DAHYE HAN

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SUMMARY

I am broadly interested in mixed-integer nonlinear programming (MINLP) and global optimization. My current research focuses on the design and analysis of algorithms for MINLP, particularly branch-and-bound methods and convex relaxation techniques. I apply these methods to problems arising from applications such as power systems and structural engineering. I am also interested in integrating machine learning with optimization to accelerate algorithmic decisions.

EDUCATION

Ph.D. **Georgia Institute of Technology** expected May 2026
- Operations Research
- Advisor: Santanu S. Dey

A.B. **Washington University in St. Louis** December 2015
- *summa cum laude* in Mathematics

TECHNICAL SKILLS

Programming: Python, Julia, MATLAB, Java, SAS Programming, version control (Git)

Optimization Solvers: Gurobi, Xpress, BARON, Mosek, HiGHS, SCIP

Machine Learning & Scientific Computing: PyTorch, XGBoost, NumPy, SciPy, Scikit-Learn, Pandas, Matplotlib

PAPERS

*marks alphabetical order of author names for equal contribution

Extreme strong branching for QCQPs [pdf]
- Santanu S. Dey*, **Dahye Han***, Yang Wang*. *(Submitted)*
- Proposed a new branching rule that resembles the strong branching rule in MIP and uses the objective function value improvement as the guiding rule for selecting the branching variable and branching point simultaneously.

Aggregation of bilinear bipartite equality constraints and its application to structural model updating problem [pdf]
- Santanu S. Dey*, **Dahye Han***, Yang Wang*. *(Under revision)*
- Examined both the theoretical and computational power of the aggregation technique for a set with two bilinear bipartite constraints.
- Applied to the finite element model updating problem in structural engineering.

Regularized MIP model for integrating energy storage systems and its application for solving a trilevel interdiction problem [pdf]
- **Dahye Han**, Nan Jiang, Santanu S. Dey, Weijun Xie. *INFORMS Journal on Computing, 2025.*
- Developed a regularized mixed-integer programming model for the optimal power flow problem with battery and proved the condition that the proposed model admits zero integrality gap with its linear programming relaxation.

Confidence-aware graph neural networks for learning reliability assessment commitments [pdf]
- Seonho Park, Wenbo Chen, **Dahye Han**, Mathieu Tanneau, Pascal Van Hentenryck. *IEEE Transactions on Power Systems, 2023.*
- Modeled the multi-time horizon reliability assessment commitment problem.

Risk-aware control and optimization for high-renewable power grids [pdf]
- Neil Barry*, Minas Chatzos*, Wenbo Chen*, **Dahye Han***, et al. (13 authors total). *arXiv.*
- Developed a stochastic version of the look-ahead commitment that gets solved in a rolling-horizon in time.

TALKS AND POSTERS

2025 Discrete Optimization Talks (invited) [video]
- Extreme strong branching for QCQPs

2025 Mixed Integer Programming Workshop Twin Cities, MN, USA
- Extreme strong branching in NLP: A Computational Study
- Honorable Mention (Finalist for Best Poster Award)

2024 INFORMS Annual Meeting (invited) Seattle, WA, USA
- Aggregation of bilinear bipartite equality constraints and its application to structural model updating problem

2024 Mixed Integer Programming Workshop Lexington, KY, USA
- Aggregation of bilinear bipartite equality constraints
- Best Poster Award

2024 International Symposium on Mathematical Programming (invited) Montreal, QC, Canada
- Regularized MIP Model for Integrating Battery and its Application

2023 INFORMS Annual Meeting (invited) Phoenix, AZ, USA
- Regularized MIP Model for Optimal Power Flow with Battery

2023 Mixed Integer Programming Workshop Los Angeles, CA, USA
- Regularized MIP Model for Optimal Power Flow with Battery

AWARDS AND HONORS

Honorable Mention (Finalist for Best Poster Award), MIP Workshop	June 2025
Best Poster Award, MIP Workshop	June 2024
CIRTL Associate Teaching Certificate	April 2024
Kerry Clayton Fellowship, Georgia Tech	August 2020 – July 2022
H. Milton Stewart Fellowship, Georgia Tech	August 2020 – July 2022
Thomas H. Eliot Scholarship, WashU	August 2011 – December 2015
High Distinction in Mathematics, WashU	December 2015
Honors Program in Statistics, WashU	December 2015

WORK EXPERIENCE

Amazon May 2025 – August 2025
Research Scientist Intern
- Developed machine learning-based filtering algorithm to optimize staff assignment models for Amazon's fulfillment centers, improving operational efficiency.

NERA Economic Consulting February 2016 – July 2020
Senior Analyst
- Provided economic analysis and consulting services to electric utilities in PJM and MISO markets on power procurement, renewable energy certificate purchases, and market strategy development.
- Developed a quadratically constrained optimization model for Oman's 2022 power procurement process, standardizing bid evaluation across different powerplant types and conducting sensitivity analysis to establish robust price benchmarks.

Twinword July 2014 – December 2015
Associate Developer
- Contributed to full-stack development and product management for a technology startup, including front-end and back-end programming, feature design, and go-to-market strategy.

TEACHING EXPERIENCE

ISYE 3044	Simulation Analysis and Design, Graduate Teaching Assistant	Summer 2023, Summer 2024
ISYE 6669	Deterministic Optimization, Graduate Teaching Assistant	Spring 2023
ISYE 6673	Financial Optimization, Graduate Teaching Assistant	Fall 2021
ISYE 6739	Statistical Methods, Graduate Teaching Assistant	Summer 2021

ACADEMIC SERVICE

Reviewer of IEEE Power & Energy Society (PESS) Letters
Reviewer of SIAM Journal on Optimization
Reviewer of Power System Computation Conference (PSCC) 2022

MEMBERSHIP

Mixed-Integer Programming Society
Institute for Operations Research and Management Sciences (INFORMS)

PATENTS

Risk-assessment Simulator for Power Systems Filed

- Mathieu Tanneau, Wenbo Chen, Minas Chatzos, **Dahye Han**, Hanyu Zhang, Haoruo Zhao.