Junhyung Lyle Kim

Legal name: Junhyung Kim

 jlylekim.github.io | google scholar | jlylekim | jlylekim | 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   Sep 2013 - 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

University of Chicago, Statistics Department   Chicago, IL

Research Assistant; Supervisors: Profs. Mikael Kuusela and Michael Stein   Oct 2016 - Jun 2017

- 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***
Workshop on Optimization for Machine Learning, NeurIPS 2022

[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***
Workshop on Optimization for Machine Learning, NeurIPS 2024

[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***
Workshop on Federated Learning and Analytics in Practice, ICML 2023

[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 on Optimization for Machine Learning, NeurIPS 2021 (Spotlight)

Preprints

(* denotes equal contributions)

[P1] 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

[P2] 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

[P3] 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

[P4] 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

[P5] 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 — Phoenix, AZ
Annual Meeting, INFORMS — Oct 2023

Adaptive Federated Learning with Auto-Tuned Clients — Montréal, Canada
Montréal Machine Learning and Optimization (MTL MLOpt), MILA — Jun 2023

Local Stochastic Factored Gradient Descent for Distributed Quantum State Tomography — Cancún, Mexico
IEEE Conference on Decision and Control (CDC) — Dec 2022

Convergence and Stability of the Stochastic Proximal Point Algorithm with Momentum — Indianapolis, IN
Optimization for Machine Learning, INFORMS — Oct 2022

Convergence and Stability of the Stochastic Proximal Point Algorithm with Momentum — Bethlehem, PA
International Conference on Continuous Optimization (ICCOPT) — Jul 2022

Fast Quantum State Reconstruction via Accelerated Non-Convex Programming — Houston, TX
Quantum Group Meeting Seminar, Rice University — Jan 2022

Acceleration and Stability of the Stochastic Proximal Point Algorithm — Virtual
Workshop on Optimization for Machine Learning, NeurIPS — Dec 2021

Fast Quantum State Reconstruction via Accelerated Non-Convex Programming — Anaheim, CA
Optimization in Quantum Computing, INFORMS — Oct 2021

Other Experience

Dimensional Fund Advisors — Austin, TX
Research Intern, Investment Analytics & Data Group — Jun 2016 - Sep 2016
- Automated checking system development for security database; VBA tool for data comparison and visualization

Cook M&A Advisory Services — Chicago, IL
Investment Banking Summer Analyst — Jun 2015 - Aug 2015
- Data analysis for several buy-side projects; client document drafting

Freenters, Inc. — Chicago, IL
Operations Intern — Aug 2014 - Jan 2015
- VBA tool for automatically personalized email dispatching; logo/poster design (Adobe Illustrator)