Matthew Brun

brunm@mit.edu | (847) 867-8155 | Cambridge, MA 02139

Education

Massachusetts Institute of Technology, Cambridge, MA　　　　　　　　　　　　　2022 - present
PhD Student in the Operations Research Center, advised by Dr. Andy Sun
Research Focus: Global Optimization, Large Scale Optimization, Energy Systems Optimization

Rice University, Houston, TX　　　　　　　　　　　　　　　　　　　　　　　　2018 - 2022
GPA: 3.96 / 4.0, Honors: Summa Cum Laude, Phi Beta Kappa, Distinction in Research and Creative Work
BA in Operations Research
Michael Ross Franko Award (Exemplary Student, Computational and Applied Math Department)

Relevant Coursework/Skills
Operations Research, Optimization, Simulation, Data Science/Machine Learning, Julia, Python, MATLAB, R, SQL

Work Experience

Lawrence Livermore National Lab, Houston, TX
Power Systems Intern, Cyber & Critical Infrastructure Summer Institute　　　　May 2024 - August 2024
  - Investigated optimization-based methods for analyzing and mitigating the impact of wildfires on power infrastructure

ORTEC, Houston, TX
Optimization Consultant Intern, Data Science & Consulting　　　　　　　　　May 2022 - August 2022
  - Engaged external clients to design and implement end-to-end manufacturing optimization applications in AIMMS
  - Engineered model formulation to provide provably optimal solutions within minutes
  - Designed, recommended, and presented best practices for implementing AIMMS unit tests

Chevron, Houston, TX
Data Science Intern, Commodity Supply Chain Management　　　　　　　　　May 2021 - August 2021
  - Designed and implemented a linear programming optimization model for lubricant additive supply chains and manufacturing, solving operational problems in seconds
  - Recommended a software framework for implementing future optimization projects
Data Science Intern, Chevron Pipeline & Power　　　　　　　　　　　　　　May 2020 - August 2020
  - Trained a deep learning model to extract building footprints from satellite imagery near pipeline routes
  - Predicted hot dog sales in gas stations, placed 2nd of 9 intern teams in model accuracy

Research Experience

Optimal Investment Strategy for EV Battery Recycling Facilities　　　　September 2022 - present
  - Implemented a two-stage nonconvex optimization model to identify optimal long term investment strategies in EV battery recycling facilities
  - Designed new solution algorithms that improve solution time by 10-50x over standard algorithms, solving to global optimality in hours

ARPA-E Grid Optimization Competition　　　　　　　　　　September 2022 - September 2023
  - Implemented software to solve multiperiod security constrained AC power flow within 99% of optimality in hours
  - Designed new heuristic methods to enable spatial and temporal decomposition of large scale (millions of variables) optimization problems
  - Placed 2nd of of 14 teams, receiving $520k in prize money

Lagrangian Duality of Multiobjective Integer Programs　　　　　　January 2021 - January 2023
  - Theoretical work which proved new results on dual strength in discrete multiobjective settings
  - Extended concepts from single objective discrete optimization and identified new counterexamples
  - Recipient of the INFORMS Undergraduate Operations Research Prize

Deep Learning for Ovarian Cancer Tissue Subtype Classification　　　　May 2019 - December 2019
  - Improved accuracy of deep learning image segmentation algorithm by 30% on new high-resolution dataset by adapting model structure
  - Awarded best in program for poster presentation at the IBB Summer Undergraduate Research Symposium