PENGFEI CHENG

1220 MeCaslin St NW, Atlanta GA, 30318 ⋄ pengfeicheng@gatech.edu ⋄ 412-616-5634

LinkedIn: www.linkedin.com/in/pengfei-cheng

EDUCATION

Georgia Institute of Technology   Atlanta, GA
Doctor of Philosophy, Chemical and Biomolecular Engineering, GPA: 4.0/4.0   Expected 2023
Research advisor: Dr. Joseph K. Scott

Carnegie Mellon University   Pittsburgh, PA
Master of Science, Chemical Engineering, GPA: 3.9/4.0   Dec. 2018
Research advisor: Dr. Ignacio Grossmann

Dalian University of Technology   Dalian, China
Bachelor of Engineering, Chemical Engineering, GPA: 3.8/4.0   July 2017

RELEVANT COURSES

Process Systems Engineering	Advanced Process Systems Engineering, Computational Methods for Process Engineering, Mathematical Modeling of Chemical Engineering Processes, Data Analysis and Chemical Engineering
Math Programming & Analysis	Linear Programming, Integer Programming*, Constraint Programming, Disjunctive Programming, Analysis I

*audited course

RESEARCH EXPERIENCE

Convergence Rate Analysis for Decomposition Methods for Global Nonconvex Stochastic Optimization
Advisor: Dr. Joseph K. Scott   Dec. 2019 - Present

· Analyzing convergence rate of Lagrangean decomposition-based methods to estimate their efficiency on general nonconvex stochastic programs
· Extended the analysis to investigate theoretically best performance of all decomposition methods and assess the limits of the decomposition framework
· Built benchmark problems with different regularity conditions to numerically test convergence orders of various decomposition methods

Prediction of Adsorption Properties of Metal-Organic Frameworks (MOFs) with Framework Flexibility
Graduate Course Project   Feb. 2020 - May 2020

· Constructed fast, accurate regression models to predict MOF adsorption uptakes considering the effect of framework flexibility based on rigid crystal model results
· Formulated models with 28 MOF features, 6 adsorbate features and 801 (MOF, adsorbate) pairs
· Built and analyzed performance of multi-linear regression, RBF, KRR, LASSO and neural network models

Optimal Scheduling of Copper Concentrate Operations under Uncertainty   Dec. 2017 - July 2019
Advisor: Dr. Ignacio E. Grossmann, collaborative project with Aurubis AG

· Developed an MINLP model for copper concentrate smelting process utilizing continuous-time representation with priority slots
· Developed and enhanced an MILP-NLP decomposition strategy to solve nonconvex MINLP model to near global optimality within reasonable time
· Implemented robust optimization and flexibility analysis to effectively formulate the uncertainty in elemental compositions of concentrates and assess its effects in various scenarios

Record-to-Record Travel with a Variable-Length Neighbor List   Sep. 2017 - Dec. 2017
Graduate Course Project
- Built record-to-record travel (with variable-length neighbor list) metaheuristics algorithm in Python to tackle large-scale vehicle routing problems (up to 360 customers)
- Examined algorithm performance on 20 benchmark problems and improved its efficiency via parametric analysis

PUBLICATIONS

- **Cheng, P.**, Garcia-Herreros, P., Lalpuria, M., & Grossmann, I. E. (2020). Optimal Scheduling of Copper Concentrate Operations under Uncertainty. *Computers & Chemical Engineering*, 106919.

TEACHING EXPERIENCE

Undergraduate Process Control Lab   Spring 2020
Teaching Assistant

PRESENTATIONS

- Dillard Robertson, **Pengfei Cheng**, Joseph Scott, "Convergence Rate Analysis for Schemes of Relaxations in Decomposition Methods for Global Nonconvex Stochastic Optimization", CAST plenary talk, *2020 AIChE Annual Meeting*

- Pablo Garcia-Herreros, Leonardo Salsano de Assis, **Pengfei Cheng**, Ignacio Grossmann, "Blend Scheduling Of Copper Concentrates At Aurubis AG", *2020 INFORMS Annual Meeting*

- **Pengfei Cheng**, Pablo Gracia-Herreros, Mangalam Lalpuria, Ignacio Grossmann, "Optimal Scheduling of Copper Concentrate Operations under Uncertainty", *2019 AIChE Annual Meeting*

SKILLS

Programming Languages	Python, C, C++
Software & Tools	Pyomo, GAMS, MATLAB, COMSOL, Aspen Series, gPROMS

ADDITIONAL PROJECTS

China National Undergraduate Chemical Engineering Design Competition   Dalian, China
Propane Dehydrogenation Plant Design   Mar. 2016 - Aug. 2016
- National first prize among 991 teams
- Led a 5-member team to complete the comprehensive design of a propane dehydrogenation plant project, aiming at improving local propane utilization in China
- Conducted model simulation and optimization for the whole process, designed and optimized heat exchange networks, designed equipment in details
- Optimized Oleflex process by integrating multi-stage steam utilization to improve efficiency of energy utilization
- Conducted safety assessment, environmental impact assessment and economic evaluation on the project to assess the project in enterprise scale