

Junhyung Lyle Kim

Legal name: Junhyung Kim

jlylekim.github.io | [google scholar](https://scholar.google.com/citations?user=jlylekim) | [jlylekim](https://www.facebook.com/jlylekim) | [jlylekim](https://www.linkedin.com/in/jlylekim) | [jlylekim](https://twitter.com/jlylekim)

Employment

JPMorganChase, Global Technology Applied Research New York, NY
Quantum Computing Research Scientist — Sr. Associate Oct 2024 - Present
• Research interests: optimization; quantum algorithms; randomized algorithms; machine learning

Education

Rice University Houston, TX
Ph.D. in Computer Science Aug 2019 - Aug 2024
• Advisors: Profs. Anastasios Kyrillidis (chair) [website]; César A. Uribe [website]; Nai-Hui Chia [website]
• Topics: algorithmic and structural acceleration techniques in machine learning and quantum computing [thesis]

University of Chicago Chicago, IL
B.A. in Mathematics; B.A. in Statistics Jun 2017
• Advisor: Prof. Panos Toulis [website]; General Honors; Dean's List 2013-2017

Professional Experience

JPMorganChase, Global Technology Applied Research New York, NY
Quantum Computing Research Intern; Host: Dr. Marco Pistoia [website] Jun 2024 - Aug 2024
• Design, analysis, and application of quantum / quantum-inspired classical algorithms

Mila – Quebec Artificial Intelligence Institute Montréal, QC
Visiting Student Researcher; Hosts: Profs. Ioannis Mitliagkas and Gauthier Gidel May 2023 - Aug 2023
• First-order methods for variational inequality problems with surrogate loss in function space
• Curvature adaptive optimization algorithm for improved out-of-distribution generalization

Meta, Fundamental AI Research (FAIR) New York, NY
AI Research Intern; Host: Dr. Aaron Defazio [website] May 2022 - Aug 2022
• Theory and application of adaptive stochastic gradient methods for deep learning

Republic of Korea Special Warfare Training Group (SWTG) Gyeonggi, South Korea
Sergeant / Aide-de-Camp to the commander of SWTG Jan 2012 - Oct 2013
• Airborne training (certified paratrooper license #748-416); maritime infiltration training

Academic Experience

Rice University, Computer Science Department Houston, TX
Ph.D. Candidate; Advisors: Profs. Anastasios Kyrillidis, César A. Uribe, and Nai-Hui Chia Aug 2019 - Aug 2024
• Active collaborations with Google (F. Pedregosa) and IBM (G. Kollias) on optimization and quantum computing
• Adaptive & robust optimization / efficient quantum state tomography via nonconvex & distributed optimization

University of Chicago, Booth School of Business Chicago, IL
Research Assistant; Supervisors: Profs. Panos Toulis and Sanjog Misra Jun 2017 - Jul 2019
• Stochastic approximation for large-scale inverse reinforcement learning

- Uncertainty quantification for high-energy physics unfolding problem; [code]; [documentation]

Publications

(* denotes equal contributions)

Journal Papers

- [J1] How Much Pre-training Is Enough to Discover a Good Subnetwork?
C. Wolfe*, F. Liao*, Q. Wang, **J. L. Kim**, A. Kyrillidis
Transactions on Machine Learning Research, TMLR 2024
- [J2] When is Momentum Extragradient Optimal? A Polynomial-Based Analysis
J. L. Kim, G. Gidel, A. Kyrillidis, F. Pedregosa
Transactions on Machine Learning Research, TMLR 2024
- [J3] Fast Quantum State Reconstruction via Accelerated Non-Convex Programming
J. L. Kim, G. Kollias, A. Kalev, K.X. Wei, A. Kyrillidis
Photonics 2023
- [J4] Local Stochastic Factored Gradient Descent for Distributed Quantum State Tomography
J. L. Kim, M. T. Toghani, C. A. Uribe, A. Kyrillidis
Control Systems Letters, L-CSS 2022

Conference Papers (peer-reviewed)

