Mark Agrios

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Education

PhD Neuroscience, Northwestern University

- September 2020 - present

B.S. Neuroscience & Mathematics, *cum laude*, College of William & Mary

- Graduated Spring 2019

Positions

Research Technologist: The Miri Lab, Northwestern University [https://mirilab.org]

- August 2019 - September 2020

Teaching Experience

Teaching Fellow

Northwestern University Neurobiology Teaching Fellow. Class: Animal Behavior NEURO 320 (undergraduate level) under Dr. Yevgenia Kozorovitskiy.

- Fall 2023

Teaching Training:

Northwestern University Center for the Integration of Research, Teaching, and Learning (CIRTL) Mentored Discussion of Teaching Program.

- Winter 2023

Lecturer:

Quantitative Methods and Experimental Design NUIN 408 (graduate level), Northwestern University.

- Fall 2021, 2022, 2023.

Natural and Artificial Vision COMP_SCI 353 (undergraduate level):

- Winter 2022

Walter Payton College Preparatory High School Volunteer Lecturer for Northwestern University Brain Awareness Outreach Program.

- 2021 - present

Teaching Assistant:
Quantitative Methods and Experimental Design NUIN 408 (graduate level), Northwestern University.
- Spring 2022

Fundamentals of Neuroscience NUIN 401 (graduate level), Northwestern University
- Fall 2021

Biostatistics BIOL 327 (undergraduate level), College of William and Mary
- August 2018 - May 2019

Tutor:
Calculus, statistics, linear algebra, introductory physics, introductory chemistry, introductory, biology, biophysics. College of William and Mary
- August 2018 - May 2019

Organizer:
Northwestern University Neurobiology Teaching Fellowship program.
- Summer 2024 - present

Mentorship

Margaret Young (2019-2022)
- Thesis: *A Quantitative Analysis of Cortical Influence on Complex Movement in Real Time.*

Sarah Hsu (2021-2023)
- Thesis: *Determining Functional Connectivity of the Mouse Forelimb Areas During Climbing.*

Polina Cherepanova (2021-2023)
- Thesis: *Quantification of Corticostriatal Interactions During Skilled Climbing in Mice.*

Miracle Burt (2024-present)
- Thesis: *Uncovering Layer-specific Projections in Mouse Sensorimotor Cortex Using Generalized Linear Models.*

Publications [* first author]

Forthcoming: ***Agrios, M.**, Solla, S., Miri, A. Interpretable Generative Models Reveal New Organization of Corticostriatal Circuits.

***Agrios, M.**, *Koh, N., *Wang, P., *Kristl, A., *Savya, S., Hsu, S., & Miri, A. (2024). Distributed muscle activity state specificity across motor system neurons. (submitted to Journal of Neuroscience)

*Kristl, A., Koh, N., **Agrios, M.**, Savya, S., Ma, Z., Basrai, D., Hsu, S., & Miri, A. Interactions between motor cortical forelimb regions and their influence on muscles reorganize across behaviors. (submitted to Nature Communications)

*Saiki-Ishikawa, A., ***Agrios, M.**, *Savya, S., *Forrest, A., Hsu, S., Basrai, D., Xu, F., & Miri, A. (2024). Hierarchy in influence but not firing patterns among forelimb motor cortices. eLife.

*Koh, N., Ma, Z., Sarup, A., Kristl, A., **Agrios, M.**, Young, M., & Miri, A. (2023). A Distinct Neural Activity Subspace for Direct Motor Cortical Influence on Muscles. (in revision at Nature Neuroscience)

*Durian, S., **Agrios, M.**, & Schwartz, G. (2023). Neural Computation. Optimal Burstiness in Populations of Spiking Neurons Facilitates Decoding of Decreases in Tonic Firing.

***Agrios, M.** (2022). A very elementary introduction to sheaves., https://doi.org/10.48550/arxiv.2202.01379

Conference Presentations

Gordon Research Conference: Neurobiology of Cognition (poster): *Learning Corticostriatal Networks Using Interpretable Generative Models*	July 2024
NEXTEN Conference of Theoretical and Computational Neuroscience (poster): *Using Interpretable Generative Models to Probe the Multiregional Interactions Underlying Movement Initiation*	May 2024
Society for Neuroscience, Washington D.C. (poster): *Using Interpretable Generative Models to Probe the Multiregional Interactions Underlying Movement Initiation*	November 2023
Society for Neuroscience, San Diego (poster): *A hidden hierarchy among motor cortices*	November 2022
Society for Neuroscience, Chicago (poster): *A paradigm for physiological examination of naturalistic climbing behavior in mice*	October 2019
SIAM, the University of Delaware (talk): *Persistent Homology in Synchronized Bursting Neuronal Networks*	September 2018

Summer research colloquium, William and Mary (talk, invited): *Topology of Pulse Coupled Oscillator Networks*	June 2018
SIAM-SEAS, UNC (talk, invited): *Dynamics and Topology in the pre-Botzinger Complex*	March 2018
JMM national conference, San Diego (talk): *Homology of Burst-synchrony and Oscillations in Spiking Neuronal Networks*	January 2018
SUMS, James Madison University (talk): *Homology of Burst-synchrony and Oscillations in Spiking Neuronal Networks*	October 2017
Summer research colloquium, William and Mary (talk): *Persistent Homology of Neuronal Networks.*	July 2017