Ethan Ferguson

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EXPERIENCE

Grammatech Inc, Ithaca— *Software Intern*

June 2021- August 2021

Project lead to completely rework binary data production pipeline. Worked with Grammatech's research team to add functionality to and bugfix the CodeSentry product. Created graph-based dependency analysis for vulnerability detection, data collection and cleaning in Python.

Sonnet Software, Syracuse— *Software Intern*

June 2019 - August 2019, December 2019 - January 2020, May 2020 - August 2020

Revitalized legacy MATLAB interface for the *Sonnet* software suite. Delivered a MacOS version of their product. Provided MATLAB support to other developers. Inspected compiler-generated x86 assembly to optimize software.

Binghamton University, Binghamton— *Research Assistant*

February 2020 - Present

Worked with Prof. Kenneth Chiu on molecule generation project with TotalEnergies, created high performance C++ data generation code, developed machine learning model. Published in NeurIPS 2021.

Worked with Prof. Hoda Naghibijouybari researching side-channel vulnerabilities in the WebGPU API on integrated Intel GPUs.

EDUCATION

Binghamton University, SUNY | Watson College of Engineering and Applied Science

August 2019 - Present, Cumulative GPA 3.98

Majoring in Computer Science, enrolled as a member of the Binghamton University Honors Program. Expected graduation in December 2022.

PROJECTS

ParticleGrid

Created and optimized high-performance C++ code for generating voxel data on molecule datasets, used in machine learning to synthesize new molecules. Achieved over 1000x speedup over original Python numpy code. Presented in APS Physics March Conference 2022. Published in IEEE eScience 2022.

Binary Production

Pioneered a complete overhaul of the data acquisition at GrammaTech. Project scrapes binaries and source files from many internet locations, builds binaries, extracts metadata, uploads all data to storage and database. Added full automation pipeline. Eliminated outdated, manual processes and fully refreshed legacy code.

Smuggling Playground

Implemented full HTTP stack in Python, with capability to enable specific vulnerabilities on-demand to demonstrate HTTP Request Smuggling attack. Wrote proxy, server, and attacker which illustrate many attack configurations.

SKILLS

Languages: C, C++, Python, Rust, CUDA, JavaScript, Java, MATLAB, Go, x86-64 Assembly

Operating Systems: Linux, macOS, Windows 7 - 11

Embedded Systems: Arduino, Raspberry Pi, soldering

Development and Creative Skills: Vi, Emacs, apache, Web Design, HTML/CSS (see website - www.eferg.us), Networking, 2D and Digital design, system building, Theater

Academic: Physics, Electronics, Mathematics

ACHIEVEMENTS

Eagle Scout

Science Olympiad Captain

National Merit Scholar Finalist

Scholastic Gold Key for the piece *Distance*.

Bausch and Lomb Honorary Science Award

FOREIGN LANGUAGES

Completed Advanced Placement French. First language English.