LANE LEWIS

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ABOUT ME

Fascinated with the computational abilities of the nervous system, I have worked to model how its properties are knit together across scales: from single neurons, to systems, to behavior, from the fresh perspective of mathematics and computer science.

EDUCATION

2019 - • University Of Arizona, Tucson AZ
Majors in Mathematics, Neuroscience and Cognitive Sciences, minor in Information Science. GPA: 3.93

2014 - 2018 • Stevensville High School
GPA: 3.7

RESEARCH EXPERIENCE

Fall 2019-

University of Arizona, Dept. Mathematics
Mentor: Calvin Zhang-Molina
Researched if small networks of simple leaky-integrate and fire neurons could approximate a computational property of the more complex Hodgkin-Huxley type single neuron models, known as post inhibitory rebound. Worked with coupled highly nonlinear differential equations and recursive maps. Presented poster at JMM mathematics conference in January 2021. First author paper in preparation.

Fall 2020-

University of Arizona, NRD Lab
Mentor: Robert Wilson
Developed PsychoSite, a full stack, open source, web application for psychologists to easily, cheaply, and securely deploy online experiments on amidst the Covid- 19 epidemic. Built using Github, Docker, Electron, Nodejs, and Svelte. Currently in use at the NRD Lab, and will be made public in the near future.

Spring 2021

University of Arizona, NRD Lab
Mentor: Robert Wilson
Developed several online tasks, including a novel task to test exploration behaviors in middle school teachers. Contributions included developing and programming tasks in the Javascript/HTML frameworks of React and Svelte, deploying tasks, and building secure, online data pipelines.

Summer 2020

University of Arizona, UBRP REU
Mentor: Robert Wilson
Expanded a biologically plausible, attractor neural network approximation of a one dimensional Kalman filter to arbitrary dimensions. Worked with general Kalman filters, linear algebra, recursive algorithms, and attractor models. Presented at the UBRP conference in January 2021.

Fall 2019-Spring 2020

University of Arizona, NRD Lab
Mentor: Jack-Morgan Mizell, Ziad Hakim
Worked on miscellaneous research tasks including programming the IOWA gambling task in python, building a data pipeline, running human subjects on tasks.

PRESENTATIONS

JMM Conference, Online, January 2021, Lewis L., Calvin Z., "Post-Inhibitory Rebound-like Behavior in Networks of Pulse-Coupled Integrate-and-Fire Neurons" (poster)

UBRP Conference, Online, January 2021, Lewis L., Wilson R., "Extending a Neural Implementation of The Kalman Filter to Arbitrary Dimensions" (poster)

PAPERS

In Prep   Lewis L., Calvin Z., "Post-Inhibitory Rebound-like Behavior in Networks of Pulse-Coupled Integrate-and-Fire Neurons"

TEACHING EXPERIENCE

Spring 2020   **University of Arizona, Dept. Mathematics**
Mentor: Natalya Sandler
Employed as a teaching assistant for Vector Calculus. Responsibilities included grading homework, leading review sessions, tutoring in Statistics, Caclulus 2, and Vector Calculus, leading a lecture.

Fall 2019   **University of Arizona, Dept. Mathematics**
Mentor: Rachel Neville
Worked as a teaching assistant for Calculus 2 in a flipped classroom setting. Responsibilities included helping students understand problems during classtime, grading homework, leading review sessions, tutoring in Statistics, Calculus 2, and Vector Calculus.

HONORS AND AWARDS

Lusk Scholarship (twice)

David Lomen Excellence In Mathematics Award

James R. Bunch Scholarship

Putnam Competition Award (twice)

Deans List With Distinction

Deans List

TECHNICAL SKILLS

Programming Languages: Python, Julia, Javascript/HTML, R

Frameworks and Services: Pandas, Docker, Github, React, Svelte, Nodejs, AWS, Electron.

RELEVANT CLASSES

Math: Real Analysis (1 and 2), Theory of Statistics, Theory of Probability

Neuroscience: Neurophysiology, Cellular and Molecular Bio of Neurons, Organic Chemistry 1