

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

Advisor: Fatma Kılınç-Karzan

Thesis: On semidefinite program relaxations of quadratically constrained quadratic programs

Sept. 2017–June 2022

Northwestern University

B.S., Double Major Computer Science, Mathematics

Honors: *summa cum laude*

Sept. 2013–June 2017

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. Kılınç-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. Kılınç-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. Kılınç-Karzan

SIAM J. Optim., 2023

Necessary and sufficient conditions for rank-one generated cones

(α) C. Argue, F. Kılınç-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, <i>Online</i>	Oct. 2020
CMU Theory Lunch, <i>Online</i>	Sept. 2020
On convex hulls of epigraphs of QCQPs	
IPCO (Conf. on Integer Programming and Comb. Optim.), <i>Online</i>	June 2020
Sufficient conditions for exact SDP reformulations of QCQPs	
INFORMS Annual Meeting, <i>Anaheim, CA</i>	Oct. 2021
OP20 (SIAM Conf. on Optim.), <i>canceled due to COVID-19</i>	May 2020
IOS (INFORMS Optim. Soc. Conf.), <i>canceled due to COVID-19</i>	Mar. 2020
INFORMS Annual Meeting, <i>Seattle, WA</i>	Oct. 2019
Hardy-Muckenhoupt bounds for Laplacian eigenvalues	
APPROX (Int. Workshop on Approx. Algorithms for Comb. Optim. Prob.), <i>Boston, MA</i>	Sept. 2019
CMU Theory Lunch, <i>Pittsburgh, PA</i>	May 2019
A linear-time algorithm for generalized trust region subproblem based on a convex quadratic reformulation	
ICCOPT (Int. Conf. on Continuous Optim.), <i>Berlin, Germany</i>	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
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HONORS AND AWARDS

ICML 2022 Outstanding Paper Award	July 2022
Awarded to <i>Solving Stackelberg prediction games with least squares loss via a spherically constrained least squares reformulation</i>	
CMU Graduate Student Service Award	Mar. 2022
Group award for development of <i>DEI in Computer Science and Society</i> course	
INFORMS Optimization Society Best Student Paper Award	Aug. 2021
Awarded to <i>On the tightness of SDP relaxations of QCQPs</i>	
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 Advances in optimal storage semidefinite programming	May. 2023
INFORMS Annual Meeting , Session co-organizer(joint with F. Kılınç-Karzan) Recent developments in semidefinite programming	Oct. 2021
INFORMS Annual Meeting , Session co-organizer Advances in nonconvex quadratic programs and their relaxations	Nov. 2020
SIAM Conference on Optimization , Minisymposium co-organizer Recent advances in structure in semidefinite programs	May 2020 (<i>canceled</i>)
INFORMS Optimization Society Conference , Session co-organizer Semidefinite Programming: Theory and Algorithms	Mar. 2020 (<i>canceled</i>)

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 Member of working group designing a course on DEI for first-year Ph.D. students	Sept. 2020–Jan. 2021

ADVISING AND MENTORING

Ph.D. Thesis committee

Yao Ji , Purdue University, Industrial Engineering	2024 Summer (Expected)
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Graduate or undergraduate project advisor

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