Sampriti Chattopadhyay

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EDUCATION

Carnegie Mellon University — Pittsburgh, PA
Doctor of Philosophy in Chemical Engineering — 2022-2026
GPA: 4/4
Selected Coursework: Advanced Process Systems Engineering, Linear Programming, Energy Systems Modelling

Indian Institute of Technology Madras — Chennai, India
Interdisciplinary Master of Technology in Data Science — 2017-2022
GPA: 9.39/10

Indian Institute of Technology Madras — Chennai, India
Bachelor of Technology in Chemical Engineering — 2017-2022
Minor: Systems Engineering
Selected Courses: Process Optimization, Process & Product Design, Applied Time Series Analysis

SKILLS

Programming Languages: Python, C, R
Software: Aspen, GAMS, Pyomo, Simulink
Languages: English, Hindi, Bengali (Fluent)

ACADEMIC PROJECTS

Stanford University (Postdoctoral Research) (Advisor: M. S. Mauter)
Energy flexibility at wastewater treatment facilities — Stanford, CA
National Alliance for Water Innovation (NAWI) Directed Research Program — October 2026 - present

Carnegie Mellon University (Doctoral Research) (Advisors: A. I. Torres, I. E. Grossmann)
Optimal retrofitting of Oil refineries for industrial decarbonization — Pittsburgh, PA
Collaboration with Shell Global — December 2022 - September 2026
Defended PhD thesis: *Systematic Decision-Making Frameworks for Optimal Retrofit Decarbonization of Oil Refineries*

Indian Institute of Technology Madras (MTech) (Advisor: Raghunathan Rengaswamy)
Hierarchical Multilabel segmentation for MIMO systems; MPC with neural network — Chennai, India
August - December 2021

- Proposed a segmentation algorithm to mine informative segments from given data
- Evaluated the efficacy of the proposed segmentation model on open and closed loop Continuous Stirred Tank Reactor and Fluidized Catalytic Cracking Unit
- Trained an input convex neural network in conjunction with its use in model predictive control (MPC)
- Used convex-concave procedure iteratively to ensure global optimization in MPC

PUBLICATIONS

- **Chattopadhyay, S.**, Torres, A. I., & Grossmann, I. E. (2026). Decarbonizing petroleum refineries under uncertainty: A multi-horizon stochastic programming approach (In preparation (2026))
- Khatu, A.∗, **Chattopadhyay, S.∗**, Grossmann, I. E., & Torres, A. I. (2026). Small modular nuclear reactors in Pareto-optimal pathways for decarbonization of refineries (In preparation (2026))
- **Chattopadhyay, S.**, Gandhi, R., Grossmann, I. E., & Torres, A. I. (2026). A novel algorithm for bounding the optimal solutions in multi-time scale decarbonization planning problems involving varying energy prices: Electrification of oil refineries as a case study. *Computers & Chemical Engineering* **2026** *213*, 109752

  Featured in: https://engineering.cmu.edu/news-events/news/2026/09/17-cost-of-going-green.html
- **Chattopadhyay, S.**, Karthikeyan, K., Gandhi, R., Grossmann, I. E., & Torres, A. I. (2025). Optimal retrofit of carbon capture and electrification technologies in oil refineries for reducing direct CO2 emissions. *Industrial & Engineering Chemistry Research* **2025** *64* (20), 10131-10147

  Featured in: https://engineering.cmu.edu/news-events/news/2025/09/02-decarbonizationrefineries.html
- Pandiyan, A., Fatima, H., **Chattopadhyay, S.**, Ramadoss, S., & Radhakrishnan, Y. (2024). UmamiPreDL: Deep learning model for umami taste prediction of peptides using BERT and CNN. *Computational Biology and Chemistry*, **2024** May 29; 111:108116.

FULL PEER-REVIEWED CONFERENCE PAPERS

- **Chattopadhyay, S.**, Torres, A. I., Grossmann, I. E., & Kazi, S. R. (2026). Electrified refineries in the power flow network. *Systems and Control Transactions*, *5*, 514-525. 36th European Symposium on Computer Aided Process Engineering (ESCAPE-36).
- Khatu, A.∗, **Chattopadhyay, S.∗**, & Torres, A. I. (2026). Pareto-Optimal Pathways for Refinery Decarbonization: Retrofit of Small Modular Nuclear Reactors. *Systems and Control Transactions*, *5*, 342-351. 36th European Symposium on Computer-Aided Process Engineering (ESCAPE-36).
- Karthikeyan, K.∗, **Chattopadhyay, S.∗**, Gandhi, R., Grossmann, I. E., & Torres, A. I. (2025). Pareto optimal solutions for decarbonization of oil refineries under different electricity grid decarbonization scenarios. *Systems and Control Transactions*, *4*, 844-849.
- **Chattopadhyay, S.**, Gandhi, R., Grossmann, I. E., & Torres, A. I. (2024). Optimization of retrofit decarbonization in oil refineries. *Systems and Control Transactions*, *3*, 426-433.

