February 24, 2023, Biological Systems Engineering, Virginia Tech
- **Mahata C.** 'Biohydrogen production from organic waste using mixed consortia' November 02, 2021, Centre for Sustainable Development Scientific Seminar, Qatar University

CONFERENCE PRESENTATION

- Umeda I. ^{**}, Liu M., **Mahata C.**, Wang Z., Yoon J., Kumar S. 'Optimization of biocrude yield and generated wastewater biodegradability in hydrothermal liquefaction of corn stover' AIChE Annual Meeting 2023 (November 5- 10, 2023), Orlando, FL, USA. **ORAL**
- **Mahata C.** ^{**}, Dhar S., Das D. 'Microalgal biofuel production using dark fermentative spent wash: a scale-up approach' Research Scholar Day 2020 (February 28, 2020), P K Sinha Centre for Bioenergy, and Renewables, IIT Kharagpur, India.

POSTER

- **Mahata C.** ^{**}, Das D. 'Optimization of dark fermentative hydrogen production by mixed consortia using artificial intelligence and statistical approach' International Conference on "Application of Biotechnology in Industry and Society (ABIS 2019)" (November 14-16, 2019), NIT Jalandhar, India. **ORAL**
- **Mahata C.**, Dhar S. ^{**}, Das D. 'Scale-up of photo-bioreactor for mixotrophic microalgae cultivation using dark fermentative spent wash' International Conference on "Application of Biotechnology in Industry and Society" (November 14-16, 2019), NIT Jalandhar, India. **ORAL**
- **Mahata C.** ^{**}, Dhar S., Das D. 'Mixotrophic cultivation of microalgae for biofuel production using dark fermentative spent wash' DBT National Workshop on Bioenergy (October 17-18, 2019), Kolkata, India. **POSTER**
- **Mahata C.** ^{**}, Balachandar G., Das D. 'Hydrogen production from organic wastes using *Klebsiella pneumoniae* IIT-BT08' 22nd World Hydrogen Energy Conference (WHEC) (June 17-22, 2018), Rio de Janeiro, Brazil. **ORAL**

^{**} Presenting author

HONORARY (TECH LICENSE TRANSFER AGREEMENT)

Dhampur Sugar Mills Limited, Uttar Pradesh, India
Visiting Researcher

June 2019 – July 2019

- Supervised the preliminary R&D work for biohydrogen production from cane molasses-based distillery effluent on the basis of technology transfer agreement (My advisors have given the license to the industry for the process)

- Trained the R&D personnel to culture hydrogen-producing bacteria and operate different reactor setups.

TECHNICAL SKILLS

Lab/Research Processes: Fermentation, Cell Cultures (bacteria, yeast, microalgae, fungus), Bioreactor Operation & Process Optimization, Biochemical Analysis

Instrumentation: Fermenters (lab to pilot), GC (TCD & FID), TOC analyser, HACH

Data Analysis & Computation: MATLAB, Minitab, MS Excel, OriginPro

Applications: Canva, ANSYS Fluent, AutoCAD, SuperPro Designer

Material Characterization: SEM-EDX, FTIR, XRD, ICP-MS, CHNS, Particle Size, Zeta Potential

RESEARCH EXPERIENCE

Agri. and Biological Engineering, UIUC, Urbana, Illinois, USA

August 2023 – Present

Graduate Research Assistant (GRA), PI: Prof. Vijay Singh

- Optimizing bench scale fermentation process for the production of succinic acid.
- Developing green and sustainable downstream processing for 3-HP recovery.
- Formulating mixed microbial consortium for food grade biomass production.

Biological Systems Engineering, Virginia Tech, Blacksburg, Virginia, USA

January 2023 – August 2023

Graduate Research Assistant (GRA), PI: Dr. Zhiwu (Drew) Wang

- Maintained the growth of white-rot fungus and aerobic granules.
- Employed physicochemical processes to mitigate the inhibition effect on biological treatment.
- Performed preliminary studies to develop continuous flow aerobic granular reactor.
- Managed project meetings with collaborators from Kansas State University and Old Dominion University
- Drafted two manuscripts and co-authored a collaborative article.

Center for Sustainable Development, Qatar University, Doha, Qatar

March 2021 – December 2022

Research Assistant, PI: Dr. Probir Das

- Operated different scale photobioreactors including 25 m³ algal raceway ponds.
- Harvested microalgal culture from raceway ponds.
- Formulated fish-feed using microalgal (five different strains) biomass as an ingredient.
- Performed techno-economic analysis to develop a cost-effective biorefinery.
- Maintained algal culture and analyzed biomass.
- Prepared project reports and manuscripts for journal publications

Bioprocess Engineering Lab, IIT Kharagpur, Kharagpur, West Bengal, India

November 2020 – December 2020

Project Assistant, PI: Prof. Debabrata Das

- Cultivated microalgae using different photobioreactors for hydrothermal liquefaction (HTL) process.
- Handled tender files for purchasing new instruments.

