

SUMMARY

PhD. Candidate with research in process systems optimization seeking an optimization or data science internship in 2020 (summer preferred).

EDUCATION

The University of Texas at Austin, MS/PhD in Progress

GPA: 3.96/4.00

Arizona State University: Barrett, the Honors College, B.S.E. In Chemical Engineering May 2016

GPA: 4.11/4.00

EXPERIENCE

Graduate Research Fellow, The University of Texas at Austin 10/2016-Present

- Mathematical modeling of electricity consumers in the chemical industries for optimal demand response scheduling under dynamic constraints
 - Reduced order modeling based on simulated operating data enables the fast solution of large optimization problems
 - Considerations given to uncertainty in electricity prices and product demand
 - Reduction of emissions via emissions minimizing production, where operating during peak renewable times is prioritized

Computational Science Graduate Fellowship (CSGF) Research Practicum, Argonne National Lab, Mathematics and Computer Science 5/2018-Present

- Nonlinear dynamic optimization under uncertainty with chance constraints
 - Characterization of statistical distributions for analytical representations in optimization problems
 - Rational approximation of the cumulative distribution function (cdf) for fast chance-constrained optimization of nonlinear problems

Undergraduate Research, Arizona State University 01/2013-05/2016

- Designed a system for oil-spill mediation using environmentally responsive organic-inorganic composites
- Design of Ionic Liquid system for application in broad temperature ranges for a microseismometer—Optimize sensitivity response of ionic liquid to vibrational changes

Intern, Henkel Consumer Goods, Inc. Research and Development, 05/2015-08/2015, 05/2014-08/2014

- Optimized several formulas using design of experiments and statistical software, JMP
- Developed concentrated formula to reduce packaging
- Characterized competitor products and built database

RECENT ACADEMIC ACHIEVEMENTS

2018 Best Paper Award, Computers in Chemical Engineering

2017-2019 Dean's Prestigious Fellowship, The University of Texas at Austin

2017-2021 Department of Energy Computer Science Graduate Fellowship (DOE CSGF)

2015-2016 Goldwater Scholar

2016 Outstanding Graduate for the Ira. A. Fulton Schools of Engineering

2016 Outstanding Undergraduate Thesis for Barrett, the Honors College

COURSEWORK

- Machine Learning
- Analysis
- Optimization
- Modern Control
- Statistical Methods I/II
- Statistical Modeling
- Parallel Computing
- High-performance Computing

PUBLICATIONS

Kelley, M. T., Baldick, R., & Baldea, M. (2019). Demand Response Operation of Electricity-Intensive Chemical Processes for Reduced Greenhouse Gas Emissions: Application to an Air Separation Unit. *ACS Sustainable Chemistry & Engineering*, 7(2), 1909–1922.

Kelley, M. T., Pattison, R. C., Baldick, R., & Baldea, M. (2018). An MILP framework for optimizing demand response operation of air separation units. *Applied Energy*, 222, 951–966. <https://doi.org/10.1016/j.apenergy.2017.12.127>

Kelley, M. T., Pattison, R. C., Baldick, R., & Baldea, M. (2018). An efficient MILP framework for integrating nonlinear process dynamics and control in optimal production scheduling calculations. *Computers & Chemical Engineering*, 110, 35–52. <https://doi.org/10.1016/j.compchemeng.2017.11.021>

Chen, H.; **Kelley, M.**; Guo, C.; Yarger, J. L.; Dai, L. L., “Adsorption and Release of Surfactant into and from Multifunctional Zwitterionic Poly(NIPAm-co-DMAPMA-co-AAc) Microgel Particles,” *J. Colloid Interface Sci.* 2015, 449, 332-340. (Invited).

PATENTS

Zander, T.; **Kelley, M.**; Bankers, J.; Adson, K. 2016. Detergent Unit Doses and Methods of Producing the Same. US Patent Application #: 14/954,349 filed February, 2016 Patent Pending.