Matthew Murawski

Neuroscience & Computer Science Graduate | Research Assistant

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PROFILE

Highly motivated recent graduate from the University of Pittsburgh with a B.S. in Neuroscience (minors in Computer Science and Chemistry) and 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 programs in Neuroscience.

EDUCATION

University of Pittsburgh, Pittsburgh, PA   Graduated: April 2025
Bachelor of Science, Frederick Honors College Joint Degree
Major: Neuroscience
Minors: Computer Science, Chemistry
Certificate: Conceptual Foundations of Medicine

RESEARCH EXPERIENCE

Research Assistant, Herman Lab   University of Pittsburgh — May 2023 – August 2025

- 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 SNr 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 Abstract/Details

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

Awards

- Neuroscience Research Excellence Award, University of Pittsburgh ($250)

- COSYNE Presenters' Travel Grant ($500)

- VSS Presenters Grant ($1000)

- University of Pittsburgh Merit Scholarship ($60,000)

Teaching Experience

Teaching Assistant, Speaking of Science   University of Pittsburgh — Spring 2025

- 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 — Fall 2022

- 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/Linux server management.

- Statistical modeling and data visualization (MATLAB, Minitab, Excel, Python libraries e.g., Matplotlib, Seaborn).

Software & Communication:

- Extensive experience with Adobe Illustrator and Photoshop.

- Strong scientific writing, communication, and presentation skills.