Alex L. Wang

Curriculum Vitae
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Education

Carnegie Mellon University Sept. 2017–May 2022 (*expected*)
Ph.D., Computer Science
Advisor: Fatma Kılınç-Karzan
Thesis: On semidefinite program relaxations of quadratically constrained quadratic programs

Northwestern University June 2017
B.S., Double Major Computer Science, Mathematics
Honors: *summa cum laude*

Publications

Working papers

Accelerated gradient descent and optimal storage for low-rank semidefinite programs
A. L. Wang and F. Kılınç-Karzan

A GTRS approach to Stackelberg prediction games with least-squares loss
R. Jiang and X. Li and A. L. Wang and J. Wang

Submitted articles

Implicit regularity and linear convergence for the generalized trust-region subproblem
A. L. Wang and Y. Lu and F. Kılınç-Karzan
Under review at *SIAM J. Optim.*, Dec. 2021

A geometric treatment of SDP exactness in QCQPs and its applications
A. L. Wang and F. Kılınç-Karzan
Under review at *Math. Program.*, Nov. 2021

New notions of simultaneous diagonalizability of quadratic forms with applications to QCQPs
A. L. Wang and R. Jiang
Under review at *Math. Program.*, Jan. 2021

Journal publications

Necessary and sufficient conditions for rank-one generated cones
C. Argue, F. Kılınç-Karzan, and A. L. Wang
Accepted at *Math. Oper. Res.*, 2021

Exactness in SDP relaxations of QCQPs: Theory and applications
F. Kılınç-Karzan and A. L. Wang
Tut. in Oper. Res., 2021

On the tightness of SDP relaxations of QCQPs
A. L. Wang and F. Kılınç-Karzan
Math. Program., 2021
Winner of INFORMS Optimization Society's 2021 Student Paper Prize

The generalized trust region subproblem: Solution complexity and convex hull results
A. L. Wang and F. Kılınç-Karzan
Math. Program., 2020

Refereed conference proceedings

On convex hulls of epigraphs of QCQPs
A. L. Wang and F. Kılınç-Karzan
Integer Program. and Comb. Optim., 2020

Hardy-Muckenhoupt bounds for Laplacian eigenvalues
G. L. Miller, N. J. Walkington, and A. L. Wang
Approx. Algorithms for Comb. Optim. Prob., 2019

Clustering stable instances of Euclidean k-means
A. Dutta, A. Vijayaraghavan, and A. L. Wang
Adv. in Neural Inf. Process. Syst., 2017

Talks

First order methods for robust quadratic minimization with applications to nonconvex QCQPs
ICS (INFORMS Comput. Soc. Conf.) Jan. 2022

Accurately and efficiently solving structured nonconvex optimization problems
CAAM Colloquium, Rice University Dec. 2021

Exactness in SDP relaxations of QCQPs: Theory and applications
INFORMS Annual Meeting, *invited tutorial talk* Oct. 2021

New notions of simultaneous diagonalizability of quadratic forms
INFORMS Annual Meeting Oct. 2021
MOPTA (Model. and Optim.: Theory and Appl.) Aug. 2021
CMU Theory Lunch Apr. 2021

A geometric treatment of SDP exactness in QCQPs and its applications
INFORMS Annual Meeting Nov. 2020

Exactness in semidefinite programming
CMU ChemE Seminar Oct. 2020
CMU Theory Lunch Sept. 2020

On convex hulls of epigraphs of QCQPs
IPCO (Conf. on Integer Programming and Comb. Optim.) June 2020

Sufficient conditions for exact SDP reformulations of QCQPs
INFORMS Annual Meeting Oct. 2021
OP20 (SIAM Conf. on Optim.), *canceled due to COVID-19* May 2020
IOS (INFORMS Optim. Soc. Conf.), *canceled due to COVID-19* Mar. 2020
INFORMS Annual Meeting Oct. 2019

Hardy-Muckenhoupt bounds for Laplacian eigenvalues
APPROX (Int. Workshop on Approx. Algorithms for Comb. Optim. Prob.) Sept. 2019
CMU Theory Lunch May 2019

Teaching

Eberly Center for Teaching Excellence and Educational Innovation

Future Faculty Program Feb. 2021–Oct. 2021
Certificate program on effective teaching
Seminars: *Grading and delivering feedback on quantitative assignments*, *Teaching problem solving in recitation*, *Planning and delivering effective lectures*, *Working well one on one with students*, *Creating a welcoming and supportive climate from day one*, *Teaching inclusively: centering DEI in course design*, *Conducting productive and engaging discussions*

Carnegie Mellon University

Optimization, Head Teaching Assistant Spring 2021
MBA core curriculum

Advanced Algorithms, Teaching Assistant — Fall 2020
Graduate-level computer science elective

Modern Convex Optimization, Teaching Assistant — Spring 2020
Graduate-level operations research and ACO (algorithms, combinatorics, and optimization) core curriculum

NORTHWESTERN UNIVERSITY

Mathematical Foundations of CS, Teaching Assistant — Fall 2016
Undergraduate-level computer science core curriculum

Honors and awards

INFORMS Optimization Society Best Student Paper Award — Aug. 2021
Awarded to *On the tightness of SDP relaxations of QCQPs*

summa cum laude, Northwestern University — June 2017
Awarded to the top 5% of the graduating class

Outstanding Senior in CS, Northwestern University — June 2017
1 of 2 recipients

Tau Beta Pi Engineering Honor Society — Nov. 2015

Professional activities

Journal and conference reviewing
INFORMS J. Optim., 2021; IPCO 2021; Math. Oper. Res., 2021; Math. Prog., 2021; Oper. Res. Lett., 2021; SIAM J. Optim., 2021

INFORMS Annual Meeting, Session Co-organizer — Oct. 2021
Recent developments in semidefinite programming

INFORMS Annual Meeting, Session Co-organizer — Nov. 2020
Advances in nonconvex quadratic programs and their relaxations

SIAM Conference on Optimization, Minisymposium Co-organizer — May 2020 (*canceled*)
Recent advances in structure in semidefinite programs

INFORMS Optimization Society Conference, Session co-organizer — Mar. 2020 (*canceled*)
Semidefinite Programming: Theory and Algorithms

Departmental service

Graduate Student Teaching Award Committee — Feb. 2022

Graduate Student Ombudsperson — May 2020–present

Doctoral Review Committee, Graduate Student Member — May 2020–present

DEI in Computer Science and Society Course, Working Group — Sept. 2020–Jan. 2021
Member of working group designing a course on DEI for first-year Ph.D. students

Mentoring

Yunlei Lu, Undergraduate student from Peking University — Jan. 2021–present

Professional affiliations

SIAM (Society for Industrial and Applied Mathematics), Member

INFORMS (Institute for Operations Research and the Management Sciences), Member

MOS (Mathematical Optimization Society), Member