Matthew Murawski

Neuroscience & Computer Science Student | Research Assistant
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Profile

Highly motivated Neuroscience and Computer Science senior at the University of Pittsburgh with extensive hands-on experience in non-human primate electrophysiology, experimental design, and data analysis. Skilled in designing and fabricating custom experimental apparatuses and in scientific communication. Seeking a research assistant position for a gap year before applying for PhD in Neuroscience.

Education

University of Pittsburgh, Pittsburgh, PA
Bachelor of Science in Neuroscience (Major) and Computer Science (Minor)
Certificate: Conceptual Foundations of Medicine
GPA: 3.71
Expected Graduation: April 2025

Research Experience

Research Assistant, Herman Lab University of Pittsburgh — May 2023 – Present

- Independently conduct visual attention experiments on non-human primates (NHPs).
- Perform multi-contact electrophysiological recordings during covert visual attention and saccade tasks in superior colliculus (SC), substantia nigra pars compacta (SNc) and lateral geniculate nucleus (LGN)
- Analyze data from multi-contact electrodes using computational techniques in MATLAB.
- Analyze inter-areal communication between the SC and SNc using alignment index analysis to elucidate functional connectivity.
- Design and fabricate 3D printed components for experimental setups using AutoCAD and Nexa3D software.
- Maintain and troubleshoot experimental software in MATLAB and Linux environments.

Senior Thesis

"Independent Encoding of Salience, Value, and Attention in Primate Superior Colliculus"

- Recorded 220 superior colliculus (SC) neurons in macaques performing a spatially cued covert change detection task and a saccade task that varied reward value and salience.
- Investigated how SC activity is modulated by physical salience, reward, and attention cues.
- Applied single-neuron ROC analyses and population-level support vector machine classification in MATLAB.
- Findings complicate the unified priority map model, potentially suggesting that independent modulatory influences support context-specific visually guided behaviors.

Presentations

- **Poster Presentation, COSYNE 2025**
  Independent Encoding of Salience, Value, and Attention in Primate Superior Colliculus
  View Presentation
- **Talk Presentation, VSS 2025 (Attention: neural mechanisms)**
  Independent Encoding of Salience, Value, and Attention in Primate Superior Colliculus
  View Presentation

Teaching Experience

Teaching Assistant, Speaking of Science University of Pittsburgh

- Assisted in course instruction, helped create class materials, met with students before each presentation, and oversaw class presentations with Drs. Judy Cameron and Susan Sesack.

Teaching Assistant, Intro to Biology 1 University of Pittsburgh

- Supported course instruction and tutored students with Dr. Lesley Ashmore.

Technical & Research Skills

Research Techniques:

- Multi-contact single-unit electrophysiological recording in Rhesus macaques.
- Chairing and managing visual experiments with non-human primates.
- Single-unit and population-level spike train analysis in MATLAB.
- Designing & fabricating 3D-printed experimental apparatuses (AutoCAD, Nexa3D).

Programming & Data Analysis:

- Proficiency in Java, Python, MATLAB, R, SQL, and Unix server management.
- Statistical modeling and data visualization (MATLAB, Minitab, Excel).

Software & Communication:

- Extensive experience with Adobe Illustrator and Photoshop.
- Strong scientific communication and presentation skills.