# Zachary Bretton

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## EDUCATION

**UNIVERSITY OF TEXAS AT AUSTIN** **Austin, TX**
***Ph.D. in Neuroscience*** **2019 - 2024**
Thesis: The neural mechanisms and long-term impacts of working memory suppression

**BOSTON UNIVERSITY** **Boston, MA**
***B.A. Biology, Specialization in Neurobiology*** **2011 - 2015**

## PROFESSIONAL EXPERIENCE

**UNIVERSITY OF TEXAS AT AUSTIN** **Austin, TX**
**Graduate Research Assistant, Lewis-Peacock Lab** **2019 -2024**

- Conducted advanced research applying machine learning models, specifically using scikit-learn, to analyze large and complex fMRI datasets.
- Developed and implemented data-driven solutions for understanding cognitive processes, utilizing advanced statistical techniques such as bootstrapping for data interpretation.
- Utilized Python and Matlab for comprehensive data analysis, preprocessing, and cleaning of fMRI data.
- Leveraged the Texas Advanced Computing Center (TACC), a high-performance computing cluster (HPCC), for running analyses, gaining experience with clusters and Docker for scalable computing.
- Led a team of undergraduate assistants, guiding them in research and career development.
- Designed and executed experimental protocols for fMRI studies, ensuring rigorous experimental design and execution.

**COLUMBIA UNIVERSITY MEDICAL CENTER** **New York, NY**
**Lab Manager / Research Technician, Neural Circuit Lab** **2016-2019**

- Conducted electrophysiological experiments and performed data analysis using Matlab, focusing on neural data from awake-behaving mice.
- Developed and implemented experimental protocols, including data collection with the Neuralynx system.
- Created custom experimental apparatuses using Arduinos, circuitry, and 3D printing to support various research projects.
- Co-developed a model for studying anxiety in mice and managed various research projects, including Early Life Stress models and Working Memory in a Schizophrenia model.
- Trained and supervised undergraduate teams, facilitated grant and protocol submissions, and managed lab operations.
- Applied advanced data analysis techniques to interpret experimental results, contributing to multiple publications.

## TECHNICAL SKILLS

- **Programming and Scripting:** Proficient in Python (NumPy, SciPy, pandas, seaborn, matplotlib, nibabel, nilearn, statsmodels), Matlab, SQL, Unix/BASH, Git, Machine Learning (scikit-learn, TensorFlow)
- **Data Analysis and High-Performance Computing:** Skilled in data cleaning (wrangling, transformation, normalization), advanced statistical analysis (bootstrapping), data visualization (Matplotlib, Seaborn), high-performance computing (HPCC, Docker, Singularity, SLURM)