

Zackary Cole Murphy

Biomedical Engineering PhD Student | EEG and FPVS Research | Research Software Developer

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Research Profile

Biomedical Engineering PhD student specializing in EEG-based cognitive neuroscience and Fast Periodic Visual Stimulation (FPVS). Research focuses on standardizing FPVS experiment design and data analysis through accessible, reproducible software, with longer-term applications in mild cognitive impairment related to dementia.

Education

2026-Present | Doctor of Philosophy in Biomedical Engineering

Mississippi State University | Starkville, Mississippi

Research focus: Development of software for the administration and data analysis of FPVS experiments.

2024-2026 | Master of Science in Biomedical Engineering

Mississippi State University | Starkville, Mississippi

Research project: Investigating semantic categorization with semantically similar stimuli using Fast Periodic Visual Stimulation.

2017-2021 | Bachelor of Science, Bagley College of Engineering (cum laude)

Mississippi State University | Starkville, Mississippi

Professional and Research Experience

Present | Assistant Undergraduate Coordinator

Department of Agricultural and Biological Engineering, Mississippi State University

I serve as the academic advisor for junior and senior students in the department of Agricultural and Biological Engineering at Mississippi State.

Present | Undergraduate Laboratory Manager

Neural Engineering Research Division, Mississippi State University

I manage the Neural Engineering Research Division's undergraduate laboratory under the supervision of Dr. David Vandenhoeve. In this role, I oversee multiple active research projects and around twenty undergraduate students.

Research Software

2026 | FPVS Studio 2.0

Creator and developer | Python 3.10, PySide6

Standalone application for designing and running FPVS experiments, including condition and stimulus management and BioSemi system support.

github.com/zcm58/FPVS-Studio-2.0 | [doi:10.5281/zenodo.20343059](https://doi.org/10.5281/zenodo.20343059)

2026 | FPVS Toolbox

Creator and developer | Python

Package for FPVS data processing, analysis, and figure creation. Supports BioSemi .bdf files and produces outputs for downstream analysis in JASP, R, and SAS.

github.com/zcm58/FPVS-Toolbox-Repo | [doi:10.5281/zenodo.20342767](https://doi.org/10.5281/zenodo.20342767)

Publications

- Murphy, Z.,** Kemp, J., & Vandenheever, D. (2026). Exploring Brain Activity in Novice Athletes During Closed and Open Skills in Table Tennis. *Journal of Motor Behavior*, 1-12. [doi:10.1080/00222895.2026.2691791](https://doi.org/10.1080/00222895.2026.2691791)
- Vandenheever, D., Davidson, H., Kemp, J., **Murphy, Z.,** Kujawa, A., Shi, J., Nadorff, M. R., Bates-Brantley, K., & Sidwell, M. (2025). Exploring facial expression processing with fast periodic visual stimulation and diverse stimuli. *Brain and Cognition*, 189, 106338. [doi:10.1016/j.bandc.2025.106338](https://doi.org/10.1016/j.bandc.2025.106338)
- Vandenheever, D., Davidson, H., Kemp, J., **Murphy, Z.,** Kujawa, A., Shi, J., Nadorff, M. R., Bates-Brantley, K., & Sidwell, M. (2025). Preliminary evidence for anxiety-linked neural sensitivity to emotional faces using fast periodic visual stimulation. *International Journal of Psychophysiology*, 214, 113212. [doi:10.1016/j.ijpsycho.2025.113212](https://doi.org/10.1016/j.ijpsycho.2025.113212)

Preprints

- Murphy, Z.,** & Vandenheever, D. (2026). Exploring Category Change Neural Responses Using Semantically Similar Stimuli With Fast Periodic Visual Stimulation. Preprint. [doi:10.64898/2026.06.22.733603](https://doi.org/10.64898/2026.06.22.733603)

Teaching and Academic Service

2026 | Member, Bagley College of Engineering Strategic Planning Committee

Mississippi State University

2026 | Participant, Preparing Future Faculty Program

Mississippi State University

2025 | Co-instructor, Senior Seminar in Agricultural Engineering

Mississippi State University

Technical Expertise

Programming and software development

Python, R, MATLAB, PySide6, graphical user interface development, parallel processing, reproducible analysis workflows, and Git/GitHub.

EEG and cognitive neuroscience

FPVS paradigm design; EEG data acquisition, analysis, and visualization; BioSemi ActiveTwo setup and troubleshooting across hundreds of participant sessions.