Weimin Huang

Contact Information

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Research Interests

My research interests lie in machine learning, mathematical optimization, and data-driven decision-making. I develop scalable, efficient algorithms that exploit the structure of optimization problems and patterns in historical solution data, with applications to large-scale, real-world decision-making.

Education

University of Southern California 08/2023 - Present
Ph.D. in Computer Science (Expected 12/2027)
Advisor: Bistra Dilkina

University of Toronto 09/2021 - 08/2023
Master of Applied Science in Operations Research
Advisor: Elias Khalil

University of Toronto 09/2016 - 08/2021
Bachelor of Applied Science in Engineering Science, Machine Intelligence Track (with Honors)

Preprints

[P3] **Weimin Huang***, Weiwei Yang*, Bistra Dilkina, Konstantina Mellou, Ishai Menache, Marco Molinaro, Chris White, Baosen Zhang "Machine learning-guided real-time AC optimal transmission switching" In: *arXiv Preprint*. [pdf]

[P2] Junyang Cai, **Weimin Huang**, Brendan Long, Matthew Cleaveland, Jyotirmoy V Deshmukh, Lars Lindemann, Bistra Dilkina "Domain-Aware Machine Learning for Accelerating MILP-Based Motion Planning with Temporal Logic and Chance Constraints" In: *arXiv Preprint*. [pdf]

[P1] **Weimin Huang**, Taoan Huang, Aaron M. Ferber, Bistra Dilkina "Distributional MIPLIB: a Multi-Domain Library for Advancing ML-Guided MILP Methods" In: *arXiv Preprint*. [pdf] [website]

Conference Publications

[C6] **Weimin Huang**, Natalie M. Isenberg, Jan Drgona, Draguna L Vrabie, Bistra Dilkina "ML-Guided Primal Heuristics for Mixed Binary Quadratic Programs" In: *Proceedings of the International Symposium on Combinatorial Search (2026)*. [pdf]

[C5] **Weimin Huang**, Ryan Piansky, Bistra Dilkina, Daniel K. Molzahn "Machine Learning Guided Optimal Transmission Switching to Mitigate Wildfire Ignition Risk" In: *Power Systems Computation Conference (2026)*. [pdf]

[C4] **Weimin Huang**, Natalie M. Isenberg, Jan Drgona, Draguna L Vrabie, Bistra Dilkina "Efficient Primal Heuristics for Mixed Binary Quadratic Programs Using Suboptimal Rounding Guidance" In: *Proceedings of the International Symposium on Combinatorial Search (2025)*.

[C3] **Weimin Huang**, Elias Khalil "Walkability Optimization: Formulations, Algorithms, and a

Case Study of Toronto" In: *Proceedings of the AAAI Conference on Artificial Intelligence (2023)*.

[C2] **Weimin Huang**, Alexander W. Olson, Elias Khalil, Shoshanna Saxe "Note: Image-based Prediction of House Attributes with Deep Learning" In: *Proceedings of the ACM SIGCAS/SIGCHI Conference on Computing and Sustainable Societies (2022) (short)*.

[C1] Mahdi S. Hosseini, Lyndon Chan, **Weimin Huang**, Yichen Wang, Danial Hasan, Corwyn Rowsell, Savvas Damaskinos, Konstantinos N Plataniotis "On Transferability of Histological Tissue Labels in Computational Pathology" In: *Proceedings of the European Conference on Computer Vision (2020)*.

Journal Publications

[J1] **Weimin Huang**, Alexander W. Olson, Elias Khalil, Shoshanna Saxe "Image-Based Prediction of Residential Building Attributes with Deep Learning" In: *Journal of Industrial Ecology (2024)*.

Presentations

ML-Guided Primal Heuristics for Mixed Binary Quadratic Programs, 2026 INFORMS Optimization Society Conference.
ML-Guided Primal Heuristics for Mixed Binary Quadratic Programs, AAAI 2026 Bridge Program - Combining AI and OR/MS for Better Trustworthy Decision Making.
Machine Learning Guided Optimal Transmission Switching to Mitigate Wildfire Ignition Risk, AAAI 2026 Bridge Program - Combining AI and OR/MS for Better Trustworthy Decision Making.
Distributional MIPLIB: a Multi-Domain Library for Advancing ML-Guided MILP Methods, AAAI 2025 Bridge Program - Combining AI and OR/MS for Better Trustworthy Decision Making.

Experience

Microsoft, Research Intern — Summer 2026
- Foundation models for real-time power grid topology optimization [P3]

Pacific Northwest National Laboratory, PhD Intern — Summer 2024
- Algorithms for large-scale Mixed-Integer Nonlinear Optimization [C4]

University of Southern California, Research Assistant — Fall 2023 - Current
- Machine learning-guided Mixed-Integer Linear Programming methods [P1], [P2], [C5]
- Primal heuristics for Mixed-Integer Nonlinear Optimization [C4], [C6]
- LLM-driven refinement for classical solvers (in progress)

University of Toronto, Research Assistant — Fall 2021 - Summer 2023
- Machine learning and mathematical optimization for sustainable cities [JI], [C2], [C3]

University of Toronto, Research Assistant — Summer 2019
- Neural architecture search for computer vision models in computational pathology [C1]

Honors and Awards

Viterbi Fellowship, University of Southern California — 2023
MIE Graduate Student Fellowship, University of Toronto — 2021–2023
Dean's Honour List , University of Toronto — 2016-2020

Service

Program Committee: AAAI 2027
Reviewer: AAAI 2026
NSF AI4OPT Student Leadership Council

Skills

Programming: C, MATLAB, Python, R, SQL, LaTeX
Deep Learning: PyTorch, Keras, Caffe, TensorFlow, Sklearn
Mathematical Optimization: CP Optimizer, Gurobi, SCIP, OR-Tools, MiniZinc