




Kendra K. Noneman

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OBJECTIVE

Senior doctoral student in computational neuroscience seeking an internship in **human-computer interaction** and **next-gen interfaces**. I bring expertise in recording and analyzing eye tracking and multi-channel neurophysiological data, building processing pipelines, and leveraging machine learning to understand the neural basis of complex gaze behaviors. Aiming to contribute to projects that explore the nature of human neuromotor and gaze signals, develop novel tools to infer user intent and experience, and create innovative interaction methods for mixed reality systems.

EDUCATION

Carnegie Mellon University

Aug 2020 –

Ph.D. in Neural Computation

- **Teaching:** Neural Engineering Laboratory, Foundations of the Neural Basis of Cognition
- **Coursework:** Machine Learning, Neural Signal Processing, Statistical Models of the Brain
- **Recognitions:** NCAA DIII National Athlete of the Week, NI Community Service Student of the Year
- **Funding:** NIH T32 Training Grant, NeurIPS Women in Machine Learning Workshop Travel Award, Society for Neuroscience Trainee Professional Development Award, Center for Visual Science Travel Award

Boise State University

Aug 2016 – May 2020

B.S. in Materials Science and Engineering, magna cum laude

- **Coursework:** Computational Modeling, Linear Algebra, Statistics, Electrical Circuits, Quantum Physics
- **Recognitions:** Tau Beta Pi Laureate, Mountain West Scholar Athlete of the Year, Top Ten Scholar, Graduating Student Leader Award, Athletics Academic Excellence Award

EXPERIENCE

Visual-Motor Neuroscience Laboratory, University of Pittsburgh

Feb 2021 –

Graduate Research Assistant — Advisor: J. Patrick Mayo

- Recorded and analyzed **eye tracking** and **electrophysiological** data from awake, behaving non-human primates to investigate the underlying neural representations of gaze control in the prefrontal cortex.
- Trained supervised **machine learning** models to decode gaze trajectories from neuronal data, varying data inputs to evaluate factors influencing predictive performance and generalization across real-world tasks and behaviors.
- Built lab infrastructure on GitHub, developed automated and user-friendly **modular data pipelines** in MATLAB and Python, and trained colleagues to effectively use high-performance computing clusters for large-scale analyses.

Joint Smith & Yu Research Lab, Carnegie Mellon University

Sep 2020 – Feb 2021

Graduate Rotation Student — Advisors: Matthew Smith, Byron Yu

- Applied dimensionality reduction methods to analyze neuronal population dynamics guiding a prefrontal cortex brain-computer interface (BCI) paradigm, revealing how subjects leveraged neurofeedback to stabilize a cursor.

Computational Materials Engineering Lab, Boise State University

Aug 2015 – May 2020

Undergraduate Research Assistant — Advisor: Eric Jankowski

- Employed **computational modeling** and molecular dynamics simulations to study the self-assembly and interaction behavior of small-molecule semiconductors for informing the design of organic photovoltaics.
- Completed a two-week Petascale Institute at the National Center for Supercomputing Applications, gaining expertise in **high-performance computing**, job scheduling, parallel programming, and GPU performance optimization.

CoAx Lab, Carnegie Mellon University

Jun 2019 – Aug 2019

Summer Research Fellow — Advisors: Tim Verstynen, Jon Rubin

- Contributed to the development and simulation of a biologically realistic spiking neural network model to study dopaminergic feedback mechanisms and credit assignment in reinforcement learning processes.

Micron Semiconductor Division, Applied Materials Inc.

May 2018 – Aug 2018

Process Engineering and Data Analytics Intern — Advisor: Kyle Hancock

- Implemented a data pipeline (SQL, Tableau) to process high-throughput sensor data, streamlining new fabrication tool integration and optimizing performance for chemical vapor deposition and reactive ion etch hardware.

Space Sciences and Astrophysics Branch, NASA Ames Research Center

Jun 2017 – Aug 2017

Computational Quantum Astrochemistry Intern — Advisors: Partha Bera, Timothy Lee

- Applied *ab-initio* quantum chemical methods to characterize the geometries and spectroscopic properties of cyclic nitrogenated organic molecules, providing calculations to aid in their future discovery in the interstellar medium.

PROJECTS

Neural Decoding for Eye Movement Prediction in Non-Human Primates

Jul 2022 –



Tools: TensorFlow, Scikit-learn, Deep Learning, Linux, High-Performance Clusters

- Trained ML models to decode gaze position from dual-area neuronal spiking activity in non-human primates, achieving high accuracy and enabling exploration of neural representations driving eye movements.
- Evaluated how data quantity and format influences the models' ability to exploit gaze-relevant neural information.
- Assessed cross-decoding performance across brain areas, eye movement types, and stimulus conditions, revealing that training on diverse conditions enhanced model adaptability for real-world gaze-based BCIs.

