Catherine Rasgaitis

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Machine Learning and Computational Neuroscience, University of Washington, Seattle

Education

University of Washington, Seattle, WA *2022-2025*
BS, Computer Science 3.6
Minor in Neural Engineering and Computation

Highline College, Des Moines, WA *2020-2022*
AS, Computer Science 3.9

Relevant Research

Svoboda Lab, Allen Institute for Neural Dynamics, Seattle, WA *Sep 2024-present*
Research Fellow advised by Camilo Laiton

- Design and benchmark computer vision-based compression methods for lightsheet microscopy volumes.

Orsborn Lab, University of Washington, Seattle, WA *Oct 2022-present*
Undergraduate Research Assistant advised by Dr. Lydia Smith

- Code and debug a tablet-based "cursor tracking task/game" for rhesus macaque monkeys.
- Train and supervise both naive and experienced subjects learning the task.
- Use deep learning methods to predict future task performance and automate task complexity adaptation.
- Analyze behavioral and neural data, focused on motor learning and feedback and feedforward control.
- Maintain and redesign in-cage infrastructure, including the reward system.

Hou Lab, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY *Jun 2024-Aug 2024*
Summer Undergraduate Research Intern advised by Dr. Kyle Daruwalla

- Build Cheephys3D, a novel tool to generate three-dimensional models of facial muscles alongside subcortical neural recordings in mice. Created a command line tool for synchronizing signals.
- Perform manual spike sorting and develop a quality control pipeline to verify good clusters.
- Design a pair of autoregressive models to predict (1) future neural states and (2) future facial muscular states. Compare the models' hidden state matrices using statistical shape analysis.
- Design a decoder model to directly predict geometric facial features from neural time series data.

Other Research

Noble Lab, University of Washington, Seattle, WA *2023-present*
Undergraduate Research Assistant advised by Dr. Anupama Jha

- Build a state-of-the-art model to predict Hi-C contact maps for inter (trans) and intrachromosomal (cis) loci from DNA sequence.
- Use xAI methods to interpret black box models to better understand predictions.

Regional Cabled Array, Ocean Observatories Initiative, Newport, OR *Aug 2024*
Summer VISIONS 2024 Scholar advised by Dr. Deborah Kelley

- Work and live aboard the R/V Atlantis, 300+ miles off the coast of Oregon.
- Assist with underwater photography, logging biology, push core sampling, and constructing water flow instruments. Also use basic wet lab techniques including titration, pipetting, and sterilization methods.
- Use variational autoencoders to analyze and reconstruct whale calls from hydrophone recordings.

Makeability Lab, University of Washington, Seattle, WA *Jan 2024-Oct 2024*
Undergraduate Research Assistant advised by Jaewook Lee

- Build EARLL, an embodied AR-based language-learning application to interface with the HoloLens2.
- Design depth estimation heuristics for accurate and seamless grab detection.
- Experiment with real-time image segmentation and object detection models, including Grounded SAM.

NASA Jet Propulsion Laboratory, Pasadena, CA *Jun 2023-Aug 2023*
Summer Artificial Intelligence Intern advised by Dr. Mark Johnston

- Construct an extensive data preprocessing pipeline from a human expert's scheduling changelog.
- Leverage behavioral cloning and reinforcement learning methods to automate the scheduling of mission communications on the Deep Space Network (DSN).
- Build a web scraper to extract data from mission wiki pages and DSN documents to interface with Meta's LLaMA model. Conducted various experiments to query the model about mission requirements.

Behavioral Ecophysics Lab, University of Washington, Seattle, WA *Mar 2023-Aug 2023*
Undergraduate Research Assistant advised by Amanda Hewes

- Analyze high-speed camera trap and GoPro footage of honeyeaters feeding at flowers.
- Artificially augment image datasets with randomized transformations and external data sources.
- Determine presence of honeyeaters, species identification, and number of flowers probed per birds' visit.

