

ZIWEN WANG

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 <https://github.com/deft-gur>

EDUCATION

- **University of Waterloo** Sep 2026 - Current
PhD Combinatorics & Optimization, under supervision of Levent Tuncel GPA: TBA
- **University of Waterloo** May 2025 - Aug 2026
MMath Combinatorics & Optimization, under supervision of Levent Tuncel GPA: 99%
- **University of Waterloo** Sep 2020 - Apr 2025
Computer Science and Combinatorics & Optimization, under supervision of George Labahn and Arne Storjohann GPA: 91%

RESEARCH AND WORK EXPERIENCE

- **Optimization, University of Waterloo** May 2025 - Sep 2026
Master's student under supervision of Levent Tuncel Waterloo, CA
 - Studied randomized algorithms on solving LP-Type problem, primal dual hybrid gradient method applied to linear program, and sketchy conjugate gradient method on semidefinite programming.
 - **Implemented Clarkson's algorithm** for solving linear programs and modified the original algorithm with various techniques that resulted in more than 10x speed up; comparable to the performance of Gurobi on some instances. Provided theoretical justification on some of those techniques.
 - Designed and derived a large scale dataset for linear program where the number of constraint is much larger than the number of variables that is suitable for benchmarking.
- **Symbolic Computation Group, University of Waterloo** May 2024 - Aug 2024 (Full time), Sep 2024 - Aug 2025 (Part Time)
URA under supervision of George Labahn and Arne Storjohann Waterloo, CA
 - Studied and comprehended papers on algorithms related to randomized linear algebra on integer matrices, including Smith and Hermite Normal Forms.
 - Implemented a Las Vegas Algorithm for computing Smith Normal Form with multipliers and Hermite Normal Form of an integer nonsingular matrix from a series of recently published papers co-authored by my supervisors.
 - Identified key slow downs and designed both theoretically and practically better sub-algorithms that resulted in speed up from 12 hours of computation to 5 min for matrices of size in ten thousands with 20 or 30 integer digits.
 - Reimplemented everything in C that resulted in over 3x speed up <https://github.com/SmithMassager>.
- **Huawei Tech. R&D lab** May 2022 - Aug 2022, Jan 2023 - Apr 2023, Sep 2023 - Dec 2023
AI Compiler assistant engineer Markham, CA
 - Trained a NN model using PyTorch for compiler optimization decisions that resulted in a 4% increase in performance.
 - Investigated the pass ordering problem for innovation project and developed code to automate this process in the LLVM project.
 - Implemented **AI Enabled Pass Optimization (ACPO)** project interface inside the LLVM compiler.
 - Redesigned feature collection process and interface for ACPO that resulted in 2x speed up in the compilation time.
 - Developed a Function Inlining interface for ACPO invocation that leveraged ML model for decision making and resulted 12% potential speed up compared to traditional heuristic prediction.

PREPRINT

- Ziwen Wang, Stavros Birmipilis, George Labahn, Arne Storjohann (2026). *A C implementation of the Smith massager algorithm*. Preprint at arXiv:2605.19254.
- Ashouri, A. H., Manzoor, M. A., Vu, D. M., Zhang, R., Wang, Z., Zhang, A., ... Gao, Y. (2023). *ACPO: AI-Enabled Compiler-Driven Program Optimization*. Submitted to ACM Transactions on Architecture and Code Optimization. Preprint at arXiv:2312.09982.

TEACHING EXPERIENCE

- **TA CO250, Introduction to Optimization** *Sep 2025 - Dec 2025, May 2026 - Aug 2026*
- **TA CO456, Introduction to Game Theory** *Sep 2025 - Dec 2025*
- **TA CO370, Deterministic OR Models** *Jan 2026 - Apr 2026*
- **TA CO372, Portfolio Optimization Models** *Sep 2026 - Dec 2026*