

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 valorization & 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 (Senior year): 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 600+, H-index 10)

- Anand A., **Mahata C.**, Mohalkar VS. (2024) Biohydrogen synthesis from food waste hydrolysate: Optimization using statistical design of experiments (DoE) and artificial neural network (ANN). *Biomass and Bioenergy* 191, 107452 [Link](#)
- Ahuja V., Kumar P., **Mahata C.**, Jeon J-M., Kumar G., Yang Y-H., Bhati S.K. (2024) A review on microbes mediated resource recovery and bioplastic (polyhydroxyalkanoates) production from wastewater. *Microbial Cell Factories* 23(1), 1-22 [Link](#)
- 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 CHAPTERS

- Rathinavel L., Ravikumar Y., Jothinathan D., Paul S.J., Pandey A., **Mahata C.** (2024) Extraction and enrichment of fatty acids from marine microalgae. In *Marine Molecules from Algae and Cyanobacteria*, Elsevier [Link](#)
- Olugbemide A.D., Ifijen I.H., **Mahata C.**, Vicente F.A., Likoza B. (2024) Valorization of deep eutectic solvent pretreated lignocellulosic biomass for improved biogas production. In *Solid Waste Management in Delta Region for SDGs Fulfillment*, Springer-Nature [Link](#)
- **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

- **Mahata C.** ^{††}, Mishra S., Singh V. Color removal from fermentation broth using powder activated carbon for the recovery of succinic acid. *ASABE Annual Meeting 2024* (July 28- 31, 2024), Anaheim, CA, USA. **POSTER**
- 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

OUTREACH (TECH LICENSE AGREEMENT)

Dhampur Sugar Mills Limited, Uttar Pradesh, India

June 2019 – July 2019

Visiting Researcher

- Supervised the preliminary research 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, Biorender, 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 (pellet) 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.
- 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 & MENTORSHIP EXPERIENCE

Undergraduate Research in Scientific Advancement, UIUC

September 2024 – Present

Mentor

- Providing wet lab training to UG students focusing on biosuccinic acid production from renewables

NPTEL, Ministry of Education, 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

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)
- Frontiers in Industrial Microbiology (Frontier)
- 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