Jimmy Hyun Jin Kim

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jimmy-hyun-jin-kim

Education

2015–2020 **Northwestern University**, Evanston, IL.
Ph.D. Candidate, Physics
Advisor: David Schwab
CGPA: 3.928

2011–2015 **University of Toronto**, Toronto, ON.
Honours B.Sc. with High Distinction, Mathematics and Physics Specialist, Philosophy Minor
CGPA: 3.97

2018–2020 Visiting Student, *Initiative for the Theoretical Sciences*, New York, NY.

2017–2020 Graduate Student Researcher, *Center for the Physics of Biological Function*, Princeton, NJ.

2017–2019 NSF Traineeship in Data-Driven Discovery (IDEAS), *Northwestern University*, Evanston, IL.

2017 Research Communication Training Program, *Northwestern University*, Evanston, IL.

2017 Cargèse Summer School on Theoretical Biophysics, *Institut d'Études Scientifiques*, Corsica, France.

2015 Ontario Summer School on High Performance Computing, *University of Toronto*, Toronto, ON.

Experience

Dec 7 2020– **Research Scientist**, *Meta Platforms*, New York, NY.
- Worked on improving the Instagram Shopping Tab recommendation system by employing various machine learning techniques such as feature engineering. This led to ∼10% gain in weekly active visitors.

Fall 2019 **Data Science Intern**, *Uber Technologies*, San Francisco, CA.
- Developed a document content extraction pipeline for the Customer Obsession team. This involved implementing and testing tools and techniques for various computer vision tasks such as image registration, text detection, optical character recognition, and barcode decoding.

Summer 2019 **Software Engineer Intern**, *Facebook*, New York, NY.
- Developed a cluster analysis pipeline for the Marketing Intelligence team.
- Created tools for generating natural language descriptions of clusters and for understanding and interpreting supervised model predictions.

2015–2020 **Graduate Research Assistant**, *Northwestern University*, Evanston, IL.
- Developed an algorithm based on variational lower bounds of mutual information for an efficient implementation of the maximally informative dimensions method of analyzing neural response. Currently investigating potential applications towards understanding deep neural networks. Supervised by Dr. David Schwab.
- Developed a platform for multi-agent reinforcement learning in game theory setting and characterized the dynamical landscape in terms of the exploration-exploitation tradeoff parameter. Supervised by Dr. David Schwab.
- Implemented a reinforcement learning inspired framework for active learning in language modelling. Supervised by Dr. Douglas Downey.
- Analytically derived optimal scaling relations of sensory and memory networks and developed simulations to numerically confirm the theoretical results. Supervised by Dr. David Schwab.

2016–2018 **Graduate Teaching Assistant**, *Northwestern University*, Evanston, IL.
- Led discussion sessions consisting of 10-50 students, held office hours, and graded tests. Subjects included classical mechanics, electromagnetism, special relativity, and quantum mechanics.

Volunteering & Outreach

2020 **Homework Helper**, *Queens Public Library*, Queens, NY.
- Helped children from preschool to elementary school age complete their homework assignments and facilitated various library activities centered around children.

May 30, 2018 **Judge, High School Project Showcase**, *Northwestern University*, Evanston, IL.
- Listened to groups of high school students presenting their research and evaluated their work. More importantly, engaged with the students, showed interest, and encouraged them in their pursuit of science.

2017–2018 **Mentor, Physics Mentorship Program**, *University of Toronto*, Toronto, ON.
- Mentored a third year undergraduate student in physics by holding regular remote meetings to discuss academic progress, research opportunities, and applying for graduate schools.

Publications

2020 **J.H.J. Kim**, Ila Fiete, David J. Schwab. *Superlinear Precision and Memory in Simple Population Codes*, arXiv:2008.00629

2016 I. Kotera, N.A. Tran, D. Fu, **J.H.J. Kim**, J.B. Rodgers, W.S. Ryu. *Pan-neuronal screening in Caenorhabditis elegans reveals assymetric dynamics of AWC neurons is critical for thermal avoidance behavior*, eLife **5**, e19021

Thesis

2020 **H.J. Kim**. *Design and Analysis of Neural Networks Using Information*. Northwestern University.

Posters

2019 C. van der Poel, **J. Kim**, D. Schwab. *Control theory for multi-agent battle arena*. 120th Topical Symposium of the APS New York State Section: Physics of Artificial Intelligence, Yorktown Heights, NY.

2019 **J. Kim**, D. Shams, D. Schwab. *Dynamics of Multi-Agent Reinforcement Learning*. Dynamics Days 2019: International Conference on Nonlinear Dynamics, Evanston, IL.

Presentations

2020 **J. Kim**, D. Schwab. *Scalable maximally informative dimensions analysis of deep neural networks*. APS March Meeting, Denver, CO.

2019 **H.J. Kim**, D. Shams, D. Schwab. *Dynamics of Reinforcement Learning in Game Theory*. APS March Meeting, Boston, MA.

2018 **J. Kim**, *Optimizing neural coding and short term memory*. ITS Informal Seminar, New York, NY.

2018 **H.J. Kim**, I. Fiete, D. Schwab. *Optimizing population coding with unimodal tuning curves and short-term memory in continuous attractor networks*. APS March Meeting, Los Angeles, CA.

2018 **J. Kim**. *Optimal neural coding and short term memory*. SIAM Bridging the Gap Seminar, Evanston, IL.

2017 **J. Kim**. *Too much precision can be bad*. Seven Minutes of Science Symposium, Evanston, IL.

Awards

2015 The Hymie and Roslyn Mida Student Award in Theoretical Physics

2015 Trinity College Provost's Scholar

2013, 2014 NSERC Undergraduate Student Research Award

2012–2014 Dean's List Scholar

Certificates

2020 Data Engineer with Python *DataCamp*

2020 Flying Car and Autonomous Flight Engineer Nanodegree *Udacity*

2020 Advanced Machine Learning with TensorFlow on Google Cloud Platform Specialization *Coursera*
- End-to-End Machine Learning with TensorFlow on GCP, Production Machine Learning Systems, Image Understanding with TensorFlow on GCP, Sequence Models for Time Series and Natural Language Processing, Recommendation Systems with TensorFlow on GCP

2020 Industrial IoT on Google Cloud Platform *Coursera*

2019 Quantitative Analyst with R *DataCamp*

Languages

fluent English, Korean, Python, MATLAB, Mathematica

familiar R, SQL, HTML, CSS, JavaScript, C++, Visual Basic