- [C1] A Catalyst Framework for the Quantum Linear System Problem via the Proximal Point Algorithm
J. L. Kim, N. H. Chia, A. Kyrillidis
AAAI Conference on Artificial Intelligence, AAAI 2026 (Oral)
- [C2] Fast Zeroth-Order Convex Optimization with Quantum Gradient Methods
J. L. Kim*, B. Augustino*, D. Herman*, E. Fontana*, J. Watkins, M. Pistoia, S. Chakrabarti
Advances in Neural Information Processing Systems, NeurIPS 2025
- [C3] Solving Hidden Monotone Variational Inequalities with Surrogate Losses
R. D'Orazio, D. Vucetic, Z. Liu, **J. L. Kim**, I. Mitliagkas, G. Gidel
International Conference on Learning Representations, ICLR 2025
- [C4] On the Error-Propagation of Inexact Hotelling's Deflation for Principal Component Analysis
F. Liao, **J. L. Kim**, C. Barnum, A. Kyrillidis
International Conference on Machine Learning, ICML 2024
- [C5] Adaptive Federated Learning with Auto-Tuned Clients
J. L. Kim, M. T. Toghani, C. A. Uribe, A. Kyrillidis
International Conference on Learning Representations, ICLR 2024
- [C6] Convergence and Stability of the Stochastic Proximal Point Algorithm with Momentum
J. L. Kim, P. Toulis, A. Kyrillidis
Conference on Learning for Dynamics and Control, L4DC 2022

Workshop Papers (peer-reviewed)

- [W1] Solving Hidden Monotone Variational Inequalities with Surrogate Losses
R. D'Orazio, D. Vucetic, Z. Liu, **J. L. Kim**, I. Mitliagkas, G. Gidel
Workshop on Optimization for Machine Learning, NeurIPS 2024
- [W2] Smoothness-Adaptive Sharpness-Aware Minimization for Finding Flatter Minima
H. Naganuma*, **J. L. Kim***, A. Kyrillidis, I. Mitliagkas
Workshop on Practical Machine Learning for Low Resource Settings, ICLR 2024

- [W3] Adaptive Federated Learning with Auto-Tuned Clients via Local Smoothness
J. L. Kim, M. T. Toghani, C. A. Uribe, A. Kyrillidis.
Workshop on Federated Learning and Analytics in Practice, ICML 2023
- [W4] Momentum Extragradient Is Optimal for Games with Cross-Shaped Jacobian Spectrum
J. L. Kim, G. Gidel, A. Kyrillidis, F. Pedregosa.
Workshop on Optimization for Machine Learning, NeurIPS 2022
- [W5] Acceleration and Stability of the Stochastic Proximal Point Algorithm
J. L. Kim, P. Toulis, A. Kyrillidis.
Workshop on Optimization for Machine Learning, NeurIPS 2021 (Spotlight)

Preprints

(* denotes equal contributions)

- [1] On Speedups for Convex Optimization via Quantum Dynamics
 S. Chakrabarti*, D. Herman*, J. Watkins*, E. Fontana, B. Augustino, **J. L. Kim**, M. Pistoia
QSim 2025
- [2] A Simple Analysis of a Quantum-Inspired Algorithm for Solving Low-Rank Linear Systems
 T. Chen*, **J. L. Kim***, A. Ray*, S. Chakrabarti, D. Herman, N. Kumar
- [3] Mechanisms for Quantum Advantage in Global Optimization of Nonconvex Functions
 G. Ozgul*, D. Herman*, A. Apte, **J. L. Kim**, A. Prakash, J. Shen, S. Chakrabarti
QIP 2026
- [4] Fault-Tolerant End-to-end Quantum Algorithms for Tensors
 E. Fontana, S. Prasad, **J. L. Kim**, J. Sullivan, M. Perlin, R. Shadlyn, S. Chakrabarti

