

# Junhyung Lyle Kim

Legal name: Junhyung Kim

[jlylekim.github.io](https://jlylekim.github.io) | [google scholar](#) | [jlylekim](#) | [jlylekim](#) | [jlylekim](#)

## Employment

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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

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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

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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

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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

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( \* 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

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(\* 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

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- 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

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- 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

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### 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

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<b>Leadership</b>	President, Rice University Computer Science Graduate Student Association (2022 - 2023) President, UChicago Korean Undergraduate Maroon Association (2016 - 2017)
<b>Software</b>	MiFGD (Python) [ <a href="#">link</a> ], sgd (R package) [ <a href="#">link</a> ], UndersmoothedUnfolding (C++) [ <a href="#">link</a> ]
<b>Language</b>	Korean (native), English (bilingual proficiency)

## Invited Talks

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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

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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)	