

# Sean Berg

## EDUCATION

530-208-7515 | sean.william.berg1@gmail.com | [LinkedIn](#) | [GitHub](#) | [swberg.com](#)

### Carnegie Mellon University

*M.S. in Artificial Intelligence Engineering - Biomedical Engineering (Research Track)*

Pittsburgh, PA

Aug. 2026 – Present

### University of California, Davis

*B.S. in Neurobiology, Physiology, and Behavior*

Davis, CA

Sep. 2021 – Mar. 2024

## AWARDS & RECOGNITION

### Carnegie Mellon University

*Biomedical Engineering Department Head's Fellowship; Academic Excellence Fellowship*

Aug. 2026

## WORK EXPERIENCE

### Junior Specialist

*The Silverman Translational Neuroscience Lab (PI: Jill Silverman)*

Aug. 2024 – Aug. 2026

Sacramento, CA

- Engineered a novel behavioral assay integrating wireless EEG collection with operant conditioning touchscreen tasks; independently designed and fabricated custom acrylic platforms (SOLIDWORKS) and TTL-based synchronization system, saving >\$20K in vendor costs (n=12 mice).
- Built the longitudinal analysis pipeline for the above touchscreen-EEG dataset: trial-level ERP and time-frequency feature extraction (ERSP, ITPC), linear mixed-effects modeling, bootstrapped slope estimation, and cluster-based permutation testing across discrimination and reversal learning.
- Developed Python pipelines for analyzing continuous wireless EEG in awake behaving mice (ERP, multitaper spectrograms, 72-hour recordings); integrated within the core lab data analysis platform (involving approx. 100 mice/year).

### Undergraduate Researcher

*The Sensorimotor Integration Lab (PI: Wilsaan Joiner)*

Aug. 2023 – Jul. 2024

Davis, CA

- Collected and analyzed sensorimotor trajectory data from force perturbation tasks (n=11 human subjects) to assess multisensory elements involved in short-term motor learning to inform forelimb prosthetic development; presented at the UC Davis 2024 Undergraduate Research Conference.

## PUBLICATIONS & PRESENTATIONS

**Manuscripts:** KCNT1 *bioRxiv* preprint under revision at *Brain* (co-author); 3 additional manuscripts in preparation: EEG-touchscreen characterization (first author); translational ERP review (first author); Biomarkers in novel Shank3 mouse model (co-author)

**Presentations:** Poster, Society for Neuroscience Annual Meeting (2025); 3 institutional research showcases, UC Davis Health (2024–2026)

## PROJECTS

### Prototype Motor Imagery Brain-Computer Interface

*Independent Project*

Jul. 2025 – Feb. 2026

Davis, CA

- Built complete binary motor imagery BCI from hardware (AD620 instrumentation amplifier, TL084CN op-amp for analog signal filtering stages) to software (Python-based real-time signal processing and classification).
- Implemented synchronized PsychoPy task paradigm and logistic regression decoder with stratified k-fold cross-validation.

## SKILLS & EXPERTISE

**Programming:** Python (NumPy, SciPy, scikit-learn, MNE-Python, pandas), MATLAB, Git, NEURON

**Signal Processing & Statistics:** ERP/ERSP/ITPC, Morlet and multitaper time-frequency decomposition, artifact rejection, spike detection, linear mixed-effects models, cluster-based permutation testing, cross-validated classification

**Instrumentation:** DSI wireless EEG telemetry, SOLIDWORKS, ABET II touchscreen, TTL synchronization, analog front-end design

**In Vivo:** Rodent stereotaxic surgery and EEG implantation (n=45, 100% survival), perfusions, histology, colony management, seizure induction, behavioral phenotyping battery (open field, novel object recognition, PPI, fear conditioning)