

NOAH FOSTER



EDUCATION

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Columbia University, Honors M.A. Statistics

New York, NY | September 2025 - December 2026 (Expected)

- *Relevant Graduate Coursework:* Applied Statistics, Probabilistic Models and Machine Learning, Analysis and Probability

Brown University, Honors B.S. Mathematics-Computer Science, B.S. Applied Math

GPA: 3.7 | September 2020 - May 2024

- *Relevant Graduate Coursework:* Mathematical Statistics, Recent Applications of Probability, Advanced Topics in Deep Learning

RESEARCH EXPERIENCE

UCSF - Statistics Research Assistant for John Kornak

San Francisco, CA | November 2024 - July 2025

- Collaborating with a research team to refine multimodal models for predicting symptom onset and disease progression in familial frontotemporal dementia (f-FTD) mutation carriers using clinical, neuroimaging, and biomarker data.
- Implementing Bayesian statistical methods in R, STAN, and JAGS to improve the accuracy of disease progression models of f-FTD.

Brown University - CS Research Assistant for Ellie Pavlick

Providence, RI | September 2022 - May 2024

- Investigated the shared geometry of conceptual information in large language and vision transformer models through the construction of a MAGMA-style multimodal model built on CLIP, BEiT and GPT-J as a follow up to the LiMBer Paper.
- Employed PyTorch, Transformers and Brown's High-Performance Computing Cluster to develop custom transformer interpretability tools to evaluate information exchange between visual embeddings and linguistic decodings leading to emergent capabilities of models in multimodal frameworks under the guidance of Ellie Pavlick at the LUNAR Lab, Brown University.

Cornell University - CS Research Assistant for Carla Gomes

Ithaca, NY | June 2023 - September 2023

- Developed attention-based graphical neural network models, applying transformer-based methods to solve complex problems with exponential search spaces, notably Latin Square-style problems using PyTorch and HPC.
- Conducted extensive experiments and analysis to assess the effectiveness of the generated solutions when compared to traditional search methods, contributing to the advancement of deep reasoning networks in combinatorial generation.

Brown University - Econometrics Research Assistant for Jon Roth

Providence, RI | October 2021 - October 2022

- Conducted groundbreaking research to challenge the conventional wisdom surrounding log-linear regression models in econometrics. Demonstrated the limitations of such models in accurately estimating parameters of interest in economic analysis.
- Employed advanced theoretical statistical techniques, including the Functional Delta Method, Hadamard and Gateaux Differentiation, and Brownian Bridges, to prove consistency and asymptotic convergence of the proposed estimators.
- Applied new estimators to unemployment insurance data using R, Python to compute empirical results.

PROJECTS

Representational Alignment and Mapping with Implications for Grounding

Python Paper | September 2023 - May 2024

- Completed an Honors Thesis under the supervision of Chen Sun demonstrating that geometric alignment of ungrounded models does not suffice to ensure semantic alignment.
- Implemented path patching and interpretability methods to explain the transformation of representations in multimodal models.

Subnetworks and Superposition

Python Paper | February 2023 - May 2023

- Developed a method to dissect polysemantic neurons in vision and language models, revealing distinct subnetworks contributing to different semantic functions and allowing for the analysis of the superposition of latent features in neural networks.
- Utilized continuous sparsification with to identify subnetworks at 10x finer densities than state of the art gradient based heuristics.

WORK & LEADERSHIP EXPERIENCE

Teaching Assistant

Providence & New York | September 2022 - December 2025

- **Natural Language Processing** (Fall 2025) Helped John Hewitt develop and teach a new course on transformer based language modelling emphasizing cutting-edge generative AI.
- **Machine Learning** (Spring 2024): Assisted Stephen Bach in teaching over 100 students the fundamentals of machine learning, including neural networks, decision trees, regression, and clustering.
- **Computational Linguistics** (Fall 2023): Designed, wrote and graded assignments for Ellie Pavlick's course for over 140 undergraduates and graduate students, covering statistical and neural methods for parsing, translating and generating language.
- **Recent Applications of Probability and Statistics** (Spring 2023): Supported Stuart Geman in teaching statistical concepts related to SVMs, neural networks, and high-dimensional inference, stochastic calculus, large deviations and exponential models.
- **Information Theory** (Fall 2022): Assisted Cole Graham in teaching entropy, (lossless and lossy) compression, and theoretical probability and statistics to over 70 advanced undergraduates and graduate students. Held office hours and graded problem sets.

Brown University Cycling Team, Captain

Providence, RI | September 2021 - May 2022

- Led a team of 20+ riders, overseeing all aspects of team management, including organizing practices, races, sponsorships, fundraising, and facilitating collaboration with cycling organizations and Brown University for both novice and experienced racers.

SKILLS

- **Programming Languages:** Python, C/C++, R, MATLAB, Julia, Bash, SQL, and $\LaTeX$
- **Technologies:** GIT, AWS, Docker, PyTorch, TensorFlow, Hugging Face, NumPy, Pandas, Scikit-Learn, STAN, JAGS