Resume - Zachary C. Brown

Contact | zachary.christopher.brown@gmail.com · (385) 535-2926
LinkedIn   Web | github.com/zacharycbrown · zacharycbrown.github.io

Relevant Experience

GRO Program Appointee, Oak Ridge National Laboratory; *Advisor: Dr. Joel Brogan*   Accepted 2025 - 2026
- Research methods for fusing multimodal knowledge graphs and large language models (LLMs)
- Automate knowledge graph curation using LLMs to create associations between unstructured data sources

Research Assistant, Duke University; *Advisor: Dr. David Carlson*   2020 - Present
- Develop scientifically valid algorithms for brain-wide network discovery and joint representation learning
- Led development of REDCLIFF-S, a nonlinear generative factor model which attains 22-28% improved f1-scores over baselines in automated hypothesis generation **(ICML 2025)**, to reduce costs in neuroscience

ETI Fellow, Oak Ridge National Laboratory; *Advisor: Dr. Philip Bingham*   2022
- Developed signal reconstruction and harmonic detection algorithms for smart grid fault detection systems
- Engineered a custom method for backpropagation through sparse matrices in PyTorch Lightning, enabling the team to use models previously unsupported by the framework

Summer Data Engineering Intern, Capital One   2019 - 2020
- Designed a pipeline to improve virtual-assistant text efficiency via fine-tuned language models
- Devised and document new data cleaning and model testing protocols to support language models
- Assisted in designing an internal cloud-based question answering system to assist company employees

Research Assistant, DRAGN Labs; *Advisor: Dr. Nancy Fulda*   2019 - 2020
- Led research on guiding GPT-2 generation by steering latent activations with GANs, achieving controllable output without altering pretrained weights **(NeurIPS 2020)**

Research Assistant, Perception-Control-and-Cognition Lab; *Advisor: Dr. David Wingate*   2017 - 2019
- Investigated machine reasoning and representation learning for robotic navigation and dialogue systems, with contributions published in **CoRL 2017** and the **2018 Amazon Alexa Prize** proceedings

Education

Ph.D. Electrical and Computer Engineering, Duke University; in progress   anticipated conferral May 2026
- *Advisor*: Dr. David Carlson

M.S. Electrical and Computer Engineering, Duke University   2023

B.S. Applied Computational Mathematics, Brigham Young University   2020

Featured Technical Skills

Python/Pytorch, Machine Learning, Signal Processing, Multimodal Learning, HPC, NLP, LLMs, AWS, Git

Relevant Publications

Brown, Z., & Carlson, D. (2025). On Leveraging Subject-Specific Information to Guide Pretrained General Purpose Models: Joint Embeddings for Neuroscientific Applications. (In-progress, expect completion this fall)

Brown, Z., & Carlson, D. (2025). Generating Hypotheses of Dynamic Causal Graphs in Neuroscience: Leveraging Generative Factor Models of Observed Time Series. *International Conference on Machine Learning, 42*.

Brown, Z., Robinson, N., Wingate, D., & Fulda, N. (2020). Towards neural programming interfaces. *Advances in Neural Information Processing Systems*, *33*, 17416-17428.