Woosuk Leo Jung

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Research interests

Continuous Optimization, Mathematical Programming, Computational Optimization, Condition number theory, Variational Analysis

Education

2022 – Present **University of Waterloo** – Ontario, Canada
PhD Candidate in Combinatorics & Optimization
Supervisors: Prof. Henry Wolkowicz and Prof. Walaa Moursi.

2019 – 2021 **Miami University** – Ohio, USA
MS in Applied Mathematics
Supervisor: Prof. Ebrahim Sarabi.

2015 – 2018 **Catholic Kwandong University** – Gangwondo, Korea
BS in Mathematics Education

Honors and scholarships

2022 - Present International Doctoral Student Award (University of Waterloo)

2024 Sinclair Graduate Scholarship (University of Waterloo)

2023 Combinatorics and Optimization Graduate Award (University of Waterloo)

Publications

SGJLMW25 **On the local and global minimizers of the smooth stress function in Euclidean Distance Matrix problems**
M. Song, D. Goncalves, W. Jung, C. Lavor, A. Mucherino, H. Wolkowicz.
Linear Algebra and its Applications, Volume 727, 15 December 2025, Pages 234-267.
DOI: https://doi.org/10.1016/j.laa.2025.08.012

JTW25 **The ω-condition number: applications to preconditioning and low rank generalized Jacobian updating**
W. Jung, D. Torregrosa-Belen, and H. Wolkowicz.
Computational Optimization and Applications, Volume 91, pages 235–282, (2025).
DOI: https://doi.org/10.1007/s10589-025-00669-w

HJS24 **Role of Subgradients in Variational Analysis of Polyhedral Functions**
N. T. V. Hang, W. Jung, M. E. Sarabi.
Journal of Optimization Theory and Applications, Volume 200, pages 1160–1192, (2024).
DOI: https://doi.org/10.1007/s10957-024-02378-6

Research papers under review

GJSTWYY **New insights and algorithms for optimal diagonal preconditioning**
S. Ghadimi, W. Jung, A. Sujanani, D. Torregrosa-Belen, H. Wolkowicz.
arxiv:2509.23439.

AJMWYY **Exact Solutions for the NP-hard Wasserstein Barycenter Problem using a Doubly Nonnegative Relaxation and a Splitting Method**
W. Jung, H. Wolkowicz.
arXiv:2311.05045.

AJWXYY **Single Element Error Correction in a Euclidean Distance Matrix**
A. Alfakih, W. Jung, H. Wolkowicz, T. Xu.
arXiv:2406.15969.

IJMTWYY **Projection, Degeneracy, and Singularity Degree for Spectrahedra**
H. Im, W. Jung, W. Moursi, D. Torregrosa-Belen, H. Wolkowicz.
arXiv:2407.06408.

Teaching experience

2022-2025 **Teaching assistant, University of Waterloo**
CO 250 (Introduction to Optimization), CO 372 (Portfolio Optimization Models), CO 673 (Optimization for Data Science), MATH 136 (Linear Algebra 1)

- Assisted instructors with grading assignments and exams, and provided constructive feedback to students
- Offered individual academic support through regular office hours
- Contributed improving lectures by communicating common student difficulties to instructors

Tutor, Tutoring Center

- Provided academic support for MATH 135 (Algebra), 136 (Linear Algebra 1) and 235 (Linear Algebra 2)
- Identified students' misunderstandings and provided clear explanations
- Guided students in developing effective problem solving strategies

2019-2021 **Teaching assistant, Miami University**
MTH 125 (Precalculus), MTH 222 (Introduction to Linear Algebra)

2016-2017 **Student Help Session, Catholic Kwandong University**
Helped peer students by answering individual inquiries across all math courses

2016 **Peer Tutoring, Catholic Kwandong University**
Led a group tutorial session to review course materials in Abstract Algebra

2016 **Teaching Practicum, Geoje middle school**
Delivered 60 hours of math classes

Conference attendance

May 2024 International Conference on Optimization: Challenges and Applications, Alicante, Spain
Invited talk: *The ω-condition number for optimal preconditioning and low rank updating*

November 2024 — 26th Midwest Optimization Meeting, Waterloo, Canada
Poster session: *The ω-condition number for optimal preconditioning and low rank updating*

March 2025 — 18th INFORMS Computing Society (ICS) Conference, Toronto, Canada
Invited talk: *Single Element Error Correction in a Euclidean Distance Matrix*

May 2025 — Strategies for Handling Applications with Nonconvexity, Banff International Research Station, Canada
Invited talk: *Single Element Error Correction in a Euclidean Distance Matrix*

Peer review for

Journal of Global Optimization

Technical skills

Programming language
MATLAB

Languages
English, Korean

Teacher Certificate

Secondary School Teacher (Grade II) of Mathematics
Issued by the Ministry of Education, Republic of Korea