Friedrich Doku

Email: frd20@pitt.edu • Phone: 763-923-9302 • Website: http://fdoku.me/ • Github: https://github.com/friedrich12

Education **University of Pittsburgh.** Pittsburgh, PA
Major **Computer Science** Graduating May 2023 (Expected)

Technical Skills

Programming Languages: Python, C++, C, Go, Assembly (Arm and x64)
Software Tools: GDB, Vim, Linux, Bash, TensorFlow, PyTorch, Docker, AWS, Kubernetes, Oracle Cloud, Buildroot, Yocto, Busybox, U-boot

Relevant Coursework: Algorithms and Data Structures, Object Oriented Programming Using Java, System Programming, Computer Organization & Assembly Language

Experience

Software Engineer Contractor @ Whonix Remote
Whonix August 2021-Present

- I'm working on a secure operating system. That protects the identity and personal data of its users.
- Developed application to automatically sign kernel modules.
- Wrote code to allow existing Linux distributions to be booted into live mode.

Software Engineer Intern @ Oracle Austin, TX
Oracle Corporation May 2021-August 2021

- I'm the lead engineer for a cloud computing project. I am developing a secure data store for IoT applications using the Oracle Cloud https://github.com/friedrich12/redsgx.
- Developed a cloud platform for secure data storage using trusted hardware
- Worked with embedded Linux, busybox, and U-boot
- Done in C and Go

Research with Professors Adam Lee & Jack Lange Pittsburgh, PA
University of Pittsburgh Fall 2020-Present

- Developing a secure image processing system for embedded devices.
- Wrote device drivers for operating system kernels.
- Implemented an IPC mechanism for communication between virtual machines.
- Configured operating systems to run on hafnium hypervisor.
- Done in C.

Developed an exokernel for embedded ARM devices Pittsburgh, PA
Mutex Unlocked Fall 2021-Present

- Developing an exokernel for the raspberry pi.
- Wrote device drivers for operating system kernel.
- Implemented core OS components, such as, timer. scheduler, virtual memory, heap, user-space, locking mechanisms, and interrupts.

Developed a Secure Contact Tracing System Named Khopesh Pittsburgh, PA
University of Pittsburgh Summer 2020

- I published a research paper on the project titled "Khopesh – Contact Tracing Without Sacrificing Privacy". See for details: https://link.springer.com/chapter/10.1007/978-3-030-63095-9_30
- I implemented the system in C++ and C https://github.com/MutexUnlocked/khopesh
- I used Docker, DigitalOcean, and R to test the system and evaluate performance results.
- Khopesh effectively hides the location data and contacts of users from attackers.
- Wrote cryptographic protocols, such as, Identity Based Encryption.

Research with Professor Paul Cohen, Dean of Computing Pittsburgh, PA
University of Pittsburgh Summer 2020-Fall 2020

- I'm an engineer for a machine learning project, currently spearheading its 1st web service, allowing the research to be disseminated to the broader research community.
- https://github.com/momacs/sim-server allows users to easily configure and run probabilistic relational agent-based models. These models can be used to run simulations on Covid-19.
- I implemented the webservice using Python.

Software Engineering Internship w/ Professor Juergen Konczak Minneapolis, MN
University of Minnesota - Twin Cities Winter 2019-Present

- Developed a cloud storage application that backs up patient data.
- I designed a robot that improves hand function for patients with somatosensory deficits.
- Added support for a Trusted Execution Environment that guarantees code and data with integrity and confidentiality.
- This work was done in C, C++, Rust, and Python.
- Developed designs for the system's architecture.

Awards

Chancellor's Undergraduate Research Fellowship Pittsburgh, PA
University of Pittsburgh November 2020

- Received funding to work on my own research project.
- The goal of my project is to remove sensitive information from camera feed.

Leadership Experience

Irondale Computer Science Club New Brighton, MN
President/Founder November 2018-Spring 2020

- Taught computer science fundamentals to students in Java. For loops, inheritance, derived classes, user input, basic data structures, binary search, linear search, merge sort, etc.
- Organized team projects such as creating a 2D platformer game.