

Junhyung Lyle Kim

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Education

Rice University

Ph.D. in Computer Science

Houston, TX

Aug 2019 - Present

- Advisor: Prof. Anastasios Kyrillidis [website]
- Research interests: optimization; distributed optimization; quantum computing; machine learning

University of Chicago

B.A. in Mathematics; B.A. in Statistics

Chicago, IL

Jun 2017

- Advisor: Prof. Panos Toulis [website]; General Honors; Dean's List 2013-2017

Research Experience

Meta, Fundamental AI Research (FAIR)

Research Intern; Supervisor: Dr. Aaron Defazio [website]

New York, NY

May 2022 - Aug 2022

- Theory and application of adaptive stochastic gradient methods for deep learning

Rice University, Computer Science Department

Ph.D. student working with Prof. Anastasios Kyrillidis

Houston, TX

Aug 2019 - Present

- Active collaborations with Google (F. Pedregosa) and IBM (G. Kollias) on optimization and quantum computing
- Efficient quantum state tomography with non-convex and distributed optimization methods
- Accelerating proximal/implicit methods for robust and fast optimization

University of Chicago, Booth School of Business

Research Assistant to Profs. Panos Toulis and Sanjog Misra

Chicago, IL

Jun 2017 - Jul 2019

- Stochastic approximation for large-scale inverse reinforcement learning

University of Chicago, Statistics Department

Research Assistant to Prof. Mikael Kuusela; Supervisor: Prof. Michael L. Stein

Chicago, IL

Oct 2016 - Jun 2017

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

Publications

- [1] **J. L. Kim**, M. T. Toghiani, C. A. Uribe, A. Kyrillidis, "Local stochastic factored gradient descent for distributed quantum state tomography" *Control Systems Letters (L-CSS)*, IEEE 2022
- [2] **J. L. Kim**, P. Toulis, A. Kyrillidis, "Convergence and stability of the stochastic proximal point algorithm with momentum" *Conference on Learning for Dynamics and Control (L4DC)*, PMLR 2022
- [3] **J. L. Kim**, P. Toulis, A. Kyrillidis, "Acceleration and stability of the stochastic proximal point algorithm" *Workshop on Optimization for Machine Learning, NeurIPS 2021 (spotlight)*

Papers Under Review

- [1] **J. L. Kim**, G. Gidel, A. Kyrillidis, F. Pedregosa "Momentum extragradient is optimal for games with cross-shaped spectrum"
- [2] **J. L. Kim**, G. Kollias, A. Kalev, K. X. Wei, A. Kyrillidis, "Fast quantum state reconstruction via accelerated non-convex programming"

Working Papers

- [1] **J. L. Kim**, J. A. Lara Benitez, M. T. Toghani, C. Wolfe, Z. Zhang, A. Kyrillidis “Momentum-inspired low-rank coordinate descent for diagonally constrained SDPs”
- [2] C. Wolfe, Q. Wang, **J. L. Kim**, A. Kyrillidis “Provably efficient lottery ticket discovery”
- [3] **J. L. Kim**, S. Misra, P. Toulis, “Exact inference of large-scale inverse reinforcement learning with stochastic gradient descent”

Invited Talks

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

Honors & Awards

- 2022 Rice Engineering Alumni Graduate Student Travel Grant (\$960)
- 2021 Rice Engineering Alumni Graduate Student Travel Grant (\$1,900)

Service

- Workshops** ICML (2021): co-organizer for “Beyond first order methods in machine learning systems” [link]
- Reviews** AISTATS (2022), CDC (2022), NECSYS (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

- Software** MiFGD (Python) [link], sgd (R package) [link], UndersmoothedUnfolding (C++) [link]
- Programming** Python, R, C++, Matlab, ROOT (CERN)
- Language** Korean (native), English (bilingual proficiency)
- Leadership** President, Rice University Computer Science Graduate Student Association (2022 - 2023)
President, UChicago Korean Undergraduate Maroon Association (2016 - 2017)

Professional Experience

Dimensional Fund Advisors

- Research Intern, Investment Analytics & Data Group Austin, TX
Jun 2016 - Sep 2016
- Automated checking system for security database; prototyping VBA tool for data comparison

Cook M&A Advisory Services

Investment Banking Summer Analyst

*Chicago, IL**Jun 2015 - Aug 2015*

- Data analysis for several buy-side projects; client document drafting

Freenters, Inc.

Operations Intern

*Chicago, IL**Aug 2014 - Jan 2015*

- VBA tool for automatically personalized email dispatching; logo/poster design (Adobe Illustrator)

Republic of Korea Special Warfare Training Group (SWTG)

Special Forces Sergeant / Aide-de-Camp to Commander of SWTG

*Gyeonggi, South Korea**Jan 2012 - Oct 2013*

- Airborne training (certified paratrooper license #748-416); maritime infiltration training