

# 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, CO<sub>2</sub> 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 700+, H-index 11)

- 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., Bhatia 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](#)

#### BOOKS

- Singh M.P., El-Sheekh M., **Mahata C.**, Pandey A. *Algae: A Promising Source of Food, Feed and Bioproduct*, Springer Nature (In Press) **Edited**

#### BOOK CHAPTERS

- Rai C., Thakur T., **Mahata C.**, Bhui B., Sharma P. (2025) Energy recovery from solid waste-recent approaches. *In Solid Waste Management*, Springer Nature [Link](#)
- 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.** <sup>††</sup>, 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**
- **Mahata C.** <sup>††</sup>, Mishra S., Singh V. Unlocking Sustainable Biomanufacturing: Scale-up Bioreactor Studies. *CABBI Retreat Meeting 2024* (July 24- 26, 2024), Champaign, IL, USA. **POSTER**
- Umeda I. <sup>††</sup>, 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. <sup>\*\*</sup>**, 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. <sup>\*\*</sup>**, 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. <sup>\*\*</sup>**, 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. <sup>\*\*</sup>**, 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. <sup>\*\*</sup>**, 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**

<sup>\*\*</sup> 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, NMR, 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 m<sup>3</sup> 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 m<sup>3</sup> 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 m<sup>3</sup> 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 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