Junhyung Lyle Kim

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Education

Rice University *Houston, TX*

Ph.D. in Computer Science *Aug 2019 - May 2024 (expected)*

- 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*

- General Honors; Dean's List 2013-2017

Publications

[1] **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. Kollias, A. Kalev, K. X. Wei, A. Kyrillidis, "Fast quantum state reconstruction via accelerated non-convex programming"

[2] **J. L. Kim**, P. Toulis, A. Kyrillidis, "Convergence and stability of the stochastic proximal point algorithm with momentum"

[3] **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"

[4] C. Wolfe, Q. Wang, **J. L. Kim**, A. Kyrillidis "Provably efficient lottery ticket discovery"

Working Papers

[1] **J. L. Kim**, C. A. Uribe, A. Kyrillidis, "Large-scale quantum state tomography via distributed optimization"

[2] **J. L. Kim**, S. Misra, P. Toulis, "Exact inference of large-scale inverse reinforcement learning with stochastic gradient descent"

[3] **J. L. Kim**, M. Kuusela, "Debiased uncertainty quantification in unfolding elementary particle spectra at the Large Hadron Collider"

Invited Talks

[1] "Acceleration and stability of the stochastic proximal point algorithm"
Workshop on Optimization for Machine Learning, NeurIPS (Dec 2021)

[2] "Fast quantum state reconstruction via accelerated non-convex programming"
Rice Quantum Seminar Series, Rice University (Nov 2021)

[3] "Fast quantum state reconstruction via accelerated non-convex programming"
Optimization in Quantum Computing, INFORMS (Oct 2021)

[4] "Exact inference of large-scale inverse reinforcement learning with stochastic gradient descent"
Working group in Econometrics, Department of Economics, University of Chicago (Jun 2018)

[5] "Debiased uncertainty quantification in unfolding elementary particle spectra at the Large Hadron Collider"
Prof. Michael L. Stein Group, Department of Statistics, University of Chicago (May 2017)

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)

Services

Workshops ICML (2021): co-organizer for "Beyond first order methods in machine learning systems" [link]
Reviews AISTATS (2022): reviewer

Mentorships

Undergraduate students

Co-advised with Prof. Anastasios Kyrillidis

- Justin Lumpkin (University of Maryland): deep matrix factorization; 1st place in Google/Rice REU program (2021 - present)
- Cruz Barnum (Reed College): scalable streaming PCA; 2nd place in Google/Rice REU program (2021 - present)
- Rithik Jain (Rice University): sparse learning with hadamard product (2021 - present)

Research Experience

Rice University, Computer Science Department
Houston, TX

Ph.D. student working with Prof. Anastasios Kyrillidis
Aug 2019 - Present

- Efficient quantum state tomography with non-convex and distributed/decentralized optimization methods
- Accelerating 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

- Developed stochastic approximation-based method for exact inference of large-scale inverse reinforcement learning with applications to discrete choice models in Econometrics

University of Chicago, Statistics Department
Chicago, IL

Research Assistant to Prof. Mikael Kuusela; Supervisor: Prof. Michael L. Stein
Oct 2016 - Jun 2017

- Implemented undersmoothing technique to find optimal regularization parameter for uncertainty quantification in high-energy physics unfolding problem in ROOT; published software on Github [link]

University of Chicago, Booth School of Business
Chicago, IL

Research Assistant to Prof. Oleg Urminsky
Jan 2016 - Apr 2016

- Wrote STATA script that automatically fills in information of each data point for 600+ excel files by searching master database; further adjusted master database to improve accuracy of each data file

Professional Experience

Dimensional Fund Advisors
Austin, TX

Research Intern, Investment Analytics & Data Group
Jun 2016 - Sep 2016

- Researched about FactSet dynamic financial data of over 50,000 securities; determined their accuracy and reliability in order to construct an automated checking system for current primary data source (Bloomberg)
- Developed VBA tool to compare two datasets that produces basic statistics and visualizes differences

Cook M&A Advisory Services
Chicago, IL

Investment Banking Summer Analyst
Jun 2015 - Aug 2015

- Organized and cleaned data for 7 buy-side projects by eliminating duplicates and inadequate components using MS Excel and VBA; drafted each client document through further qualitative research

Freenters, Inc.
Chicago, IL

Operations Intern
Aug 2014 - Jan 2015

- Developed MS Excel VBA algorithm that sends automatically personalized emails to a mass contact list
- Designed new posters and company logo in Scalable Vector Graphics format using Adobe Illustrator

Republic of Korea Special Warfare Training Group (SWTG)
Gyeonggi, South Korea

Special Forces Sergeant / Aide-de-Camp to Commander of SWTG
Jan 2012 - Oct 2013

- Selected out of 1000+ soldiers to aid Commander of SWTG; completed various trainings including Airborne training (certified paratrooper license #748-416) and maritime infiltration training