∗ Authors contributed equally

PRESENTATIONS AND POSTERS

- **Chattopadhyay, S.**, Torres, A. I., Grossmann, I. E., & Kazi, S. R. Electrified refineries in the power flow network. 36th European Symposium on Computer Aided Process Engineering (ESCAPE-36), Sheffield, UK. (June 2026).
- Khatu, A., **Chattopadhyay, S.**, & Torres, A. I. Pareto-Optimal Pathways for Refinery Decarbonization: Retrofit of Small Modular Nuclear Reactors. 36th European Symposium on Computer Aided Process Engineering (ESCAPE-36), Sheffield, UK. (June 2026).
- **Chattopadhyay, S.**, Gandhi, R., Torres, A. I., & Grossmann, I. E. (2025, November). Stochastic optimization for decarbonization planning of oil refineries under uncertainty. AIChE Annual Meeting, Boston, MA, United States.
- **Chattopadhyay, S.**, & Kazi, S. R. (2025, November). Incorporating electric grid network effects on electrification of the chemical industry. AIChE Annual Meeting, Boston, MA, United States.
- Karthikeyan, K.∗, **Chattopadhyay, S.∗**, Gandhi, R., Grossmann, I. E., & Torres, A. I. (2025, July 6–9). Pareto optimal solutions for decarbonization of oil refineries under different electricity grid decarbonization scenarios. 35th European Symposium on Computer Aided Process Engineering (ESCAPE-35), Ghent, Belgium.
- **Chattopadhyay, S.**, Gandhi, R., Grossmann, I. E., & Torres, A. I. (2024, November). Leveraging hourly variations in electricity pricing for optimal retrofit electrification of an oil refinery. AIChE Annual Meeting, San Diego, CA, United States.
- **Chattopadhyay, S.**, Gandhi, R., Grossmann, I. E., & Torres, A. I. (2024, July 14–18). Optimization of retrofit decarbonization in oil refineries. Foundations of Computer Aided Process Design (FOCAPD 2024), Breckenridge, CO, United States.
- **Chattopadhyay, S.**, Torres, A. I., & Grossmann, I. E. (2023, November). Optimal flowsheets for electrification of oil refineries through superstructure optimization. AIChE Annual Meeting, Orlando, FL, United States.

∗ Authors contributed equally

TEACHING EXPERIENCE

Carnegie Mellon University, Pittsburgh, PA, USA

- Teaching Assistant, Advanced Process Systems Engineering — January–May 2024 & 2025
- Teaching Assistant, Chemical Process Design — September–December 2023 & 2024
- Teaching Assistant, Chemical Engineering Process Control — January–May 2023

Indian Institute of Technology Madras, Chennai, Tamil Nadu, India

- Teaching assistant for Chemical Engineering Process Control Laboratory — July - November 2021
- Teaching Assistant for Mathematical Foundations of Data Science — January-May 2022

PROFESSIONAL EXPERIENCE

Los Alamos National Laboratory — Los Alamos, NM

Student Intern at Center for Nonlinear Studies — June-August 2025

- Developed a surrogate model-based framework to incorporate electricity market effects into the optimal operation of electrified refineries, demonstrating economic benefits and grid load smoothing

Shell US — Houston, TX

Summer Internship at Shell Technology Center, Houston — June - August 2024

- Was successful in internship assessment and was awarded with a return offer
- Designed a framework to optimize decarbonization Strategies at the Shell Polymer Monaca plant

ITC Limited Bangalore, India
R&D Internship at Life Sciences and Technology Division May – July 2021

- Awarded with a Pre-Placement Offer for exemplary performance during the summer internship
- Framed 3 project proposals for capability building to leverage AI in sensory sciences

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MENTORSHIP EXPERIENCE

Undergraduate students

- **Keerthana Karthikeyan** (2023-2025): Pareto optimal solutions for decarbonization of oil refineries under different electricity grid decarbonization scenarios
- **Tejesh V. Sandhu** (2025-present): Interactive Module for Optimal Retrofit Planning in Chemical Industry Decarbonization
- **Anka Münker** (2025-2026): Optimal retrofitting of cement production for reduced GHG emissions

Master's students

- **Aditya S. Khatu** (2025-2026): Pareto-Optimal Pathways for Refinery Decarbonization: Retrofit of Small Modular Nuclear Reactors

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AWARDS AND HONORS

- Received complimentary registration supported by the U.S. National Science Foundation to participate in the FOCAPD Conference held from July 14-18, 2024, at Beaver Run, Breckenridge, CO. (2024)
- B Ravichandran Memorial Prize for 1st rank in Dual Degree Chemical Engineering at IIT Madras (2022)
- One of 10 students selected for the Engineering Summer Education Program at University of Tokyo (2020)

LEADERSHIP AND VOLUNTEER WORK

- Volunteer at Bengali Students Organization of Pittsburgh (2023-2025)
- Assistant captain of the Indian Classical Dance Club Abhinaya at Carnegie Mellon University (2023-2024)
- Head of Branding and Engagement Team, Center for Innovation, IIT Madras (2020-2021)
- Awarded as a star volunteer of the Teach Your Neighborhood program of the National Service Scheme (2018)