Awards and Honors

Allen School Undergraduate Conference Travel Award, OurCS 2024, Oct 2024, Pittsburgh, PA.
Weill NeuroHUB and CoNECT Student Travel Award, SfN Neuroscience, Jul 2024, Chicago, IL.
Simons Foundation - Shenoy Undergraduate Research Fellowship in Neuroscience (SURFiN), Jul 2024.
UW Genomics - Herschel and Caryl Roman Undergraduate Scholarship, Jul 2024.
WA NASA Space Grant Scholarship, Apr 2022, Apr 2023, Apr 2024.
UW Undergraduate Research Conference Travel Award, SANS 2024, Apr 2024, Toronto, ON, CAN.
Cold Spring Harbor Laboratory - Dorcas Cummings Scholar Fellowship, Feb 2024.
Pacific Cascade Chapter of the SfN Travel Grant, SANS 2024, Jan 2024, Toronto, ON, CAN.
Runner Up for Best Poster, Allen Undergraduate & Master's Research Showcase, May 2023, Seattle, WA.
UW CSE - Denice Dee Denton Scholarship in Computer Science & Engineering, Sep 2022, Seattle, WA.
Major League Hacking Top 50 Hacker, Jul 2022. (Also won 30+ hackathon awards from 2020-2025.)
SHS - John & Mary Vukovich Scholarship, Jun 2022.
Mi Centro - David Almonte Memorial Scholarship, May 2022.
Medium.com - Top Writer for Space, Jul 2021; Top Writer for Innovation, May 2021.

Publications

Jaewook Lee, Sieun Kim, Minji Park, **Catherine Rasgaitis**, Jon E. Froehlich. Embodied AR Language Learning Through Everyday Object Interactions: A Demonstration of EARLL. *UIST 2024.*

Talks

Cross-modal analysis of spontaneous facial movements and neural activity in mice *Aug 2024*

- *Talk for Undergraduate Research Program (URP) Symposium at Cold Spring Harbor Laboratory*

Posters

* = equal contribution

Catherine Rasgaitis, Alan Joseph, Marie Dippon, William Montague, Yuyu Lin, Alexandra Ion. DigiBrace: Customization pipeline for low-cost, personalized orthosis fabrication. OurCS at Carnegie Mellon University, Oct 2024.

Catherine Rasgaitis*, Lydia Smith*, Katherine Perks, Leo Scholl, Amy Orsborn. Developing an automatic in-cage touch screen system to optimize high throughput experiments in non-human primates. SfN Neuroscience 2024, Oct 2024.

Catherine Rasgaitis, Daniel Zheng, Lincoln Mansbach, Ruslana Korolov, Evan Wu, Graham Cobden, Joanna Zhou, Peyton Rapo, Eric Chudler. Opticars: Innovating Mobility with Eye-Controlled Vehicles. Allen School Undergraduate and Master's Research Showcase, May 2024.

Catherine Rasgaitis, Anupama Jha, William Stafford Noble. Improving TwinC model for predicting Hi-C contacts from DNA sequence. UW Undergraduate Research Symposium, May 2024.

Catherine Rasgaitis, Eric Chudler. Investigating the neural and ocular markers of facial perception. Social & Affective Neuroscience Society 2024 Conference, Apr 2024.

Catherine Rasgaitis*, David Pak*. Decoding Visual Stimuli from Neuropixels Data: A Graph Based Approach. CSE 493 Deep Learning Symposium, Mar 2024.

Catherine Rasgaitis, Lydia Smith, Katherine Perks, Penelope Lilley, Leo Scholl, Amy Orsborn. Streamlining Task Complexity Adaptation in Non-Human Primate Training. Women in NeuroAI Symposium, Feb 2024; WaNPRC Scientific Symposium, Mar 2024.

Catherine Rasgaitis, Lydia Smith, Katherine Perks, Leo Scholl, Amy Orsborn. Using Machine Learning to Forecast Non-Human Primate Motor Performance. Allen School Undergraduate and Master's Research Showcase, May 2023.

