

Jimmy Hyun Jin Kim

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<https://biophysics.princeton.edu/people/jimmy-kim>

Education	Northwestern University, Evanston, IL.	2015-2020 (expected)
	<i>Ph.D. Candidate, Physics.</i> (Advisor: David J. Schwab) CGPA: 3.928	
	University of Toronto, Toronto, ON.	2011-2015
	<i>Honours B.Sc. with High Distinction, Mathematics and Physics Specialist.</i> CGPA: 3.97	
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	Visiting Student at the Initiative for the Theoretical Sciences	2018-present
	Graduate Student Researcher at the Center for the Physics of Biological Function	2017-present
	IDEAS Traineeship at Northwestern University	2017-2019
	Research Communication Training Program at Northwestern University	2017
	Cargese Summer School on Theoretical Biophysics	2017
	Ontario Summer School on High Performance Computing	2015
Certificates	Quantitative Analyst with R (DataCamp)	2019
	Databases and SQL for Data Science (Coursera)	2019
	Neural Networks for Machine Learning (Coursera)	2017
	Computational Neuroscience (Coursera)	2017
	Integrated Data Science (Northwestern University)	2017
	Machine Learning (Coursera)	2016
	High Performance Computing (SciNet)	2015
	Scientific Computing (SciNet)	2015
Awards	The Hymie and Roslyn Mida Student Award in Theoretical Physics	2015
	Trinity College Provost's Scholar	2015
	NSERC Undergraduate Student Research Award	2013,2014
	Dean's List Scholar	2012,2013,2014
	The Coxeter Scholarship in Mathematics	2013
	The William Ramsay Scholarship in Physics	2013
	The Harry Boxen Memorial Scholarship in Physics	2013
	Chancellor's Scholarship	2012,2013
	Dr. John Knowles Colling Memorial Scholarship	2012
	Summer Undergraduate Research Fellowship	2012
	University of Toronto Scholar	2011
	The Wasteneys Admission Scholarship	2011
Work Experience	Data Science Intern, Uber Technologies (San Francisco, CA)	Sep. - Dec. 2019
	<ul style="list-style-type: none">• Developed a document content extraction pipeline for the Customer Obsession team.• Implemented and tested different techniques and tools for computer vision tasks such as image registration, text detection, optical character recognition, barcode decoding, and more.	
	Software Engineer Intern, Facebook (New York, NY)	May - Aug. 2019
	<ul style="list-style-type: none">• Developed a cluster analysis pipeline for the Marketing Intelligence team.• Developed a module for generating natural language descriptions of clusters.• Created tools for understanding and interpreting supervised model predictions.	

	Teaching Assistant, Northwestern University (Evanston, IL) Sep. 2016 - June 2018	
	<ul style="list-style-type: none"> • Led discussion sessions consisting of 10-50 students, held office hours, and graded tests. • Subjects included classical mechanics, electromagnetism, and special relativity. 	
Projects	<p>Dynamics of multi-agent reinforcement learning in game theory</p> <ul style="list-style-type: none"> • Implemented a platform for multi-agent reinforcement learning in game theory setting. • Characterized the dynamical landscape of multi-agent reinforcement learning in terms of the exploration-exploitation tradeoff parameter. • Publication in preparation. <p>Superlinear precision and memory in neural coding</p> <ul style="list-style-type: none"> • Analytically derived optimal scaling relations in sensory and memory networks and developed simulations in both Python and MATLAB to numerically confirm the theoretical results. • Discovered that superlinear scaling of precision is possible in spite of the failure of the Cramer-Rao bound given by the Fisher Information. • Publication in preparation. <p>Active learning in natural language processing</p> <ul style="list-style-type: none"> • Implemented a reinforcement learning inspired framework to facilitate active learning for language modelling. <p>Visualizing neural decoding with head direction cells</p> <ul style="list-style-type: none"> • Built an interactive visual demonstration of neural decoding process in head direction cells using HTML, CSS, and JavaScript (D3.js). • The product has been used as an aid for explaining research results to people outside the field. <p>Neuronal tracking and activity measurement in <i>C. elegans</i></p> <ul style="list-style-type: none"> • Developed an image processing platform in MATLAB for tracking and quantifying fluorescence intensity (proxy for activity) from multiple neurons in <i>C. elegans</i>. • The platform has been used to discover a previously unknown neural circuitry. • Results published in eLife. 	
Volunteering/ Outreach	Judge, High School Project Showcase at Northwestern University	2018
	Mentor, Physics Mentorship Program at University of Toronto	2017-2018
	Demonstrator, 100 in 1 Day	2014
	Demonstrator, Science Rendezvous	2012,2014
Publications	<p>Pan-neuronal screening in <i>Caenorhabditis elegans</i> reveals asymmetric dynamics of AWC neurons is critical for thermal avoidance behavior.</p> <p>Authors: I. Kotera, N.A. Tran, D. Fu, J.H.J. Kim, J.B. Rodgers, W.S. Ryu</p> <p>eLife 5, e19021 (2016)</p>	
Posters	“Dynamics of Multi-Agent Reinforcement Learning”, Dynamics Days	2019
Talks	“Dynamics of Reinforcement Learning in Game Theory”, APS March Meeting	2019
	“Optimizing population coding and short term memory”, APS March Meeting	2018
	“Optimal neural coding and short term memory”, SIAM Bridging the Gap	2018
	“Too much precision can be bad”, Seven Minutes of Science	2017
Languages	<p>(<i>fluent</i>) English, Korean, Python, MATLAB, Mathematica</p> <p>(<i>basic</i>) R, SQL, HTML, CSS, JavaScript, C++, Visual Basic</p>	