Samuel Hodges

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EDUCATION

NC State University — *Master of Computer Science* GPA 3.78 August 2020 - December 2022
- Member of the Robot Code Lab under John-Paul Ore, PhD

UNC Asheville— *Bachelor of Science in Computer Science, Math minor* GPA 3.83 August 2016 - May 2020
- Dean's List (Fall 2016- Fall 2019), Chancellor's List (Spring 2019)

TECHNICAL SKILLS

Languages — Python, C++, Bash, JavaScript + HTML/CSS, TypeScript, Java, Arduino, C, MATLAB
Technologies — Linux, Git, Docker, Docker Compose, Agile Development, CI/CD, AWS, ROS2, Behavior Trees, PyTest, SQL (MySQL, Oracle DBMS), RESTful APIs, SFML, LaTeX, Svelte, Node.js, Keras+TF, PyTorch, Jira

RELEVANT WORK EXPERIENCE

NCSU Computer Science — *Research Assistant* September 2020 - October 2022
- Defined **Behavior-Tree**-specific coverage criteria for robots and then implemented them in an open-source **Coverage Tool** using **C++** and **Python**.
- Co-authored *Canopy: Coverage Measurement for Behavior Trees.* In review by *ICRA 2023*.
- Developed multiple **Docker** images and **Bash** scripts for developing **ROS**-based Robots. Created **Docker** image for simulating **ROS2** robots in Unity.

NCSU Computer Science — *Teaching Assistant* August 2020 - December 2022
- Mentored students and assessed code in: undergraduate Software Engineering, Software Engineering for Robotics, and Discrete Mathematics.

UNCA Computer Science (in collaboration with NEMAC) — *Research Assistant* May 2019 - July 2020
- Developed SBML compliant **Python** code for asynchronous simulation graphing with the GillesPy2 team.
- Co-Authored *GillesPy2: a Biochemical Modeling Framework for Simulation Driven Biological Discovery.* Currently in review by *Letters in Biomathematics*
- Improved functions for graphical and statistical analysis of stochastic simulations with **Matplotlib** and **Plotly**.
- Gained experience in **test-driven development** and **Git** version control.

EXAMPLE PROJECTS

A* Pathfinding and Boids — *C++ , Python, SFML*
- Wrote **multithreaded C++** code for simulating and animating multi-agent movement behaviors using **SFML**.
- Created **Python** scripts for creating large geometric graphs and procedural multi-room indoor test environments.
- Programmed A* search algorithm with path-following in **C++** for indoor navigation.

Wifi-Enabled Humidistat Controller — *C++, Arduino, ESP32, JavaScript + HTML/CSS*
- Developed application in **Arduino/C++** for monitoring and controlling temperature and humidity using an **esp32** over LAN.
- Implemented ad hoc wifi network broadcast on device for home network authentication.
- Utilized **RESTful** web server for monitoring and controlling device in-browser.

Canopy (Coverage for Behavior Trees) — *Python, C++, ROS2, Bash, Docker*
- Developed a **ROS2** application for logging Behavior Tree activity and for calculating tree **coverage**.
- Utilized **ROS2** node messaging to enable library/implementation agnostic monitoring and logging.
- Created **ROS2** publisher nodes for out-of-the-box functionality with BehaviorTree.CPP and py_trees_ros.

Personal Website — *Svelte, JavaScript, html+css, Node.js*
- Produced a static website in **Svelte** and **JavaScript** and deployed to github pages.

Genetic Algorithm for Chess Heuristic Optimization — *Python*
- Created a command line chess game runner in **Python** with options for custom board configurations.
- Implemented opposing AI agents utilizing Alpha-Beta Pruning Search and a board state transposition table (hash table).
- Collaborated on genetic algorithms for player agent heuristic function optimization.