Eric Lei

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Education

2020–2025 **Ph.D. in Electrical and Systems Eng.**, *University of Pennsylvania*, Philadelphia, PA
Thesis topic: *Neural Compression: An Information-Theoretic Perspective*
Advisors: *Prof. Shirin Saeedi Bidokhti* and *Prof. Hamed Hassani*
NSF Graduate Research Fellow

2020–2023 **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

Summer 2024 **Summer Research Associate**, *JPMorganChase*, New York, NY

Summer 2022 **AI Research Intern**, *InterDigital*, New York, NY

Spring 2022 **Machine Learning Intern**, *Nokia Bell Labs*, Murray Hill, NJ

Summer 2020 **Research Intern**, *Systems and Technology Research*, Woburn, MA

Summer 2019 **Summer Research Intern**, *MIT Lincoln Laboratory*, Lexington, MA

Publications

[1] **E. Lei**, H. Hsu, and C.-F. Chen, "Detection of Partially-Synthesized LLM Text," *Socially Responsible Language Modelling Research (SoLaR) Workshop at NeurIPS*, 2024.

[2] **E. Lei**, H. Hassani, and S. Saeedi Bidokhti, "Approaching Rate-Distortion Limits in Neural Compression with Lattice Transform Coding," *arXiv preprint arXiv:2403.07320*, 2024.

[3] **E. Lei**, M. A. Lodhi, J. Pang, J. Ahn, and D. Tian, "WrappingNet: Mesh Autoencoder via Deep Sphere Deformation," *IEEE International Conference on Image Processing*, 2024. **Best Student Paper Award**.

[4] **E. Lei**, A. Adibi, and H. Hassani, "Score-based methods for discrete optimization in deep learning," *arXiv preprint arXiv:2310.09890*, 2023.

[5] **E. Lei**, Y. B. Uslu, H. Hassani, and S. Saeedi Bidokhti, "Text + Sketch: Image Compression at Ultra Low Rates," *ICML Workshop on Neural Compression*, 2023.

[6] **E. Lei**, H. Hassani, and S. Saeedi Bidokhti, "Federated Neural Compression Under Heterogeneous Data," *International Symposium on Information Theory (ISIT)*, 2023.

[7] **E. Lei**, H. Hassani, and S. Saeedi Bidokhti, "On a Relation Between Rate-Distortion Theory and Optimal Transport," *ICLR Tiny Papers*, 2023.

[8] **E. Lei**, H. Hassani, and S. Saeedi Bidokhti, "Neural Estimation of the Rate-Distortion Function With Applications to Operational Source Coding," *IEEE Journal on Selected Areas in Information Theory*, 2022.

[9] **E. Lei**, H. Hassani, and S. Saeedi Bidokhti, "Neural Estimation of the Rate Distortion Function for Massive Datasets," *IEEE International Symposium on Information Theory (ISIT)*, 2022.

[10] R. Arghal, **E. Lei**, and S. Saeedi Bidokhti, "Robust Graph Neural Networks via Probabilistic Lipschitz Constraints," in *Learning for Dynamics and Control Conference (L4DC)*, pp. 1073–1085, 2022.

[11] **E. Lei**, H. Hassani, and S. Saeedi 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**.

[12] 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.

[13] **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

2024 Best Student Paper Award, International Conference on Image Processing

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

Jun. 2023 *Federated Neural Compression Under Heterogeneous Data*, International Symposium on Information Theory (ISIT), Taipei, Taiwan.

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 2022/2024	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

International Conference on Learning Representations (ICLR)
IEEE Transactions on Information Theory
Neural Information Processing Systems (NeurIPS)
IEEE Transactions on Communications
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