

# Saba Ghasemi Naraghi

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LinkedIn Profile

## Profile

PhD candidate with deep expertise in Linear Programming (LP), Mixed-Integer Linear Programming (MILP), and Convex Optimization. Skilled in advanced decomposition techniques such as Bender's Decomposition and Row-Column Generation, and decentralized optimization via ADMM. Experienced in machine learning, including implementing a CatBoost model for the crew pairing problem during an internship at American Airlines. Proven track record in solving complex optimization problems in both academic and industrial contexts.

## Education

- 2022 – Present **Ph.D., Chemical Engineering**, *Oklahoma State University*, Stillwater, OK.  
GPA: 3.8/4
- 2019 – 2021 **M.Sc., Optimization**, *Amirkabir University of Technology*, Tehran, Iran.  
GPA: 4.0/4
- 2018 – 2021 **B.Sc., Industrial Engineering**, *Amirkabir University of Technology*, Tehran, Iran.  
GPA: 3.76/4
- 2015 – 2019 **B.Sc., Applied Mathematics**, *Amirkabir University of Technology*, Tehran, Iran.  
GPA: 3.65/4

## Relevant PhD Coursework

- 2024 Integer Programming (A)  
2024 Convex Optimization (A)  
2023 Network Optimization (A)  
2022 Nonlinear Optimization (A)

## Technical Skills

- Languages C, Python, Julia
- Libraries JuMP, Pyomo, Gurobipy, CatBoost. MLJ, OR-Tools, GeoPandas, Pandas
- Solvers Gurobi, CPLEX, BARON, IPOPT, SCIP, HiGHS, FICO Xpress
- Tools MATLAB,  $\LaTeX$ , GAMS, Jupyter Notebook, SPSS, Git, Copilot 365
- Cloud & DevOps Microsoft Azure, Databricks, Docker
- Databases Teradata, Enterprise Data Warehousing (EDW)

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## Professional Experience

- Jun 2025 – Aug 2025 **IT Intern, Operations Research and Advanced Analytics**, American Airlines, Fort Worth, TX.
- Worked within American Airlines' IT and Advanced Analytics environment, gaining exposure to enterprise data infrastructure and large-scale capacity planning systems.
  - Developed scalable set partitioning models for the crew pairing problem across Airbus and Boeing subfleets.
  - Applied bipartite matching at the leg and duty levels to reduce the number of generated sequences, improving solver tractability.
  - Leveraged Teradata to process and manage large-scale airline operations data; built scalable optimization and forecasting models (CatBoost) to improve crew pairing efficiency and computational performance.
- 2022 – **Graduate Research Assistant**, Oklahoma State University, Stillwater, OK.
- Present
- Designed optimal microgrid scheduling models for steam cracking processes, identifying an optimal electrification level of 20%, which reduced CO<sub>2</sub>-equivalent emissions by 18.8% while maintaining production efficiency.
  - Built a differential-algebraic equation (DAE) optimization model in Pyomo for naphtha cracking reactors.
  - Proposed supply chain optimization models for risk management using VaR and CVaR, reducing computational time by at least 25%.
- 2019 – 2021 **Graduate Research Assistant**, Amirkabir University of Technology, Tehran, Iran.
- Applied perspective reformulation to mixed-integer nonlinear programs (MINLPs), improving solution times for portfolio optimization problems.
  - Evaluated linearization techniques for MINLPs in logistic growth and index tracking applications.

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## Peer-Reviewed Book Chapters

- 2025 Ghasemi Naraghi S., Kareck T., Xiao L., Reed R., Ramanan P., Jiang Z. "Decarbonization of Steam Cracking for Clean Olefins Production: Microgrid Planning and Operation." *Optimization of Sustainable Process Systems: Multiscale Models and Uncertainties*. John Wiley & Sons, Inc., 2025.

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## Peer-Reviewed Conference Proceedings

- 2025 Ghasemi Naraghi S., Kareck T., Jiang Z. "Multi-objective Optimization of Steam Cracking Microgrid for Clean Olefins Production." *Systems & Control Transactions*.
- 2025 Ghasemi Naraghi S., Jiang Z. "Joint Optimization of Fair Facility Allocation and Robust Inventory Management for Perishable Consumer Products." *Systems & Control Transactions*.
- 2023 Ghasemi Naraghi S., Jiang Z., "Stochastic Optimization of Agrochemical Supply Chains," Proceedings of IISE Annual Conference and Expo 2023.
- 2023 Ghasemi Naraghi S., Jiang Z., "Optimization of Risk-Managed Agrochemical Supply Chains," Computer Aided Chemical Engineering, 52, 3337-3343.

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## Working Manuscripts

- 2025 Ghasemi Naraghi S., Reed R., Kareck T., Ramanan P., Jiang Z. "Toward Decarbonization of Chemical Manufacturing: Joint Optimization of Unit Commitment and Microgrid Operations." *IEEE Transactions on Sustainable Energy*.
- 2025 Reed R., Ghasemi Naraghi S., Kareck T., Ramanan P., Jiang Z. "Decentralized Operations Planning of Decarbonized Chemical Plants with Renewable-driven Transmission Systems." *IEEE Transactions on Sustainable Energy*.

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## Presentations and Talks

- 2024 Ghasemi Naraghi S., Jiang Z. "Joint Optimization of Fair Facility Allocation and Robust Inventory Management for Perishable Consumer Products." *2024 AIChE Annual Meeting*, San Diego, CA.

- 2024 Ghasemi Naraghi S., Kareck T., Jiang Z. "Decarbonization of Steam Cracking for Clean Olefins Production: Optimal Microgrid Scheduling." *2024 INFORMS Annual Meeting*, Seattle, WA.
- 2024 Reed R., Ramanan P., Ghasemi Naraghi S., Jiang Z. "Decentralized Operations Planning of Decarbonized Chemical Plants with Renewable-driven Transmission Systems." *2024 INFORMS Annual Meeting*, Seattle, WA.
- 2023 Ghasemi Naraghi S., Jiang Z. "Perspective Reformulation of Stochastic Agrochemical Supply Chain Optimization Problem with Mean-Variance Risk Management." *2023 AIChE Annual Meeting*, Orlando, FL.
- 2023 Ghasemi Naraghi S., Jiang Z. "Stochastic Bilevel Optimization of Agrochemical Supply Chains with Mean-Variance Risk Management." *2023 AIChE Annual Meeting*, Orlando, FL.

## --- Honors and Awards

- 2021 Top 5% among M.Sc. students in Optimization.
- 2019 – 2021 Government tuition-fee scholarship for M.Sc. degree.
- 2019 Top 5% among B.Sc. students in Applied Mathematics.
- Since 2019 Member of Iran's National Elites Foundation.

## --- Volunteer Experience

- 2022 – 2023 Secretary, Iranian Students Association at Oklahoma State University.
- 2022 STEM Outreach Volunteer, Oklahoma Science Fair.