Charles Grimes Gerrity, Ph.D.

Menlo Park, CA

cgerrity21@gmail.com 207-756-5194

charles-gerrity cgerrity

Positions

2025 – Present **Postdoctoral Scholar** Vanderbilt University, *Nashville, TN, USA*
Department of Psychology
Principal Investigator: Thilo Womelsdorf
• Used deep learning model to identify attentional filtering during flexible behavior from neuronal recordings

2017 – 2024 **Graduate Student** Vanderbilt University, *Nashville, TN, USA*
Department of Electrical and Computer Engineering
Principal Investigator/Co-Advisor: Thilo Womelsdorf
Co-Advisor: Richard Alan Peters
• Obtained high channel invasive neural recordings from non-human primates
• Established and developed pipeline to process large data (more than 2 TB)
• Applied machine learning methods to generate a cognitive BCI to decode decision

Education

2017 – 2024 **Ph.D. Electrical Engineering** Vanderbilt University, *Nashville, TN, USA*
Dissertation title: *A brain-computer interface for decoding decisions during learning in a multidimensional environment*

2017 – 2021 **M.S. Electrical Engineering** Vanderbilt University, *Nashville, TN, USA*
Focus: Signal Processing, Minor: Robotics
Thesis title: *A method for automated performance evaluation and tuning of neural oscillation detection algorithms*

2013 – 2017 **B.A. Chemistry and Economics** Bowdoin College, *Brunswick, ME, USA*

Research

Journal Articles

1. **C. G. Gerrity**, R. L. Treuting, R. A. Peters, and T. Womelsdorf, "Neuronal decoding of decisions in multidimensional feature space using a gated recurrent variational autoencoder," *bioRxiv*, p. 2025.08.20.671126, 2025, ISSN: 2692-8205.

2. R. L. Treuting, K. Banaie Boroujeni, **C. G. Gerrity**, A. Neumann, P. Tiesinga, and T. Womelsdorf, "Adaptive reinforcement learning is causally supported by anterior cingulate cortex and striatum," *Neuron*, 2025, ISSN: 0896-6273. DOI: 10.1016/j.neuron.2025.05.018.

3. B. C. Gorske, E. M. Mumford, C. G. Gerrity, and I. Ko, "A peptoid square helix via synergistic control of backbone dihedral angles," *Journal of the American Chemical Society*, vol. 139, no. 24, pp. 8070–8073, 2017, ISSN: 0002-7863. DOI: 10.1021/jacs.7b02319.

In Preparation

1. **C. G. Gerrity**, R. L. Treuting, and T. Womelsdorf, "Neuronal decoding of attentional filtering in anterior cingulate cortex and striatum," In Preparation.

2. **C. G. Gerrity**, R. L. Treuting, R. A. Peters, and T. Womelsdorf, "Generalized latent space information supporting cognitive control across the cingulate-striatal network," In Preparation.
3. K. A. Asfaw, **C. G. Gerrity**, R. L. Treuting, and T. Womelsdorf, "Anterior cingulate cortex predicts choice outcomes across task difficulties," In Preparation.
4. R. L. Treuting, **C. G. Gerrity**, and T. Womelsdorf, "Oscillatory bursts index behavioral adjustment during learning in anterior cingulate cortex," In Preparation.
5. S. Ahmadi, **C. G. Gerrity**, R. L. Treuting, and T. Womelsdorf, "Neuronal decoding of future choice policies across the fronto-striatal network," In Preparation.

Conference Proceedings and Presentations

1. **C. G. Gerrity**, R. L. Treuting, and T. Womelsdorf, "Decoding the updating of attentional priorities in anterior cingulate cortex, prefrontal cortex and striatum," in *Society for Neuroscience*, San Diego, CA, 2025.
2. S. A. Nabi, **C. G. Gerrity**, R. L. Treuting, and T. Womelsdorf, "Anterior cingulate cortex links past and current choice outcomes during information sampling," in *Society for Neuroscience*, San Diego, CA, 2025.
3. **C. G. Gerrity**, R. L. Treuting, A. P. Richard, and T. Womelsdorf, "A brain-computer interface for understanding and altering decision making during learning in a multidimensional environment," in *Vanderbilt ECE Day*, Nashville, TN, 2023.

Teaching

Teaching Assistant

2017 **Introduction to Engineering** (ES 1401,ES 1402,ES 1403), Vanderbilt University
2018 **Digital Logic** (EECE 2116), Vanderbilt University
Digital Logic Lab (EECE 2116L), Vanderbilt University
2019 **Discrete Structures** (CS 2212), Vanderbilt University
2019 – 2024 **Program and Project Management** (EECE/ECE 4950), Vanderbilt University
Electrical and Computer Engineering Design (EECE/ECE 4951), Vanderbilt University
Senior Design Seminar (EECE/ECE 4959), Vanderbilt University

Course Support

2024 **Brain Computer Interfaces** (CORE 2500), Vanderbilt University

Research Advising

2024 – Present **Kaleab Asfaw** (B.S. Computer Science), Vanderbilt University
Sajad AhmadiNabi (Ph.D. Psychology), Vanderbilt University

Technical Skills

Programming	MATLAB, Python, R, LaTeX
Technologies	GPU Computing, SLURM, Intan Recording Controller, Open Ephys, NAN Microdrives
Competencies	Systems Neuroscience, High Density Electrophysiology Recordings, Animal Research
AI Background	MLP, Convolutional Neural Network, LSTM, GRU, ResNet, Variational Autoencoder
Research Interests	Signal Processing, Deep Learning, Invasive Neural Recordings, Bidirectional BCIs, Big Data, Explainable AI

Technical Skills (continued)

Languages	Native Proficiency: English Working Proficiency: French and Spanish

Grants, Fellowships, Honors, and Awards

June 2023 – Aug 2023	National Institute of Mental Health (R01MH123687)
June 2024 – December 2024	National Institute of Mental Health (R01MH123687)

Professional Affiliations - Memberships

Society for Neuroscience

Institute of Electrical and Electronics Engineers

Media

2025 Breakthrough study shows how brain-to-computer 'electroceuticals' can help restore cognition

References

Thilo Womelsdorf	Associate Professor of Biomedical Engineering, Computer Science, and Psychology Email: thilo.womelsdorf@vanderbilt.edu Dissertation Advisor and Post-Doctoral Scholar Principal Investigator
Richard Alan Peters	Associate Professor of Electrical Engineering Email: alan.peters@vanderbilt.edu Dissertation Advisor (Electrical Engineering)