Submitted Abstracts

Kyle Daruwalla, Irene Nozal Martin, Linghua Zhang, Diana Naglič, Andrew Frankel, Yuhan Zhang, **Catherine Rasgaitis**, Xinyan Zhang, Zainab Ahmad, Xun Helen Hou. Cheese3D: sensitive detection and analysis of whole-face movement in mice. COSYNE 2025. (submitted, pending approval)

Employment History

Allen School Peer Adviser, University of Washington, Seattle, WA *Sep 2024-present*
- Mentor computer science and computer engineering undergraduates from the Allen School

Michael P. Anderson Aerospace Program Mentor, The Museum of Flight, Seattle, WA *Jan 2024-Jun 2024*
- Mentor middle school students interested in pursuing STEM, assist in field trips, lead workshops

Web Designer, Highline College Journalism Dept., Des Moines, WA *Mar 2021-Jun 2022*
- Build and maintain a web edition of the Thunderword, the school newspaper
- Occasionally write articles for the tech column

Skills

Tools
- Languages: Python, SQL, HTML/CSS/JavaScript, TypeScript, Java, C, C++
- Misc: LaTeX, Git & Github, Code Ocean, Figma

Relevant Coursework * = graduate course
- CSE 311, 312: Foundations of Computing I, II; CSE 331: Software Design and Implementation; CSE 332: Data Structures and Parallelism; CSE 333: Systems Programming; CSE 351: Hardware/Software Interface; CSE 442: Data Visualization; CSE 446: Machine Learning; CSE 478: Autonomous Robotics; CSE 480: Computer Ethics; CSE 487: Computational Biology; CSE 490: Neural Engineering; CSE 493: Deep Learning; CSE 599: Machine Learning for Neuroscience*; BIOEN 484: Computational Modeling & Simulation of Bioelectricity; BIOL 130: Introduction to Neuroscience; BIOL 180, 200, 220: Introductory Biology I, II, III; CHEM 220: Organic Chemistry

Organizations and Outreach

President, Synaptech *Sep 2023-present*
President of the neurotechnology club at the University of Washington.

I teach weekly 1-2 hr lectures. Previous lecture topics include neuron tracing, data analysis for Neuropixel probes, collecting data and fitting models with EEG recordings, and more. I also run short scientific experiments during lectures, such as experiments for dual task interference, memory, and handedness.

I am also involved in various Synaptech projects:

Truthinator 3000 (Project Lead) *Sep 2024-present*

Biometric lie detector that uses an electric current to mildly “shock” people that act deceptive.

Looking Glass (Project Lead) *Sep 2023-present*

Research project to analyze the neural and ocular responses during facial perception in humans.

Opticars (Project Lead) *Sep 2023-Jun 2024*

Eye-controlled, custom-built Arduino cars.

Smart Music (Contributor) *Sep 2022-Jun 2024*

Generate original music compositions in a user’s preferred musical style from neural feedback.

Vice President, SPACE *Sep 2024-present*
Vice President for the engineering-focused SPACE (Students Pursuing Academic & Celestial Excellence) club at the University of Washington.

Crew, LUX Film Production Club *Sep 2022-present*
Volunteer crew member and production lead for student films at the University of Washington.

Films: *Rent Control* • Horror (screenwriter and gaffer, 2024); *Green Trace* • Horror (assistant camera, 2023); *From the Depths of Space* • Thriller (gaffer, 2023); *Paranoia* • Horror (director and screenwriter, 2023); *Use Case* • Drama (camera operator, 2022)

Events

- Neurotechnology Hackathon Organizer, Mentor (2024, 2025)
    - Assist with judging, logistics, and technical support for hackers
    - Workshops I hosted: Biotech Lightning Tutorials; Data Analysis for Neuropixel Probes
- STEM Pals Poster Expo Presenter (2024)
- Allen School Welcome Day Volunteer (2024)
- Allen School Advising & Orientation Panelist x3 (2024)
- DubHacks Hackathon, “Introduction to Neurotechnology” Workshop Host (2024)
- Engineering Discovery Days Volunteer (2024)
- UW x Rice Neurotechnology Career Panel Host (2024)
- Brain Awareness Week Volunteer (2024)
- Engineering Fair Volunteer (2023, 2024)
- Dawg Daze Event Host (2023, 2024)
    - Painting with Brainwaves; Brain Games