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

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

Implicit regularity and accelerated algorithms for the generalized trust region subproblem
A. L. Wang and Y. Lu and F. Kılınç-Karzan

A geometric treatment of SDP exactness in QCQPs and its applications
A. L. Wang and F. Kılınç-Karzan
arXiv preprint, May 2021

Weighted Cheeger and Buser inequalities, with applications to clustering and cutting probability densities
T. Chu, G. L. Miller, N. J. Walkington, and A. L. Wang
arXiv preprint, Apr. 2020

Submitted articles

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

Necessary and sufficient conditions for rank-one generated cones
C. Argue, F. Kılınç-Karzan, and A. L. Wang
Under minor revision at *Math. Oper. Res.*, (July 2020; revised in April and September 2021)

Journal publications

Exactness in SDP relaxations of QCQPs: Theory and applications
F. Kılınç-Karzan and A. L. Wang
Accepted at *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

Exactness in SDP relaxations of QCQPs: Theory and applications

INFORMS Annual Meeting, *invited tutorial talk* (virtual: **VTD80**)	Oct. 2021 (*Forthcoming*)

New notions of simultaneous diagonalizability of quadratic forms

INFORMS Annual Meeting (in-person: **TB40**) (virtual: **VSB66**)	Oct. 2021 (*Forthcoming*)
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, *IOS prize talk session* (in-person: **SC23**) (virtual: **VSB62**)	Oct. 2021 (*Forthcoming*)
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

Professional activities

Reviewer: IPCO 2021; Math. Oper. Res., 2021; SIAM J. Optim., 2021; Math. Prog., 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
Recent advances in structure in semidefinite programs
Canceled due to COVID-19

INFORMS Optimization Society Conference, Session co-organizer   Mar. 2020
Semidefinite Programming: Theory and Algorithms
Canceled due to COVID-19

Departmental service

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

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 affiliations

SIAM (Society for Industrial and Applied Mathematics), Member

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

MOS (Mathematical Optimization Society), Member