Multimodal Analysis of Gaze Patterns in Epilepsy Patients Using Computer Vision

Dec 2023 –



Tools: Dlib, Mediapipe, OpenCV, SEEG, High-Performance Clusters

- Developed a robust pipeline to track gaze positions and behavioral patterns from videos of epilepsy patients during seizures, handling variations in video quality, camera perspectives, and inter-subject variability.
- Current aim is to align gaze dynamics with stereo-electroencephalography (SEEG) recordings, from deep visual and motor brain areas, to investigate the neural basis of gaze behaviors and seizure-related motor abnormalities.

PUBLICATIONS AND PRESENTATIONS

Peer-Reviewed Publications

- [1] **KK Noneman**, JP Mayo. (2024). "Decoding continuous tracking eye movements from cortical spiking activity." *International Journal of Neural Systems*, DOI: 10.1142/S0129065724500709
- [2] **KK Noneman**, JP Mayo. (2024). "Gaze decoding with sensory and motor cortical activity." *Proceedings of the 2024 Symposium on Eye Tracking Research and Applications*, DOI: 10.1145/3649902.3655655.
- [3] PP Bera, **KK Noneman**, TJ Lee. (2022). "Energy landscape, and structural and spectroscopic characterization of diazirine and its cyclic isomers." *Journal of Physical Chemistry A*, DOI: 10.1021/acs.jpca.2c01444.
- [4] JE Rubin, C Vich, M Clapp, **KK Noneman**, T Verstynen. (2021). "The credit assignment problem in cortico-basal ganglia-thalamic networks: A review, a problem and a possible solution." *Eur. J. Neurosci*, DOI: 10.1111/ejn.14745.
- [5] **K Noneman**, C Muhich, K Ausman, M Henry, E Jankowski. (2021). "Molecular simulations for understanding the stabilization of fullerenes in water." *Journal of Computational Science Ed.*, DOI: 10.22369/issn.2153-4136/12/1/6.
- [6] E Jankowski, N Ellyson, JW Fothergill, MM Henry, **KK Noneman**, et al. (2020). "Perspective on coarse-graining, cognitive load, and materials simulation." *Computational Materials Science*, DOI: 10.1016/j.commatsci.2019.109129.

Conference Presentations

- [1] "Improving generalization in neuron-to-gaze decoding for brain-computer interfaces," *Poster*. Conference on Neural Information Processing Systems (NeurIPS), Women in Machine Learning Workshop, Vancouver, CA (Dec 2024).
- [2] "Gaze decoding with sensory and motor cortical activity," *Poster*. Association for Computing Machinery Symposium on Eye Tracking Research and Applications (ETRA), Glasgow, CA (Jun 2024).
- [3] "Decoding smooth pursuit eye movements from area MT and FEF neuronal responses," *Poster*. Gordon Research Conference on Eye Movements, Mount Holyoke, MA (Jul 2023).
- [4] "Modulation of frontal eye field neuronal activity during saccades and smooth pursuit," *Poster*. Center for Visual Science Symposium on Active Vision, Rochester, NY (May 2022).

SKILLS

Programming Languages: Python, MATLAB, Bash/Shell, LaTeX

Libraries and Frameworks: TensorFlow, PyTorch, Scikit-learn, Pandas, NumPy, OpenCV, Dlib, MediaPipe, Matplotlib

Technologies: Git, Unix, Linux, SLURM, Make, Conda, Inkscape, Globus, Jupyter Notebooks

Machine Learning: Deep Learning (DNNs, RNNs, GRUs, LSTMs), Linear/Logistic Regression, Dimensionality Reduction (PCA, FA, GPFA, LDA), Kalman Filter, XGBoost, Support Vector Machines, Detectron2

Experimental Systems: Eye Tracking (EyeLink, Tobii Pro), Multi-Channel Neural Recording (Plexon probes), Single-Unit Recording (Tungsten Microelectrodes), MATLAB-Based Behavioral Task Design (Psychtoolbox), Spike Sorting (Kilosort)

LEADERSHIP

Founding President of Executive Board

Neuroscience Institute Student Organization, Carnegie Mellon University

2022 – 2024

Co-chair, Colloquium Planning Committee

Center for the Neural Basis of Cognition, University of Pittsburgh

2021 – 2023

Department Representative

Graduate Student Assembly, Carnegie Mellon University

2021 – 2022

Chapter President

Tau Beta Pi Engineering Honor Society, Boise State University

2018 – 2020

Women's Track and Field Representative

Student-Athlete Advisory Committee, Boise State University

2018 – 2020