

PENGFEI CHENG

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EDUCATION

Georgia Institute of Technology

Doctor of Philosophy, Chemical and Biomolecular Engineering, GPA: 4.0/4.0

Research advisor: Dr. Joseph K. Scott

Atlanta, GA

Expected 2024

Carnegie Mellon University

Master of Science, Chemical Engineering, GPA: 3.92/4.0

Research advisor: Dr. Ignacio E. Grossmann

Pittsburgh, PA

Dec. 2018

Dalian University of Technology

Bachelor of Engineering, Chemical Engineering, GPA: 3.85/4.0

Dalian, China

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 Optimization

Dec. 2019 - Present

Advisor: Dr. Joseph K. Scott

- Analyzing convergence rate of Lagrangean decomposition-based methods to assess their performance on general nonconvex stochastic programs
- Built test instances with various regularity conditions to numerically investigate convergence rates of different decomposition methods

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 coordinately to effectively formulate the uncertainty in elemental compositions of concentrates and assess its effects in various scenarios

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

Record-to-Record Travel with a Variable-Length Neighbor List

Sep. 2017 - Dec. 2017

Graduate Course Project

- Built Record-to-Record Travel with a Variable-Length Neighbor List (VRTR) metaheuristics algorithm in Python to deal with large-scale vehicle routing problems
- Examined performance of the algorithm on 20 benchmark problems and improved its efficiency by conducting parametric analysis on the length of neighbor list

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

Optimal Scheduling of Copper Concentrate Operations under Uncertainty

- Oral, *AIChE Annual Meeting*, Orlando, FL Nov. 2019
- Oral, *The Enterprise-Wise Optimization Spring Meeting*, Pittsburgh, PA Mar. 2019
- Poster, *The Center for Advanced Process Decision-making Annual Review Meeting*, Pittsburgh, PA Mar. 2019
- Poster, *The Enterprise-Wise Optimization Fall Meeting*, Pittsburgh, PA Nov. 2018
- Poster, *The Chemical Engineering Graduate Student Association Symposium*, Pittsburgh, PA Oct. 2018

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