

Jongha “Jon” Ryu

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Research Interests	I am interested in applying information-theoretic ideas to develop efficient machine learning algorithms.
Education	<div><div>University of California, San Diego (UCSD) Ph.D. Candidate in Electrical and Computer Engineering (GPA: 4.09/4.0) · Advisor: Young-Han Kim, co-advisor: Sanjoy Dasgupta M.S. in Electrical and Computer Engineering</div><div>Sep. 2015 – Jun. 2022 (expected)</div></div> <div><div>Seoul National University (SNU) Bachelor of Science (<i>summa cum laude</i>, GPA: 4.11/4.3) · Major in Electrical and Computer Engineering & Mathematical Sciences; minor in Physics Seoul Science High School</div><div>Mar. 2008 – Aug. 2015 Mar. 2006 – Feb. 2008</div></div> <div><div>· 1 year early graduation</div></div>
Research Experience	<div><div>Graduate Student Researcher Department of ECE, UCSD</div><div>Sep. 2015 – present</div></div> <div><div>Research Intern AI Research Group, Qualcomm Technologies, Inc. · Researched deep learning based sequential models for speech processing [C4].</div><div>Jun. 2019 – Dec. 2019</div></div> <div><div>Research Intern Deep Learning Team, SoC R&D, Samsung Semiconductor Inc. · Developed a new information-theoretic representation learning principle [P2].</div><div>Jun. 2018 – Sep. 2018</div></div>
Preprints	(* indicates equal contribution. † indicates alphabetical orders.) [P1] Jaeyoon Yoo, Heonseok Ha, Jihun Yi, Jongha Ryu , Chanju Kim, Jung-Woo Ha, Young-Han Kim, Sungroh Yoon, “Energy-based sequence GANs for recommendation and their connection to imitation learning,” arXiv:1706.09220. [P2] J. Jon Ryu , Yoojin Choi, Young-Han Kim, Mostafa El-Khamy, Jungwon Lee, “Wyner VAE: Joint and Conditional Generation with Succinct Common Representation Learning,” arXiv:1905.10945; an extended abstract was presented at <i>Third Workshop on Bayesian Deep Learning (NeurIPS)</i> , December 2018. [P3] J. Jon Ryu , Yoojin Choi, Young-Han Kim, Mostafa El-Khamy, Jungwon Lee, “Adversarial Learning of a Variational Generative Model with Succinct Bottleneck Representation,” In preparation; an extended abstract is to be presented at <i>Sixth Workshop on Bayesian Deep Learning (NeurIPS)</i> , December 2021. [P4] J. Jon Ryu , Young-Han Kim, “One-Nearest-Neighbor Search is All You Need for Minimax Optimal Regression and Classification,” Submitted. [P5] Alankrita Bhatt*, J. Jon Ryu *, Young-Han Kim, “On Universal Portfolios with Continuous Side Information,” Submitted.
Journal papers	[J1] J. Jon Ryu *, Shouvik Ganguly*, Young-Han Kim, Yung-Kyun Noh, Daniel Lee, “Nearest neighbor density functional estimation from inverse Laplace transform,” arXiv:1805.08342. <i>IEEE Transactions on Information Theory</i> (to appear).
Conference papers	[C1] Alankrita Bhatt†, Jiun-Ting Huang†, Young-Han Kim†, J. Jon Ryu †, and Pinar Sen†, “Monte Carlo methods for randomized likelihood decoding,” <i>56th Annual Allerton Conference on Communication, Control, and Computation (Allerton)</i> , September 2018. [C2] Jongha Ryu , Young-Han Kim, “Conditional distribution learning using neural networks and its application to universal image denoising,” <i>International Conference on Image Processing (ICIP)</i> , October 2018.

	<p>[C3] Alankrita Bhatt[†], Jiun-Ting Huang[†], Young-Han Kim[†], J. Jon Ryu[†], and Pinar Sen[†], “Variations on a theme by Liu, Cuff, and Verdú: The power of posterior sampling,” <i>Information Theory Workshop (ITW)</i>, November 2018.</p> <p>[C4] Yang Yang, Guillaume Sautiere, J. Jon Ryu, Taco Cohen, “Feedback Recurrent Autoencoder,” <i>45th International Conference on Acoustics, Speech, and Signal Processing (ICASSP)</i>, May 2020.</p> <p>[C5] J. Jon Ryu, Jiun-Ting Huang, Young-Han Kim, “On the Role of Eigendecomposition in Kernel Embedding,” <i>2021 IEEE International Symposium on Information Theory (ISIT)</i>, Jun 2021.</p> <p>[C6] J. Jon Ryu, Alankrita Bhatt, Young-Han Kim, “Parameter-free Online Linear Optimization with Side Information via Universal Coin Betting,” AISTATS 2022 (accepted).</p>
Skills	Python (PyTorch, Tensorflow, Keras), MATLAB, R, Julia
Selected Course-work	<p>ECE Information Theory, Universal Information Processing, Network Information Theory, Algebraic Coding Theory, Probabilistic Coding Theory, Random Processes, Dynamical Systems under Uncertainty, Image and Video Restoration</p> <p>CSE Probabilistic Reasoning and Learning, Distribution Learning and Testing, Randomized Algorithms, Advanced Optimization, Online Learning, Unsupervised Learning</p> <p>MATH/STAT Probability Theory (A,B,C), Mathematical Statistics (A,B,C), Applied Statistics (A,B), Markov Chains and Mixing Times, Convex Analysis and Optimization (A,B,C), High-dimensional Statistics, Multivariate Analysis, Probabilistic Combinatorics and Algorithms (A)</p>
Honors and Awards	<p>Departemental Fellowship Sep. 2015 – Jun. 2016 Department of ECE, UCSD</p> <p>Kwanjeong Scholarship for Graduate Studies Sep. 2015 – Jun. 2020 Kwanjeong Scholarship Foundation, South Korea</p> <p>Kwanjeong Scholarship for Undergraduate Studies Mar. 2010 – Dec. 2013 Kwanjeong Scholarship Foundation, South Korea</p> <p>University Students Contest of Mathematics Korean Mathematical Society</p> <ul style="list-style-type: none"> · Gold prize (2010), Honorable mention (2009) (among non-math majors) · Bronze Prize (2013) (among math majors)
Teaching Experience	<p>Teaching Assistant</p> <ul style="list-style-type: none"> • ECE 250 Random Processes Winter 2017 • ECE 154C Communication Systems Spring 2017 <ul style="list-style-type: none"> · Designed hands-on programming assignments for the class based on Julia. · Basic source coding and channel coding algorithms. • ECE 225B Universal Probability and Applications in Data Science Spring 2018 <ul style="list-style-type: none"> · Designed hands-on programming assignments for the class based on Python. · Lempel-Ziv probability assignment, context-tree weighting, and universal portfolio. • ECE 269 Linear Algebra and Applications Winter 2019
Other Experience	<p>Military Service Mar. 2011 – Dec. 2012 Republic of Korea Army</p>