

# PENGFEI CHENG

pengfeicheng@gatech.edu

LinkedIn URL: [www.linkedin.com/in/pengfei-cheng](https://www.linkedin.com/in/pengfei-cheng)

## 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

---

- 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