

# Mark Agrios

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## **Research Interests**

Computational and theoretical neuroscience. Applications of algebraic topology and differential geometry in studying neural manifolds and neural coding. Neural circuitry. Emergence and criticality in self organizing systems.

## **Positions**

**PhD student:** Northwestern University

- September 2020 - present

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

- August 2019 - present

**Tutor:** Calculus, statistics, physics, linear algebra, biophysics

- August 2018 - May 2019

**Teaching Assistant:** Biostatistics

- August 2018 - May 2019

## **Academic Training**

PhD Neuroscience, Northwestern University, September 2020 - present

B.S. Neuroscience *cum laude*, College of William & Mary, Spring 2019

B.S. Mathematics *cum laude*, College of William & Mary, Spring 2019

## **Leadership Positions**

Pi Mu Epsilon Math honors society at the College of William & Mary

- President: Fall 2018 - Spring 2019
- Vice-President: Fall 2017 - Spring 2018

## **Grants Awarded**

William & Mary honors fellow

- Summer 2018
- Project: *Simplicial Homology and Burst-Synchronizing Neural Networks* (in progress)  
Advisors: Prof Sarah Day (department of mathematics) Prof Drew LaMar (department of biology)

NSF, William & Mary EXTREEMS-QED program

- Summer 2017

## ***Conferences Presented***

### ***Undergraduate research project***

SIAM, the University of Delaware (talk)	September 2018
Summer research colloquium, William and Mary (talk, invited)	June 2018
SIAM-SEAS, UNC (talk, invited)	March 2018
JMM national conference, San Diego (talk)	January 2018
SUMS, James Madison University (talk)	October 2017
Summer research colloquium, William and Mary (talk)	July 2017

### ***Work with the Miri Lab***

Society for Neuroscience, Chicago (poster, co-author)	October 2019
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## ***Conferences Attended***

BAMM at VCU	May 2017
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## ***Computational Experience*** [<https://github.com/markagrios>]

**Python:** Computational topology/homology (GUDHI, PHAT), biological neuron simulation (NEST, Brian2, NEURON), scientific computing (Scipy, Numpy), data analysis and visualization (Pandas, Seaborn)

**Matlab:** Data analysis/statistics, dimensionality reduction (PCA, ISOMAP, t-SNE, UMAP), parallel computing

**Microcontroller software:** Arduino, Raspberry Pi

**Electrophysiology and spike-sorting software:** SpikeGLX, Kilosort/Kilosort2, Phy