NOAH FOSTER

(510)850-4918 | noah_foster@brown.edu | GitHub

EDUCATION

Brown University, Sc. B. in Applied Math, Sc. B. in Mathematics *Providence, RI* | Expected Graduation Spring 2024

- *Relevant Graduate Coursework*: Deep Learning, Real Analysis, Recent Applications of Probability and Statistics
- *Relevant Undergraduate Coursework*: Computational Linguistics, Machine Learning, Abstract Algebra, Honors Linear Algebra, Topology, Information Theory, Statistical Inference I & II, Computational Probability and Statistics, Partial Differential Equations, Mathematical Econometrics

RESEARCH EXPERIENCE

LiMBeR2 - Computer Science Research Assistant *Providence, RI* | Fall 2022 - Present

- Investigated the compositionality of conceptual information in large language and vision transformer models through the construction of a MAGMA-style model built on CLIP, BEiT and GPT-J as a follow up to the LiMBeR Paper
- Evaluated information loss between visual and linguistic embeddings in Ellie Pavlick's LUNAR Lab

Better2022 - Computer Science Research Assistant *Providence, RI* | Fall 2022 - Present

- Built a pipeline to perform rapid multi-lingual document search and triage through a fine-tuned and prompt-tuned BLOOM 176B Model for IARPA to enable US intelligence analysts to extract and retrieve highly-detailed, personalized knowledge across diverse domains using Hugging Face models in Ellie Pavlick's LUNAR Lab

APTE - Econometrics Research Assistant *Providence, RI* | October 2021 - Present

- Proved asymptotic behavior of proposed estimators by applying theoretical statistical techniques involving the Functional Delta Method, Hadamard and Gateaux Differentiation, and Brownian Bridges
- Applied new statistical techniques to Unemployment Data using Linear Optimization Libraries in R, Python using Jupyter, Google Colab and Brown University's High Performance Computing to better estimate elasticity of consumption under varying unemployment insurance with Jon Roth.

WORK EXPERIENCE

Teaching Assistant for Information Theory *Providence, RI* | September 2022 - December 2022

- Held Office Hours and graded problem sets for Cole Graham's class on entropy, (lossless and lossy) compression and theoretical probability and statistics for over 70 advanced undergraduates and graduate students.

Brown Math Circle *Providence, RI* | September 2022 - December 2022

- Compiled Problem Sets for local students using past experience at the Julia Robinson Mathematics Festival

PROJECTS

DeTex *Python* | October 2022 - Present

- Built a Convolutional Vision Transformer to caption pictures of math formulas with their corresponding LaTeX
- Scraped nearly every equation and corresponding LaTeXcode from Wikipedia to create a database of over a million labeled images before data augmentation allowing for complex network architecture

Information Theoretic Compression Class *C++* | September 2022 - Present

- Built a package for holding compressed text in memory using optimal prefix encoding for arithmetic blocks to enable large corpus processing with compressed data in RAM with marginal loss of reading speed

LEADERSHIP EXPERIENCE

Board of Executive Directors CLCS, *Officer* *Alameda, CA* | Fall 2017 - Spring 2020

- Voting Officer on the Board member of non-profit overseeing budget, accreditation, and legal matters for two schools totalling over 100 staff and over 1,000 students spanning kindergarten through 12th grade
- Led school through Covid-19 emergency funding and move to remote learning as well as curriculum development, staff retention, and California Education Code compliance.

Brown University Cycling Team, *Captain* *Providence, RI* | Fall 2021 - Spring 2022

- Organized a team 20+ riders through weekly practices and racing as well as managing sponsorships and fundraising.
- Coordinated with Brown Administration, USAC, and Eastern Collegiate Cycling Conference to support riders first engaging with competitive racing, as well as experienced racers in learning team racing strategy and technique

SKILLS & INTERESTS

- **Languages**: Python (PyTorch, TensorFlow, Spacy, NumPy), R, MATLAB, Julia, C/C++, Slurm, SQL, LaTeX
- **Interests**: Statistics, Deep Learning, Machine Learning, NLP, Probability, Mathematics, Causal Inference
- **Seminars**: Webscraping and Data Visualization, CCV Brown University, June 2020
- **Hobbies**: Cycling (Strava), Skiing, Backpacking, Hiking, Photography