Honors & Awards

- 2025 NeurIPS 2025 Top Reviewer (complimentary registration)
- 2025 ICLR 2025 Notable Reviewer
- 2024 Rice Engineering Alumni Graduate Student Spring Travel Grant (\$540)
- 2023 Rice Engineering Alumni Graduate Student Fall Travel Grant (\$480)
- 2023 AISTATS 2023 Top Reviewer (Top 10 %, complimentary registration)
- 2022 Rice Engineering Alumni Graduate Student Fall Travel Grant (\$1,200)
- 2022 Rice Engineering Alumni Graduate Student Spring Travel Grant (\$960)
- 2021 Spotlight paper, Workshop on Optimization for Machine Learning (NeurIPS 2021)
- 2021 Rice Engineering Alumni Graduate Student Fall Travel Grant (\$1,900)

Service

- Workshops** QuantIPS 2023: Co-organizer for "Quantum Information Processing Systems" [[link](#)]
 TL;DR 2023: Co-organizer for "Texas Colloquium on Distributed Learning" [[link](#)]
 ICML 2021: Co-organizer for "Beyond First Order Methods in Machine Learning Systems" [[link](#)]
- Reviews** Quantum, TMLR, NeurIPS, ICML, ICLR, AISTATS, CDC (2022), NECSYS (2022), TCNS (2022)

Mentorship

Undergraduate students

Co-advised with Prof. Anastasios Kyrillidis

- Rithik Jain (Rice University): sparse learning with hadamard product Mar 2021 - May 2022
- Justin Lumpkin (U of Maryland): deep matrix factorization; Google/Rice REU 1st place May 2021 - Aug 2021
- Cruz Barnum (Reed College): scalable streaming PCA; Google/Rice REU 2nd place May 2021 - Aug 2021

Others

Leadership *President*, Rice University Computer Science Graduate Student Association (2022 - 2023)
President, UChicago Korean Undergraduate Maroon Association (2016 - 2017)

Software MiFGD (Python)[[link](#)], sgd (R package)[[link](#)], UndersmoothedUnfolding (C++)[[link](#)]

Language Korean (native), English (bilingual proficiency)

Invited Talks

Adaptive Federated Learning with Auto-Tuned Clients <i>Annual Meeting, INFORMS</i>	Phoenix, AZ Oct 2023
Adaptive Federated Learning with Auto-Tuned Clients <i>Montréal Machine Learning and Optimization (MTL MLOpt), MILA</i>	Montréal, Canada Jun 2023
Local Stochastic Factored Gradient Descent for Distributed Quantum State Tomography <i>IEEE Conference on Decision and Control (CDC)</i>	Cancún, Mexico Dec 2022
Convergence and Stability of the Stochastic Proximal Point Algorithm with Momentum <i>Optimization for Machine Learning, INFORMS</i>	Indianapolis, IN Oct 2022
Convergence and Stability of the Stochastic Proximal Point Algorithm with Momentum <i>International Conference on Continuous Optimization (ICCOPT)</i>	Bethlehem, PA Jul 2022
Fast Quantum State Reconstruction via Accelerated Non-Convex Programming <i>Quantum Group Meeting Seminar, Rice University</i>	Houston, TX Jan 2022
Acceleration and Stability of the Stochastic Proximal Point Algorithm <i>Workshop on Optimization for Machine Learning, NeurIPS</i>	Virtual Dec 2021
Fast Quantum State Reconstruction via Accelerated Non-Convex Programming <i>Optimization in Quantum Computing, INFORMS</i>	Anaheim, CA Oct 2021

Other Experience

Dimensional Fund Advisors Research Intern, Investment Analytics & Data Group • Automated checking system development for security database; VBA tool for data comparison and visualization	Austin, TX Jun 2016 - Sep 2016
Cook M&A Advisory Services Investment Banking Summer Analyst • Data analysis for several buy-side projects; client document drafting	Chicago, IL Jun 2015 - Aug 2015
Freenters, Inc. Operations Intern • VBA tool for automatically personalized email dispatching; logo/poster design (Adobe Illustrator)	Chicago, IL Aug 2014 - Jan 2015