

Junhyung Lyle Kim

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Education

Rice University

Ph.D. in Computer Science

Houston, TX

Aug 2019 - 2024 (expected)

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

University of Chicago

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

Chicago, IL

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”

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

Computer Science Department, Rice University

Houston, TX

Ph.D. student working with Prof. Anastasios Kyrillidis

May 2019 - Present

- Efficient quantum state tomography with non-convex and distributed/decentralized optimization methods
- Accelerating implicit methods for robust and fast optimization

Booth School of Business, University of Chicago

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

Statistics Department, University of Chicago

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](#)]

Booth School of Business, University of Chicago

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