Jacob M. Sprouse

Jacobmsprouse@gmail.com ❖ (706)-761-8144❖ Auburn, Alabama
GitHub: https://github.com/Jsprouseo LinkedIn: https://www.linkedin.com/in/jacob-sprouse-590a71255/

Projects / Research

- **Cryptography**: Developed a Server & Client encryption communication using Classes and Functions for OOP in Python. The encryption uses PyCryptodome and focuses on the AES modes (i.e, ECB, CBC, OFB and RSA key encryption). Currently working on making this in Java. (**Skills: Python, OOP, Cryptography, Java**)
- **Engr-1100 Graphic interface:** Intro to Engineering Final Project, GUI with PySide6. Utilizes OOP programming in python to create a simple GUI that showcases cybercrime data visually. (**Skills: Python, PySide6, G.U.I., OOP**)
- **Wscale Grid-Search**: A grid search I made for NetPyNE to output the Excitatory post-synaptic potential and weight of a neural simulation (**Skills: Algorithms, Python, JSON, Batch, Computational Neuroscience**)
- **NetPyNE Batch development**: Helped maintain and clean the NetPyNE code for Suny-Downstate-medical center to facilitate parallel simulation, optimization and analysis of multiscale biological neuronal networks in NEURON (**Skills: Python, Batch, OOP, Computational Neuroscience, Debugging, NetPyNE**)
- **Bayesian Research Paper**: Currently working on a research paper with Suny-Downstate-medical center to co-author a paper on Bayesian neural networks in NetPyNE code. (In-Progress) (**Skills: Python, Machine Learning, OOP, Research, Computational Neuroscience, Bayesian Inference, Variance based sensitivity analysis**)

Experience

Google Summer of Code 2024 Contributor - Computational Neuroscience Systems Architect

INCF · Internship May 2024 - Present
·New York, United States · Remote

- As a Google Summer of Code 2024 intern for the International Neuroinformatics Coordinating Facility (INCF), I enhanced model development using NetPyNE's "batch" subpackage. My work involves refactoring the code base for better scalability and user-friendliness. I also explored the effectiveness of various search algorithms—including random, population-based, and posterior-based approaches—on a diverse repository of models, such as rodent motor (M1), rodent somatosensory (S1), and macaque auditory (A1) thalamocortical circuits. My ultimate goal is to optimize NetPyNE's capabilities, making them more efficient and impactful for computational neuroscience research.

Skills applied: **Python (Programming), Computational Neuroscience, Machine Learning, Bayesian Inference, Batch programming, Object-Oriented Programming (OOP), System Architecture**

EDUCATION

Auburn University **2019 – Current**
Auburn, AL **Expected Graduation Date**
Fall, 2025
Degree – Bachelor of Science, Neuroscience
Minor in Chemistry

Auburn University **2019 – Current**
Auburn, AL **Expected Graduation Date**
May, 2026
Degree - Bachelor of Science, Computer Science
Specialty in AI Engineering

- Member of Auburn ACM, Ethical hacking, Competitive programming, and Web Development clubs.
- practicing for CPT (competitive programing)
- National Cyber League Competitions (NCL)

Smiths Station High School **May 2019**
High School Diploma Smiths Station, AL