**Gabriel Sherman**

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**Experience**

Trail of Bits

Salt Lake City, UT

Summer Research Intern 06/2024 to 08/2024

* Advanced the development of an innovative automatic harness generation approach for C-based libraries. Enhanced its functionality to support more complex library harnessing routines and optimized the overall efficiency of the method.
* Integrated Trail of Bits’ code indexing tool, Multiplier, to perform static analysis of the library under test. This static analysis involved parsing the abstract syntax tree of the build artifact to extract relevant information about the library.
* Created harnesses for several widely-used open-source libraries. Performed fuzzing and bug triage, identifying and reporting 6 confirmed bugs to the respective library developers.
* Engaged in a dedicated and technical environment focused on cybersecurity.
* Presented my summer research work at Empire Hacking in New York City.

University of Utah

Salt Lake City, UT

Undergraduate University Research 05/2023 to 05/2024

* Performed research on usage agnostic automatic harness generation for fuzzing public libraries under the guidance of Dr. Stefan Nagy.
* Developed a novel approach in Python to automatically generate C files that serve as both correct and effective fuzzing harnesses for the library under test.
* Observed the compilation and the runtime behavior of a generated harness on a small set of seed inputs. Used these behavior oracles to guide harness mutation toward a final corpus of harnesses.
* Performed extensive fuzz testing on automatically generated harnesses to compare coverage and bug-finding capabilities vs state-of-the-art approaches.

3m Health Information Systems

Salt Lake City, UT

Software Engineer Intern 05/2022 to 08/2022

* Developed a single page application in Angular to assist customers in comparing the configurations of a web application between different environments.
* Utilized skills in JavaScript, html, and CSS to develop a well-put together web application that met the needs of the customer.
* Retrieved relevant data from a database, processed the retrieved data, and displayed it in a user-oriented fashion.
* Collaborated with multiple members of a software development team and worked in an agile based software development process.

**Education and Training**

**Ph.D.:** Computer Science 08/2024 - Current

University of Utah, Salt Lake City, UT

Bachelor of Science: Computer Science 08/2020 - 05/2024

University of Utah, Salt Lake City, UT

* 3.9 Overall GPA

**Skills and Technologies**

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| --- | --- |
| * Cybersecurity Principles * Software Instrumentation and Testing * Artificial Intelligence and Machine Learning * Crash Triage | * Linux OS * LLVM Toolchain * C/C++ * Python |

**SChoolwork and projects**

Salt Lake City, UT

**Operating System Fundamentals**

* Built an early prototype of a kernel based on the xv6 architecture. This prototype included booting, interrupt handling, and running processes in user space.
* Implemented a reduced linker program. Parsed the ELF file to perform relocation on all entries in the relocation table.

**Learning Management System**

* Used the Django framework to host a learning management system on a public domain.
* Performed database queries to update grades, get student assignments, view submissions, and more.
* Deployed the application using AWS EC2 and registered it using a registered domain name.

**Comparison of Machine Learning Approaches**

* Perceptron, ensemble, logical regression, decision trees
* Implemented multiple foundation machine learning algorithms in Python. These included perceptron, logical regression, decision trees, and ensemble approaches.
* Performed k-fold cross validation to derive the most effective hyperparameters for the implementation (learning rate, tree depth, etc.)
* Analyzed the accuracy of these approaches using a validation data set.