Bioprocess Engineering Lab, IIT Kharagpur, Kharagpur, West Bengal, India

September 2016 – June 2020

Junior Research Fellow, PI: Prof. Debabrata Das

- Operated different scale bioreactors and photobioreactors including 10 m³ fermenter for dark fermentative hydrogen production.
- Optimized physicochemical parameters for enhanced biohydrogen production using RSM and Artificial Intelligence (AI)
- Developed a mixed consortium for biohydrogen production.
- Characterized pretreated lignocellulosic materials using SEM-EDX, XRD and FTIR spectra.
- Conducted 3rd year undergraduate lab practical classes (Biochemical Engineering Lab)
- Conducted tutorial classes (Aspects of Biochemical Engineering) for undergraduate (2nd year) & postgraduate students (1st year)
- Analysed microbial kinetic data for bacteria, yeast, and microalgae.
- Experienced in bioethanol production from algal biomass using yeast culture.
- Developed a novel photobioreactor for microalgae cultivation.

- Experienced in chemical analysis (for biomass and wastewater) such as COD, protein, fatty acids, carbohydrate, nitrate, phosphate, ammonium estimation.
- Operated gas chromatography (TCD & FID) for the analysis of hydrogen gas, volatile fatty acids, and algal lipid profile.

Bioprocess Engineering Lab, IIT Kharagpur, Kharagpur, West Bengal, India

May 2016 – August 2016

Project Research Assistant, PI: Prof. Debabrata Das

- Assisted and managed the fabrication and installation process of 10 m³ bioreactor along with several utilities.
- Operated the reactor to explore commercial production of biohydrogen *via* dark fermentation.

TEACHING EXPERIENCE

NPTEL, MHRD, India

July 2017 – October 2018

Teaching Assistant, Instructor: Prof. Debabrata Das

Courses: [Industrial Biotechnology \(Fall 17\)](#), [Aspects of Biochemical Engineering \(Spring 18\)](#), [Industrial Biotechnology Rerun \(Fall 18\)](#)

- Prepared study materials and formulated assignment questions and weekly quizzes along with detailed solutions
- Monitored the student discussion forum by responding to queries within twenty-four hours.
- Involved in the lecture video recording and editing.
- Assisted the course coordinator during the live session for the interaction with students.

NPTEL: National Programme on Technology Enhanced Learning

MHRD: Ministry of Human Resource Development

PROFESSIONAL EXPERIENCE

Mineral Lab Service Pvt Ltd, Jaigad Port, Maharashtra, India

March 2016 – May 2016

Lab Trainee, Inspection Service Section

- Inspected mineral commodities include all minerals and ores few are iron ore, bauxite, alumina, coal, coke and pet-coke, ferroalloys, along with chemicals and agriproducts.

Elpenor Digital Agency, Kolkata, West Bengal, India

August 2015 – February 2016

Junior Research Analyst, Business Analytics and Reporting

- Provided quality writing services as per the requirement of the esteemed clients.

VOLUNTEERING EXPERIENCE

CRY – Child Rights and You, IIT Kharagpur, Kharagpur, West Bengal, India

September 2017 – September 2019

Volunteer (Teams: Project Baalrakshak, Pathshala)

- Conducted workshops on Child Sexual Abuse (CSA) with kids, parents, and teachers in rural as well as urban places.
- Organized school sessions, field activities to educate underprivileged children.
- Participated in a training cum internship on child and adolescent counselling.

ACADEMIC SERVICES

Peer-Reviewer

- Scientific Reports (Nature)
- Fish Physiology and Biochemistry (Springer)
- 3 Biotech (Springer)
- Microbial Cell Factories (BMC)
- Process Safety and Environmental Protection (Elsevier)
- Environmental Chemistry and Ecotoxicology (Elsevier)

Verify at ORCID: [0000-0002-7974-3012](https://orcid.org/0000-0002-7974-3012)

GRANT/FELLOWSHIP

- *Junior Research Fellowship* from Department of Biotechnology, India (PAN IIT Project) during my MS degree at IIT Kharagpur (Project code: ICB3)
- *Foreign Travel Grant* by IIT Kharagpur

PROFESSIONAL MEMBERSHIP

- American Institute of Chemical Engineers
- American Society of Agricultural and Biological Engineers
- Society for Biological Engineering
- Institute of Food Technologists

WORKSHOP PARTICIPATED (SELECTED)

- **'Recent Advances in Bio-cementation Technology (INDO – AUS Workshop)'**, January 04 – 05, 2020, SPARC Program organized by Prof. Ramkrishna Sen (Biotechnology Dept.), IIT Kharagpur, India
- **'Sustainable Bio-refinery for Waste Valorization (INDO – US Workshop)'**, January 02 – 03, 2020, SPARC Program organized by Prof. Ramkrishna Sen (Biotechnology Dept.), IIT Kharagpur, India
- **'Multiscale Modelling Approach in Micro/Nano-Fluidics'**, December 09 – 10, 2019, SPARC Program organized by Prof. Suman Chakraborty (Mechanical Engineering Dept.), IIT Kharagpur, India
- **'Technical Report Writing using LaTeX'**, June 03, 2019, Electrical and Electronics Engineers, IIT Kharagpur, India
- **'Python for Data Science'**, March 03, 2019, Indian Cyber Security Solutions, IIT Kharagpur, India
- **'AutoCAD 3D workshop at SAMUDRAMANTHAN'**, March 30-31, 2018, Edubloc saltyART Design, IIT Kharagpur, India
- **'Introduction to Machine Learning'**, March 18, 2018, Neurapses Technologies, IIT Kharagpur, India
- **'The recent developments in Microbial Fuel Cell and Membrane Bioreactor Technology (INDO – EU Workshop)'**, February 02-03, 2018, IIT Kharagpur, India
- **'Introduction to Python'**, August 16-19, 2017, Institute of Electrical and Electronics Engineers, IIT Kharagpur, India