

CHANDAN MAHATA

PhD Candidate, Agricultural & Biological Engineering | Mavis Future Faculty Fellow

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CAREER SUMMARY

A chemical engineer with advanced training in biotechnology, currently pursuing a PhD in Agricultural & Biological Engineering at the University of Illinois Urbana-Champaign, with experience in laboratory- to pilot-scale fermentation and sustainable bioprocess development. As a Mavis Future Faculty Fellow, I aspire to pursue a tenure-track academic faculty career in chemical engineering/biotechnology.

RESEARCH INTEREST

Bioprocess & bioproduct development, metabolic engineering, biomanufacturing, bio-separation, green chemistry, 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: Precision fermentation and downstream processing for the production of industry-relevant high-value platform chemicals

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

GRANT/FELLOWSHIP/AWARDS

- **Emerging Engineering Educators (EMEE) Workshop**, Engineering Unleashed, Kern Family Foundation (2026) — *selected participant in a fully funded, competitive faculty development program preparing future engineering educators*
- **Ben and Georgeann Jones Graduate Student Award for Research Excellence**, Agricultural and Biological Engineering, University of Illinois Urbana-Champaign (2026) — *awarded to the top PhD candidate in recognition of outstanding research achievements*
- **Mavis Future Faculty Fellows**, Grainger College of Engineering, University of Illinois Urbana-Champaign (2025–2026) — *selected for a competitive, year-long faculty development fellowship focused on research, teaching, mentoring, leadership, and academic career preparation*
- **Graduate College Block Grant**, University of Illinois Urbana-Champaign (Summer 2025)
- **Junior Research Fellowship**, Department of Biotechnology (DBT), Government of India (2017–2021) — *supported research during my M.S. (Research) program*
- **Foreign Travel Grant**, Indian Institute of Technology Kharagpur (2018) — *supported attendance at the 22nd World Hydrogen Energy Conference (WHEC), Rio de Janeiro, Brazil*

JOURNAL PUBLICATIONS

- **Mahata, C.**, Mishra, S., Tran, V., Tan, S., Zhao, H., Singh, V. (2026). Influence of Inorganic Carbon Sources on Low-pH Succinic Acid Production by *Issatchenkia orientalis*: Process Insights and Kinetic Analysis. *ACS Sustainable Chemistry & Engineering*, 14 (29), 13056–13065 [Link](#)

- Li, C., Wang, J., Liu, M., Zheng, Y., Kumar, S., Umeda, I., **Mahata, C.**, Norton, J., & Wang, W. (2026). Harnessing Activated Sludge for the Treatment of Hydrothermal Liquefaction Wastewater: A Proof-of-Concept Study. *Water Environment Research*, 98(2), e70313 [Link](#)
- **Mahata, C.**, Mishra, S., Singh, V. (2026). 3-Hydroxypropionic acid recovery from fermentation broth through novel downstream processing: Technoeconomic analysis. *Bioresource Technology*, 445, 134094 [Link](#)
- Wao, A. A., Fatima, M., Singh, S., Chandra, N., **Mahata, C.**, Mal, J., Singh, N. K., Pandey, A. (2026). Exploring the potentials of algal derived bio-stimulants and biofertilizers for sustainable agriculture- a review. *Bioresource Technology Reports*, 33, 102605 [Link](#)
- Banerjee, S., Manoharan, S., Ravikumar, N., **Mahata, C.** (2025). Polymeric membrane bioreactors in water treatment: a path to sustainability. *Iranian Polymer Journal*, 1 – 24 [Link](#)
- Thakur, V., Kumar, A., Singh, J., **Mahata, C.**, Mirza, A., Jeewanthi, R. K. C. (2025). Nanoemulsion coatings with encapsulating clove essential oil for shelf-life enhancement of guava. *Applied Fruit Science*, 67, 178 [Link](#)
- Jacob, S., Kundu, D., Chintagunta, A.D., Kumar, N.S., Samanta, P., **Mahata, C.**, Dey, S., Shibirathna, R.G., Barathi, A., Kumar, S., Wang, Z., Goel, G. (2025). Anaerobic digestion-derived digestate valorization: green chemistry innovations for resource recovery and reutilization. *Green Chemistry* 27(25), 7472-7505 [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](#)
- 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](#)
- 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](#)

PATENT

- Zhao, H., Martin, T., Tan, S., **Mahata, C.**, Mishra, S., Singh, V. (2025). 3-hydroxypropionic acid production using yeast at an industrially relevant scale, U.S. Patent Application No. 63/766,638, filed Mar 4, 2025, Patent pending.

BOOKS

- Das, D., Banerjee, S., **Mahata, C.** (2025). *Environmental Biotechnology: Advanced Technology for Combating Pollution*, co-published by Springer Nature & Capital Publishing **Authored Textbook** [Link](#)
- Singh, M.P., El-Sheekh, M., **Mahata, C.**, Pandey, A. (2026). *Algae: A Promising Source of Food, Feed and Bioproduct*, Springer Nature **Edited** [Link](#)

