

Sedona N. Ewbank

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 LinkedIn | GitHub | Google Scholar

Summary

Curious and intrinsically motivated researcher with 9 years of experience in computational and experimental neuroscience. Strong record of employing state-of-the-art computational tools and resources to create and use pipelines for visualizing, analyzing, modeling, and simulating neural activity, brain structure, and behavior across organisms. Extensive domain knowledge of neuroscience combined with working proficiency in machine learning. Keen interest in solving the big questions in neuroscience.

Education

Stanford University

Sept. 2019 – present

PhD in Neurosciences

National Sciences Foundation Graduate Research Fellow

Thesis: “Profiling the effects of subanesthetic ketamine on naturalistic behavior and brain microstructure”

University of Washington

Sept. 2015 – Aug. 2018

BS in Neurobiology and Biochemistry

Departmental distinction; magna cum laude; Washington Research Fellow

Honor’s Thesis: “Chronic AgRP Neuronal Stimulation is Not Sufficient to Cause Chronically Increased Food Intake in Mice”

Experience

Graduate Research Assistant

Sept. 2020 – Present

Stanford University

Stanford, CA

Advised by Raag D. Airan, MD, PhD

Research Technician

Aug. 2017 – Aug. 2019

Howard Hughes Medical Institute / University of Washington

Seattle, WA

Advised by Richard D. Palmiter, PhD

Summer Research Fellow

July 2017 – Aug. 2017

École Polytechnique Fédérale de Lausanne

Lausanne, VD, CH

Advised by Brian D. McCabe, PhD

Undergraduate Research Fellow

April 2016 – June 2017

University of Washington

Seattle, WA

Advised by Leo J. Pallanck, PhD

Research and Development Intern

July 2015 – Sept. 2015

Aervoe Industries, Inc.

Gardnerville, NV

Skills

Computational

- Languages: Python, Matlab, Shell, R
- Tools: scikit-learn, scipy, numpy, statsmodels, tensorflow, matplotlib, NetworkX, MNE, FSL, nibabel, nilearn, DeepLabCut, KeyPoint-MoSeq, VAME, B-SOiD
- Systems: high-performance computing, containerized software
- Methods: signal processing, biomedical image analysis, machine learning, statistics, pharmacokinetic modeling, simulation

Experimental

- Rodent husbandry, stereotactic surgery, behavior, histology, and functional ultrasound imaging
- *D. melanogaster* husbandry, genetics, behavior, and histology
- Immunohistochemistry

Research Support

Ongoing

- National Science Foundation Graduate Research Fellowship — \$138,000 2021-2026
“Focal Neuromodulation by Ultrasound-Gated Nanoparticle Release of a GABA_A Receptor Antagonist”

Past

- Neuroscience Preclinical Imaging Lab Neuroimaging Pilot Grant — \$5,000 2023-2024
“Developing a translational diffusion MRI-based biomarker for the therapeutic action of psychedelics”
- Washington Research Foundation Fellowship — \$7,500 2017-2018
“Investigating whether AgRP neuronal maintenance of energy homeostasis involves regulation of the gut microbiota in mice”
- University of Washington Mary Gates Research Scholarship — \$5,000 2017
“Genetic screen for modifiers of GBA1 pathogenicity in D. melanogaster model of GBA1 deficiency”

Awards & Honors

- International Society for Magnetic Resonance in Medicine Magna Cum Laude Merit Award 2025
- International Society for Magnetic Resonance in Medicine Trainee Educational Stipend 2025
- Stanford University Mind, Brain, Computation, & Technology Program 2022
- Stanford University School of Medicine Bertarelli Fellowship 2021
- Society for Neuroscience Trainee Professional Development Award 2018
- University of Washington Undergraduate Research Conference Travel Award 2018
- University of Washington Husky 100 Award 2018
- University of Washington Rex J. and Ruth C. Robinson Scholarship Fund in Chemistry 2017
- ThinkSwiss Summer School Scholarship 2017
- University of Washington Purple and Gold Scholarship 2015
- National AP Scholar and AP Scholar with Distinction 2015
- Nevada Prize Exam in Mathematics Certificate of Merit and Best Paper awards 2014

Publications

- Yu BJ, Purohit M, Sinha Roy K, Xiang Y, **Ewbank SN**, ... Airan RD. “Acoustically activatable liposomes as a translational nanotechnology for site-targeted drug delivery and noninvasive neuromodulation.” *Nat Nanotechnol.* 2025 Aug 18;ePub. doi:10.1038/s41565-025-01990-5
- Muwanga GPB, Pang A, **Ewbank SN**, Siliezar-Doyle J, Nippert A, Airan RD, Tawfik VL. “Ethological profiling of pain and analgesia in a mouse model of complex regional pain syndrome.” *bioRxiv.* 2025 April 01. doi: 10.1101/2025.03.28.644648
- Di Ianni T, **Ewbank SN**, Levinstein MR, Azadian MM, Budinich RC, Michaelides M, Airan RD. “Sex dependence of opioid-mediated responses to subanesthetic ketamine in rats.” *Nat Commun.* 2024 Jan 30;15,893. doi:10.1038/s41467-024-45157-7
- Ewbank SN**, Campos CA, ... Palmiter RD. “Chronic Gq signaling in AgRP neurons does not cause obesity.” *Proc Natl Acad Sci USA.* 2020 Aug 25;117(34):20874-20880. doi:10.1073/pnas.2004941117

Presentations

Oral

- Ewbank SN**, Hart AR, Dai E, Gopal DN, St. Laurent RM, Vo I, Magana O, Mukunda P, McNab JA, Rodriguez CI, Airan RD. “Cross-species quantification of the effect of ketamine on gray matter microstructure in obsessive-compulsive disorder.” Oral presentation. International Society for Magnetic Resonance in Medicine (ISMRM) Annual Meeting & Exhibition. Honolulu, HI. 2025

