Eric Lei

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Education

2020– **Ph.D. in Electrical and Systems Eng.**, *University of Pennsylvania*, Philadelphia, PA
Warren Center for Network and Data Sciences, SEAS
Advisors: *Prof. Shirin Saeedi Bidokhti* and *Prof. Hamed Hassani*
NSF Graduate Research Fellow

2020– **M.S. in Electrical and Systems Eng.**, *University of Pennsylvania*, Philadelphia, PA

2016–2020 **B.S. in Electrical and Computer Eng.**, *Cornell University*, Ithaca, NY
Minors in Mathematics, Computer Science

Experience

Research

2020– **Graduate Research Fellow**, *University of Pennsylvania*, Philadelphia, PA

2018–2020 **Undergraduate Researcher**, *Cornell University*, Ithaca, NY

Industry

Summer 2022 **AI Research Intern**, *InterDigital*, *R&I Video Lab*, New York, NY
Hosts: *Dr. Dong Tian* and *Dr. Muhammad Asad Lodhi*

Spring 2022 **Machine Learning Intern**, *Nokia Bell Labs*, *Math & Algo. Group*, Murray Hill, NJ
Hosts: *Dr. Iraj Saniee* and *Dr. Carl Nuzman*

Summer 2020 **Research Intern**, *Systems and Technology Research*, *Cyber Group*, Woburn, MA
Host: *Dr. Vineet Mehta*

Summer 2019 **Summer Research Intern**, *MIT Lincoln Laboratory*, *Space Systems*, Lexington, MA
Hosts: *Dr. Pablo Hopman* and *Steven Michael*

Publications

[1] **E. Lei**, H. Hassani, and S. S. Bidokhti, "Federated neural compression under heterogeneous data," *Accepted to International Symposium on Information Theory*, 2023.

[2] **E. Lei**, H. Hassani, and S. S. Bidokhti, "On a relation between rate-distortion theory and optimal transport," *International Conference on Learning Representations (Tiny Papers Track)*, 2023.

[3] **E. Lei**, H. Hassani, and S. S. Bidokhti, "Neural estimation of the rate-distortion function with applications to operational source coding," *IEEE Journal on Selected Areas in Information Theory (Special Issue on Modern Compression)*, 2022.

[4] **E. Lei**, H. Hassani, and S. S. Bidokhti, "Neural estimation of the rate distortion function for massive datasets," *IEEE International Symposium on Information Theory (ISIT)*, 2022.

[5] R. Arghal, **E. Lei**, and S. S. Bidokhti, "Robust graph neural networks via probabilistic lipschitz constraints," in *Proceedings of The 4th Annual Learning for Dynamics and Control Conference* (R. Firoozi, N. Mehr, E. Yel, R. Antonova, J. Bohg, M. Schwager,

and M. Kochenderfer, eds.), vol. 168 of *Proceedings of Machine Learning Research*, pp. 1073–1085, PMLR, 23–24 Jun 2022.

[6] **E. Lei**, H. Hassani, and S. S. Bidokhti, "Out-of-distribution robustness in deep learning compression," *ICML Workshop on Information-Theoretic Methods for Rigorous, Responsible, and Reliable Machine Learning*, 2021. **selected for 1 of 4 contributed talks**.

[7] E. Gönültaş, **E. Lei**, J. Langerman, H. Huang, and C. Studer, "Csi-based multi-antenna and multi-point indoor positioning using probability fusion," *IEEE Transactions on Wireless Communications*, pp. 1–1, 2021.

[8] **E. Lei**, O. Castañeda, O. Tirkkonen, T. Goldstein, and C. Studer, "Siamese neural networks for wireless positioning and channel charting," in *2019 57th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, pp. 200–207, 2019.

Fellowships and Awards

2022	North American School of Information Theory (NASIT) Travel Grant Award
2020	NSF Graduate Research Fellowship
2020	Ganster Engineering Fellowship (University of Pennsylvania)
2020	The Dean's Fellowship (University of Pennsylvania)
2020	Sigma Xi
2019	Tau Beta Pi
2018	Eta Kappa Nu

Talks

Apr. 2023	*Federated Neural Compression Under Heterogeneous Data*, TILOS-Intel Research Discussion.
Apr. 2023	*On a Relation Between Rate-Distortion Theory and Optimal Transport*, ESE PhD Colloquium, University of Pennsylvania.
Dec. 2022	*Neural Estimation of the Rate-Distortion Function With Applications to Operational Source Coding*, The Institute for Emerging CORE Methods in Data Science (EnCORE) Retreat, UC San Diego.
Aug. 2022	Tutorial on *Neural Compression: Algorithms and Fundamental Limits*, East Asian School of Information Theory (EASIT), Shenzhen, China.
Jun. 2022	*Robust Graph Neural Networks via Probabilistic Lipschitz Constraints*, Learning for Dynamics and Control Conference (L4DC) Poster, Palo Alto, CA.
Jun. 2022	*Neural Estimation of the Rate-Distortion Function*, International Symposium on Information Theory (ISIT), Espoo, Finland.
Jan. 2022	*Out-of-Distribution Robustness in Deep Learning Compression*, The Institute for Learning-Enabled Optimization at Scale (TILOS) Retreat, UC San Diego.
Jul. 2021	*Out-of-Distribution Robustness in Deep Learning Compression*, Contributed Talk at ITR3 Workshop @ ICML.

Teaching Experience

Spring 2022	ESE 6740: Information Theory	*Head TA, UPenn*
Fall 2021	ESE 5420: Statistics for Data Science	*Head TA, UPenn*

Spring 2020	ECE 3100: Intro to Probability and Inference	*TA, Cornell*
Fall 2019	CS 4780: Machine Learning for Intelligent Systems	*TA, Cornell*
Fall 2018	ECE 2300: Digital Logic and Computer Organization	*TA, Cornell*
Spring 2018 & 2019	ECE 1210: The Computing Technology Inside Your Smartphone	*TA, Cornell*

Review Activities

Neural Information Processing Systems (NeurIPS)

IEEE Journal on Selected Areas in Communications (JSAC)

Data Compression Conference (DCC)

Learning on Graphs Conference (LoG)

IEEE International Symposium on Information Theory (ISIT)

IEEE Transactions on Wireless Communication

International Conference on Machine Learning (ICML)

Technical Skills

Programming Languages: Python, C/C++, MATLAB, Verilog, R, Java

Tools: PyTorch, Tensorflow, SQL, Jax, OpenMP

Outreach

2021–2022 Science Engagement Institute, *The Franklin Institute*, Philadelphia, PA
- Worked with science communicators to develop strategies for sharing research with the public

Summer 2021 Research Mentor, *Summer STEM Institute*, Remote
- Mentor high school students in various data science and ML projects
- Projects mentored: causal inference (Bayesian networks), EKG classification using CNNs

Spring 2019 Volunteer, *Expanding Your Horizons*, Ithaca, NY
- Helped lead a circuits workshop for under-represented minorities at local high schools

2018–2020 Member, *Eta Kappa Nu Honor Society*, Ithaca, NY
- Led exam review sessions for freshman and sophomore level ECE classes

2018–2019 Corporate Chair, *IEEE Cornell Student Branch*, Ithaca, NY
- Hosted information sessions for industry recruiting, professor talks for the student body

2018 Tutor, *Cornell University Engineering Success*, Ithaca, NY
- Tutor for first-generation low-income students in a discrete mathematics course