

# ALLIOT C. NAGLE

acnagle@utexas.edu

## EDUCATION

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**University of Texas at Austin**  
PhD Electrical Engineering

Aug. 2022 – Present

**University of Wisconsin-Madison**  
MS Electrical Engineering

Sept. 2019 – Dec. 2021

**University of Wisconsin-Madison**  
BS Electrical Engineering

Sept. 2014 – May 2019

## RESEARCH EXPERIENCE

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**Graduate Researcher**, University of Texas at Austin  
Advisor: Hyeji Kim

Aug. 2022 – Present

- Conduct research at the intersection of information theory and machine learning
- Research interests include large language models, representation learning, and methods for accelerated training and inference

**Graduate Researcher**, University of Wisconsin-Madison  
Advisor: Barry Van Veen and Matthew Banks

May 2021 – June 2022

- Modeled brain function/stimulus response captured from EEG data as a multivariate auto-regressive model with a group LASSO penalty based on fMRI data
- Utilized high-throughput computing and meta-scheduler DAGman to pipeline large-scale cross validation and model selection jobs in MATLAB
- Wrote a set of MATLAB functions to quickly assemble a submission to HTCCondor systems, capable of launching up to hundreds of thousands of CPU jobs

**Graduate Researcher**, University of Wisconsin-Madison  
Advisor: Dimitris Papailiopoulos

Sept. 2019 – Dec. 2021

- Designed and implement deep learning experiments in Python using the PyTorch framework
- Researched sparse and low-rank neural networks

## PUBLICATIONS & PREPRINTS

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*Fundamental Limits of Prompt Compression: A Rate-Distortion Framework for Black-Box Language Models.* **Alliot Nagle\***, Adway Girish\*, Marco Bondaschi, Michael Gastpar, Ashok Vardhan Makkuva, Hyeji Kim. NeurIPS 2024.

*Local to Global: Learning Dynamics and Effect of Initialization for Transformers.* Ashok Vardhan Makkuva, Marco Bondaschi, Chanakya Ekbote, Adway Girish, **Alliot Nagle**, Hyeji Kim, Michael Gastpar. NeurIPS 2024.

*Attention with Markov: A Framework for Principled Analysis of Transformers via Markov Chains .* Ashok Vardhan Makkuva, Marco Bondaschi, Adway Girish, **Alliot Nagle**, Martin Jaggi, Hyeji Kim, Michael Gastpar. Preprint.

*Neural Distributed Source Coding.* Jay Whang\*, **Alliot Nagle\***, Anish Acharya, Hyeji Kim, Alexandros G. Dimakis. JSAIT Special Issue, 2024.

*Improved High-Dimensional Multivariate Autoregressive Model Estimation of Human Electrophysiological Data Using fMRI Priors.* **Alliot Nagle**, Josh P. Gerrelts, Bryan M. Krause, Aaron D. Boes, Joel E. Bruss, Kirill V. Nourski, Matthew I. Banks, Barry Van Veen. NeuroImage, 2023.

*Rare Gems: Finding Lottery Tickets at Initialization.* Kartik Sreenivasan, Jy-yong Sohn, Liu Yang, Matthew Grinde, **Alliot Nagle**, Hongyi Wang, Eric Xing, Kangwook Lee, Dimitris Papailiopoulos. NeurIPS 2022.

*Optimal Lottery Tickets via SubsetSum: Logarithmic Over-Parameterization is Sufficient.* Ankit Pensia, Shashank Rajput, **Alliot Nagle**, Harit Vishwakarma, Dimitris Papailiopoulos. NeurIPS 2020 spotlight.

## AWARDS

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| • ECE Gerald Holdridge Outstanding Teaching Assistant Award | Dec. 2019             |
| • Cockrell School of Engineering Multi-Year Fellowship      | Aug. 2022 – Aug. 2026 |

## TEACHING EXPERIENCE

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**Graduate Teaching Assistant**, University of Wisconsin-Madison Sept. 2019 – May 2021  
ECE 331 (Intro to Random Signal Analysis and Statistics) and ECE 204 (Data Science and Engineering)

- Recipient of the *ECE Gerald Holdridge Outstanding Teaching Assistant Award* for ECE 331
- Answer students' questions during in-class activities and office hours. Engage with students in a flipped-classroom active learning environment to better facilitate their understanding of course content
- Responsible for reviewing and editing all in-class activities, homeworks, and quizzes, and then implementing them in Canvas, our online learning tool

**Undergraduate Teaching Assistant**, University of Wisconsin-Madison Sept. 2018 – May 2018  
ECE 203 (Signals, Information, and Computation) and ECE 330 (Signals and Systems)

- Answered students' questions in a flipped-classroom active learning environment in these introductory-level signal processing courses
- ECE 203 topics included Fourier Series, FT, DTFT, DFT, sampling, LTI systems, FIR filters, discrete and continuous-time systems, difference and differential equations
- ECE 330 topics included complex numbers, convolution, LTI systems, Fourier Series, DFT, sampling, filtering, image processing

## TECHNICAL SKILLS

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<b>Programming Languages</b>	Python (Sci-kit Learn, PyTorch), C/C++ (CUDA, OpenMP, MPI), MATLAB, Java, Julia
<b>Software &amp; Tools</b>	Amazon EC2, Slurm, HTCondor, L <sup>A</sup> T <sub>E</sub> X, Altium Designer, Git

## SELECTED COURSEWORK

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**UT Austin:** Convex Optimization, Probability and Stochastic Processes I, Advanced Topics in Computer Vision, Advanced Topics in Unsupervised Learning, Data-Driven Algorithm Design, Generative Models in Machine Learning

**UW-Madison:** Introduction to Optimization, Matrix Methods in Machine Learning, Introduction to Artificial Intelligence, Theory of Information Processing and Transmission, High Performance Computing for Engineering Applications, Machine Learning, Mathematical Foundations of Machine Learning, Theoretical Foundations of Machine Learning