BOOK CHAPTERS

- Mishra, S., Srivastava, A., Koshe, P., **Mahata, C.**, Vishvakarma, R., Pandey, A. (2026). Integrated Algal Engineering Approaches for Bioremediation, Bioenergy, and Industrial Applications: Current Scenario and Future Directions. In *Algal Photobioreactors*, Springer Nature [Link](#)
- Choudhary, R., Kumar, A., Kumar, V., Elmnifi, M. H., Dhar, S., Alqahtani, F. M. Sharma, D., **Mahata C.**, Chaudhari S. K., Kumari S., Patel K. (2026). Case study on biopolymers derived from food and agro-industrial wastes. In *Food and Agro-Industrial Wastes*, Academic Press [Link](#)
- Saishree, R., Das, S.K., Panda, N., Prusty, B.A.K., **Mahata, C.** (2025). From plastics to bioplastics: technological innovations and nature-based solutions to achieve global sustainability. In *Micro-Nano Plastics Exposure, Environmental Degradation and Public Health Crisis. Sustainable Development Goals Series*, Springer Nature [Link](#)
- Mehta, A., **Mahata, C.** (2025). Mitigation of CO₂ emissions with microalgae. In *Algal-based Waste Treatment Technologies in a Circular Economy*, CRC Press [Link](#)
- 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., Likozar, 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, US
- **Mahata C.** 'Biohydrogen production from organic waste using mixed consortia' November 02, 2021, Centre for Sustainable Development Scientific Seminar, Qatar University, Qatar

CONFERENCE PRESENTATION

- **Mahata C.** ^{††}, Mishra, S., Tran, V., Tan, S., Zhao, H., Singh, V. Effect of inorganic carbon sources in succinic acid biosynthesis using acid-tolerant engineered yeast. *ASABE Annual Meeting 2024* (July 12- 15, 2024), Indianapolis, IN, USA. **ORAL**
- **Mahata C.** ^{††}, Mishra S., Singh V. 3-Hydroxypropionic acid recovery from fermentation broth using novel downstream processing: A technoeconomic analysis. *CABBI Retreat Meeting 2026* (June 29- July 1, 2026), Champaign, IL, USA.

POSTER & POSTER AD

- **Mahata C.** ^{††}, Mishra S., Tran V., Zhao H., Singh V. Effect of inorganic carbon sources in succinic acid (SA) biosynthesis using acid-tolerant engineered yeast. *CABBI Retreat Meeting 2025* (July 15- 17, 2025), Champaign, IL, USA. **POSTER**
- Mishra S. ^{††}, Das M., Jia Y., **Mahata C.**, Joshua Y., Bari N., Zhengyong Z., Lu T., Rao C.R., Jin Y.S., Singh V. Self-Sustaining Hybrid Bioinorganic Chassis for Improved Fermentation to Produce Complete Flavored Food. *AIChE Annual Meeting 2024* (October 27- 31, 2024), San Diego, CA, USA. **ORAL**
- **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**

- **Mahata C. ^{**}**, 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. ^{**}, 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 & INDUSTRY ENGAGEMENT

Dhampur Sugar Mills Limited, Uttar Pradesh, India

June 2019 – July 2019

Visiting Researcher

- Supervised the preliminary R&D work for biohydrogen production from cane molasses-based distillery effluent under a licensed technology transfer agreement
- 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, RStudio

Material Characterization: SEM-EDX, FTIR, XRD, ICP-MS, NMR, 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

- Engineering precision fermentation processes for high value platform chemicals using engineered microbial strains.
- Developing downstream processing to recover final products from the fermentation broth.

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

January 2023 – August 2023

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

- Developed a fungus-based system to treat toxic chemicals originated from thermochemical processes.

Center for Sustainable Development, Qatar University, Doha, Qatar

March 2021 – December 2022

Research Assistant, PI: Dr. Probir Das

- Formulated fish-feed pellets using microalgal (five different strains) biomass cultivated in 25 m³ algal raceway ponds.

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.

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 a 10 m³ fermenter for dark fermentative H₂ production.
- Optimized physicochemical parameters for enhanced biohydrogen production using AI-ML techniques
- Experienced in cultivating bacteria, yeast, and microalgae in different types of bioreactors.

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

May 2016 – August 2016

Project Research Assistant, PI: Prof. Debabrata Das

- Fabricated and operated 10 m³ bioreactor to explore commercial production of biohydrogen *via* dark fermentation.

TEACHING & MENTORSHIP EXPERIENCE

Undergraduate Research in Scientific Advancement, UIUC

August 2024 – May 2025

Mentor (Research)

- Mentored undergraduate researchers in precision fermentation and downstream processing of bio-succinic acid from renewable feedstocks, providing hands-on laboratory training.
- Guided experimental design, data interpretation, and poster preparation; one mentee received first prize in an end-of-semester research poster competition.

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.

NPTEL: National Programme on Technology Enhanced Learning

VOLUNTEERING EXPERIENCE

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

September 2017 – September 2019

Volunteer (Teams: Project Baalrakshak, Pathshala)

- Conducted age-appropriate awareness and educational workshops for students, parents, and teachers in rural and urban communities, focusing on child safety, well-being, and rights.
- Organized school-based science learning sessions using simple science-based models and field activities, in collaboration with teachers, to improve educational access, engagement, and scientific literacy.

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), Frontiers in Bioengineering and Biotechnology (Frontier), Environmental Chemistry and Ecotoxicology (Elsevier), Bioresource Technology Reports (Elsevier), Process Biochemistry (Elsevier), Energy Nexus (Elsevier), Green Carbon (Elsevier), International Journal of Hydrogen Energy (Elsevier), Journal of Water Process Engineering (Elsevier), Bioresource Technology (Elsevier), Biocatalysis and Agricultural Biotechnology (Elsevier), Environmental Technology & Innovation (Elsevier)

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