

J. Lyle Kim

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Education

Rice University

Ph.D. in Computer Science

Houston, TX

Aug 2019 - Present

- Advisors: Prof. Anastasios Kyrillidis (chair) [website]; Prof. César A. Uribe [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

Mila – Quebec Artificial Intelligence Institute / Université de Montréal

Visiting Student Researcher; Hosts: Profs. Ioannis Mitliagkas and Gauthier Gidel

Montréal, QC

May 2023 - Present

- Analysis of single and multi-objective optimization with applications in machine learning

Meta, Fundamental AI Research (FAIR)

Research Intern; Host: 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 Profs. Anastasios Kyrillidis and César A. Uribe

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

Journal/Conference Papers

- [1] Fast Quantum State Reconstruction via Accelerated Non-Convex Programming
J. L. Kim, G. Kollias, A. Kalev, K.X. Wei, A. Kyrillidis.
Photonics 2023 / Quantum Information Processing (QIP) 2023 (poster)
- [2] 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), IEEE 2022 / Quantum Information Processing (QIP) 2023 (poster)
- [3] 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), PMLR 2022

Workshop Papers

- [1] 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
- [2] 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)

Papers Under Review

- [1] When is Momentum Extragradient Optimal? A Polynomial-Based Analysis
J. L. Kim, G. Gidel, A. Kyrillidis, F. Pedregosa.
- [2] Adaptive Federated Learning with Auto-Tuned Clients
J. L. Kim, M. T. Toghani, C. A. Uribe, A. Kyrillidis.

Working Papers

- [1] Solving Quantum Linear System via Implicit Gradient Descent
J. L. Kim, N. Chia, A. Kyrillidis.
- [2] Momentum-Inspired Low-Rank Coordinate Descent for Diagonally Constrained SDPs
J. L. Kim, J. A. Lara Benitez, M. T. Toghani, C. Wolfe, Z. Zhang, A. Kyrillidis.

Invited Talks

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

Honors & Awards

- 2023 AISTATS 2023 Top Reviewer (Top 10 %)
- 2022 Rice Engineering Alumni Graduate Student Fall Travel Grant (\$1,200)
- 2022 Rice Engineering Alumni Graduate Student Spring Travel Grant (\$960)
- 2021 Rice Engineering Alumni Graduate Student Fall Travel Grant (\$1,900)

Service

- Workshops** ICML (2021): co-organizer for "Beyond first order methods in machine learning systems" [[link](#)]
- Reviews** AISTATS (2022–2023), NeurIPS (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 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 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