Alex L. Wang

Curriculum Vitae
February 12, 2024
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ACADEMIC POSITIONS

Purdue University
Assistant Professor in Krannert School of Management, Quantitative Methods
Jan. 2023–present

Centrum Wiskunde & Informatica
Postdoctoral Researcher
Advisor: Monique Laurent
July 2022–Dec. 2022

EDUCATION

Carnegie Mellon University
Ph.D., Computer Science
Sept. 2017–June 2022
Advisor: Fatma Kilinc-Karzan
Thesis: On semidefinite program relaxations of quadratically constrained quadratic programs

Northwestern University
Sept. 2013–June 2017
B.S., Double Major Computer Science, Mathematics
Honors: summa cum laude

PUBLICATIONS

Articles under review

Accelerated Gradient Descent via Long Steps
(α) B. Grimmer, K. Shu, and A. L. Wang

Sharpness and well-conditioning of nonsmooth convex formulations in statistical signal recovery
(α) L. Ding and A. L. Wang

A geometric treatment of SDP exactness in QCQPs and its applications
A. L. Wang and F. Kilinc-Karzan

Hidden convexity and algorithms in constrained optimization over the rotation group
(α) A. Ramachandran, K. Shu, and A. L. Wang

Accelerated first-order methods for a class of semidefinite programs
A. L. Wang and F. Kilinc-Karzan

New notions of simultaneous diagonalizability of quadratic forms with applications to QCQPs
A. L. Wang and R. Jiang

Journal publications

Implicit regularity and linear convergence for the generalized trust-region subproblem
A. L. Wang and Y. Lu and F. Kilinc-Karzan
SIAM J. Optim., 2023

Necessary and sufficient conditions for rank-one generated cones
(α) C. Argue, F. Kilinc-Karzan, and A. L. Wang
Math. Oper. Res., 2021

(α) indicates alphabetical author order
Exactness in SDP relaxations of QCQPs: Theory and applications
(α) 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
Solving Stackelberg prediction games with least squares loss via spherically constrained least squares reformulation
J. Wang and W. Huang and R. Jiang and X. Li and A. L. Wang
International Conf. on Machine Learning
Winner of ICML 2022 Outstanding Paper Award (1/10)
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
(α) G. L. Miller, N. J. Walkington, and A. L. Wang
*Approx. Algorithms for Comb. Optim. Prob.,* 2019
Clustering stable instances of Euclidean k-means
(α) A. Dutta, A. Vijayaraghavan, and A. L. Wang
*Adv. in Neural Inf. Process. Syst.,* 2017

TALKS

New first-order methods in modern/classical settings
The University of Sydney Business School Research Seminar, *Sydney, Australia* Nov. 2023
Daniels School of Business Quantitative Methods Seminar, *West Lafayette, IN* Sept. 2023

Sharp exact penalty formulations in signal recovery
INFORMS Annual Meeting, *Phoenix, AZ* Oct. 2023
ICIAM23 (Int. Congr. on Ind. and Appl. Math.), *Tokyo, Japan* Aug. 2023

Accelerated first-order methods for a class of semidefinite programs
OP23 (SIAM Conf. on Optim.), *Seattle, WA* May. 2023
Workshop on semidefinite and polynomial optimization, *Amsterdam, Netherlands* Aug. 2022
ICCOPT (Int. Conf. on Continuous Optim.), *Bethlehem, PA* July 2022
Networks and Optimization Seminar, Centrum Wiskunde & Informatica, *Online* Feb. 2022

Accurately and efficiently solving structured nonconvex optimization problems
ISE, University of Illinois Urbana-Champaign, *Online* Mar. 2022
Quantitative Methods, Purdue University Krannert School of Business, *West Lafayette, IN* Jan. 2022
Mathematics of Data & Decisions Seminar, UC Davis, *Online* Jan. 2022
Argonne National Laboratory, *Online* Jan. 2022
CAAM Colloquium, Rice University, *Houston, TX* Dec. 2021

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

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

A geometric treatment of SDP exactness in QCQPs and its applications
INFORMS Annual Meeting, *Online* Nov. 2020
Exactness in semidefinite programming
CMU ChemE Seminar, Online Oct. 2020
CMU Theory Lunch, Online Sept. 2020

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

Sufficient conditions for exact SDP reformulations of QCQPs
INFORMS Annual Meeting, Anaheim, CA 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, Seattle, WA Oct. 2019

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

A linear-time algorithm for generalized trust region subproblem based on a convex quadratic reformulation
ICCOPT (Int. Conf. on Continuous Optim.), Berlin, Germany Aug. 2019

TEACHING

Purdue University
MGMT 690 Convex Optimization
MGMT 306 Management Science, Instructor Spring 2023, Spring 2024

Carnegie Mellon University
Optimization, Head Teaching Assistant Spring 2021
Advanced Algorithms, Teaching Assistant Fall 2020
Modern Convex Optimization, Teaching Assistant Spring 2020

Northwestern University
Mathematical Foundations of CS, Teaching Assistant Fall 2016

HONORS AND AWARDS

ICML 2022 Outstanding Paper Award July 2022
Awarded to Solving Stackelberg prediction games with least squares loss via a spherically constrained least squares reformulation

CMU Graduate Student Service Award Mar. 2022
Group award for development of DEI in Computer Science and Society course

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., IPCO, J. Optim. Theory Appl., Math. Oper. Res., Math. Prog., Optim. Lett., SIAM J. Optim.

INFORMS Optimization Society Conference, Session co-organizer March 2024
Recent advances in semidefinite programming

INFORMS Annual Meeting, Session co-organizer Oct. 2023
The interplay between learning, optimization, and statistics
SIAM Conference on Optimization, Minisymposium co-organizer May 2023
Advances in optimal storage semidefinite programming

INFORMS Annual Meeting, Session co-organizer (joint with F. Kılınç-Karzan) 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–May 2022
Doctoral Review Committee, Graduate Student Member May 2020–May 2022
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

ADVISING AND MENTORING
Ph.D. Thesis committee
Yao Ji, Purdue University, Industrial Engineering 2024 Summer (Expected)

Graduate or undergraduate project advisor
Yunlei Lu, Undergraduate student from Peking University Jan. 2021–Feb. 2023
First placement: Master of Scientific Computing program, Courant Institute of Mathematical Sciences, NYU

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