

Charles Grimes Gerrity, Ph.D.

Menlo Park, CA • 207-756-5194 • cgerrity21@gmail.com
[linkedin.com/in/charles-gerrity](https://www.linkedin.com/in/charles-gerrity) • github.com/cgerrity

Neuroscientist and machine learning engineer with expertise in developing deep learning models for neural data analysis and cognitive brain-computer interfaces. Specialized in processing large-scale neuronal datasets (over 2 TB) using deep learning architectures including variational autoencoders and recurrent networks for decoding choice. Demonstrated expertise across brain-computer interface development, from in vivo neural recording through signal processing, data visualization, model design and training, to decoder analysis.

EXPERIENCE

Vanderbilt University, Nashville, TN

Postdoctoral Scholar - Department of Psychology

2025 – Present

- Analyzed temporal dynamics of learning using neural recordings and computational modeling, leading to a conference presentation and manuscript in preparation
- Optimized deep learning training pipeline to increase training speed four times over prior system
- Examined deep learning model to identify attentional filtering patterns from neuronal recordings, revealing novel insights into learning dynamics
- Mentored graduate and undergraduate students on machine learning projects, leading to two conference presentations and three manuscripts in preparation
- Principal Investigator: Thilo Womelsdorf

Vanderbilt University, Nashville, TN

Graduate Research/Teaching Assistant - Department of Electrical and Computer Engineering

2017 – 2024

- Conducted over 25 acute high-density electrophysiology recording sessions with more than 300 simultaneous channels across frontal cortical and subcortical structures in non-human primates
- Built scalable machine learning pipeline processing more than 2 TB of neural recordings, enabling analysis across the lab with over 4 TB processed to date
- Developed gated recurrent variational autoencoder for multi-label, multi-class decision decoding, achieving 80% accuracy on reward-associated prediction and 62% balanced accuracy across all labels
- Identified novel brain region contributions to learning using explainable AI analysis of neural network decoding model
- Co-Advisors: Thilo Womelsdorf and Richard Alan Peters

EDUCATION

Vanderbilt University, Nashville, TN

Ph.D. — Electrical Engineering

2017 – 2024

Dissertation Title: A brain-computer interface for decoding decisions during learning in multidimensional environments

Vanderbilt University, Nashville, TN

Master of Science — Electrical Engineering

2017 – 2021

Focus: Signal Processing, Minor: Robotics

Bowdoin College, Brunswick, ME

Bachelor of Arts — Chemistry and Economics

2013 – 2017

TECHNICAL SKILLS

Programming: MATLAB, Python, \LaTeX , R

Deep Learning: Variational Autoencoders, LSTM, GRU, CNN, ResNet

Neuroscience Tools: High-density electrophysiology (NeuroNexus), Intan Recording Systems, Open Ephys, NAN Microdrives

Data Analysis: Signal Processing, Time Series Analysis, Dimensionality Reduction

Other: Git, SLURM, GPU Computing

Languages: English (Native), French (Working Proficiency), Spanish (Working Proficiency)