Junhyung Lyle Kim

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Education _

Rice University Houston, TX

Ph.D. in Computer Science

Aug 2019 - Present

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

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

Research Experience _____

Meta, Fundamental AI Research (FAIR)

New York, NY

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

May 2022 - Aug 2022

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

Rice University, Computer Science Department

Houston, TX

Ph.D. student working with Prof. Anastasios Kyrillidis

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

Chicago, IL

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

Oct 2016 - Jun 2017

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

Publications

Journals

[1] J. L. Kim, M. T. Toghani, C. A. Uribe, A. Kyrillidis, "Local stochastic factored gradient descent for distributed quantum state tomography" Control Systems Letters (L-CSS), IEEE 2022

Conference Papers

- [1] J. L. Kim, M. T. Toghani, C. A. Uribe, A. Kyrillidis, "Local stochastic factored gradient descent for distributed quantum state tomography" Conference on Decision and Control, IEEE 2022
- [2] J. L. Kim, P. Toulis, A. Kyrillidis, "Convergence and stability of the stochastic proximal point algorithm with Conference on Learning for Dynamics and Control (L4DC), PMLR 2022

Workshop Papers & Posters

- [1] **J. L. Kim**, G. Kollias, A. Kalev, K. X. Wei, A. Kyrillidis, "Fast quantum state reconstruction via accelerated non-convex programming" *Quantum Information Processing (QIP)*, 2023
- [2] **J. L. Kim**, M. T. Toghani, C. A. Uribe, A. Kyrillidis, "Local stochastic factored gradient descent for distributed quantum state tomography" *Quantum Information Processing (QIP)*, 2023
- [3] **J. L. Kim**, G. Gidel, A. Kyrillidis, F. Pedregosa "Momentum extragradient is optimal for games with cross-shaped Jacobian spectrum"

 Workshop on Optimization for Machine Learning, NeurIPS 2022
- [4] **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)*

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

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 Workshop on Optimization for Machine Learning, NeurIPS	Virtual Dec 2021
Fast quantum state reconstruction via accelerated non-convex programming	Anaheim, CA
Optimization in Quantum Computing, INFORMS	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 (2022–2023), CDC (2022), NECSYS (2022), TCNS (2022)

Mentorship __

Undergraduate students

Co-advised with Prof. Anastasios Kyrillidis

• Rithik Jain (Rice University): sparse learning with hadamard product

• Justin Lumpkin (U of Maryland): deep matrix factorization; Google/Rice REU 1st place

• Cruz Barnum (Reed College): scalable streaming PCA; Google/Rice REU 2nd place

Mar 2021 - May 2022

May 2021 - Aug 2021 May 2021 - Aug 2021

2

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

Austin, TX

Research Intern, Investment Analytics & Data Group

Jun 2016 - Sep 2016

· Automated checking system for security database; prototyping VBA tool for data comparison

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)

Republic of Korea Special Warfare Training Group (SWTG)

Gyeonggi, South Korea

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

Jan 2012 - Oct 2013

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