- Ewbank SN**, Muwanga GPB, Gopal DN, Yu BJ, Tawfik VL, Airan RD. “Quantitative ethological profiling of the psychopharmacology and pain-alleviating effects of subanesthetic ketamine.” Oral presentation. Society for Neuroscience. Chicago, IL. 2024
- Ewbank SN**. “Noninvasive quantification of ketamine-induced structural plasticity in mice using multishell diffusion weighted imaging.” Oral presentation. Wu Tsai Neuroscience Preclinical Imaging Lab Symposium. Stanford, CA. 2024

Poster

- Ewbank SN**, Habib P, Liang X, Noristani R, Kim J, Bliss TM, Airan RD, Steinberg G. “Leveraging a reproducible diffusion MRI analysis pipeline to characterize stem cell-driven structural recovery in stroke-injured rat brains.” Poster. Knight Initiative for Brain Resilience Symposium. Stanford, CA. 2025
- Ewbank S**, Hart A, Muwanga G, Gopal D, Sinha Roy K, Yu B, St. Laurent R, Tawfik V, Rodriguez C, McNab J, Airan R. “Quantitative Profiling of the Effects of Subanesthetic Ketamine on Naturalistic Behavior and Brain Microstructure.” Poster. American College of Neuropsychopharmacology Annual Meeting. Phoenix, AZ. 2024
- Ewbank S**, Hart A, Muwanga G, Gopal D, Sinha Roy K, Yu B, St. Laurent R, Tawfik V, Rodriguez C, McNab J, Airan R. “Quantitative profiling of the effects of subanesthetic ketamine on naturalistic behavior and brain microstructure.” Poster. Wu Tsai Neurosciences Institute Symposium: Brains & Machines: The Co-Evolution of Neuroscience and AI. Stanford, CA. 2024
- Ewbank SN**, Hart AR, Casey AB, McNab JA, Heifets BD, and Airan RD. “Noninvasive quantification of ketamine-induced structural plasticity in mice using multishell diffusion weighted imaging.” Poster. International Society for Magnetic Resonance in Medicine (ISMRM) Annual Meeting & Exhibition. Singapore. 2024
- Ewbank SN**, Gopal DN, Airan RD. “Quantitative ethological profiling of the effects of subanesthetic ketamine in health, chronic pain, and substance withdrawal in rats.” Poster. NIH HEAL Initiative Scientific Meeting. Rockville, MD. 2024
- Ewbank SN**, Di Ianni T, Bishop JH, Airan RD. “Computational analysis of ketamine’s effects on naturalistic behaviors and pain in rats.” Poster. Wu Tsai Neurosciences Institute Retreat Symposium. Santa Cruz, CA. 2022
- Ewbank SN**, Campos CA, Padilla SL, Bowen AJ, Palmiter RD. “The role of AgRP neurons in shaping the composition and energy harvest capacity of the gut microbiota.” Poster. Society for Neuroscience. San Diego, CA. 2018
- Ewbank SN**, Campos CA, Padilla SL, Bowen AJ, Palmiter RD. “Energy Homeostasis Neural Circuitry In the Brain Regulates the Composition of the Gut Microbiota.” Poster. University of Washington Undergraduate Research Symposium. Seattle, WA. 2018
- Ewbank SN**, Asadzadeh J, McCabe BD. “Establishing a Drosophila Model System to Study Tau Imbalance and Spreading in Neural Circuits.” Poster. École Polytechnique Fédérale de Lausanne Summer Research Program Poster Symposium. Lausanne, VD, CH. 2018
- Ewbank SN**, Germanos AA, Pallanck LJ, Davis MY. “Using a Drosophila melanogaster Model to Understand the Role of Mutations in the Glucosidase, Beta Acid 1 Gene in Parkinson’s Disease.” Poster. UW Department of Neurology Trainee Research Symposium. Seattle, WA. 2017
- Ewbank SN**, Germanos AA, Pallanck LJ, Davis MY. “Using a Drosophila melanogaster Model to Understand the Role of Mutations in the Glucosidase, Beta Acid 1 Gene in Parkinson’s Disease.” Poster. University of Washington Undergraduate Research Symposium. Seattle, WA. 2017

Teaching & Service

Service

- Stanford Future Advancers of Science and Technology (FAST), Mentor 2020-2022
- Stanford Neurosciences Application Assistance Program (SNAAP), Mentor 2020-2022
- Stanford Biosciences Student Association, NSF GRFP Application Mentor 2021
- PATH (People Assisting The Homeless) Thanksgiving Dinner, Volunteer 2021

- WeHOPE Shelter Christmas Dinner and Concert, Volunteer Mandolinist and Server 2019
- University of Washington Undergraduate Research Program, Leader 2017-2018
- Bethany Community Church Women's Shelter, Overnight Volunteer 2017-2019
- University of Washington Grey Matters, Writer 2018
- Alzheimer's Association, Seattle Walk to End Alzheimer's Planning Team 2017

Teaching

- Stanford Neurosciences Preclinical Imaging Laboratory Data Processing Workshop, Instructor 2024
- Stanford Neuroscience Undergraduate Research Opportunity Fellowship, Teaching Assistant 2022
- Stanford Intensive Neurosciences Boot Camp (NEPR 299), Teaching Assistant 2020

Peer Reviewing

- Biological Psychiatry, *ad hoc* reviewer 2025
- Neuropsychopharmacology, *ad hoc* reviewer 2025
- Neuropharmacology, *ad hoc* reviewer 2022