Austen Barker

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github.com/atbarker

Computer science researcher and programmer specializing in security, operating systems, and storage who likes to break things and then figure out how to fix them.

Education

University of California, Santa Cruz — Santa Cruz, CA
Doctor of Philosophy, Computer Science — *Sep. 2018 — Present (expected Jun. 2022)*
Dissertation: *Artifice: Rethinking the Adversary to Design Usable Deniable Storage*
Master of Science, Computer Science — *Sep. 2017 — Jun. 2018*
Bachelor of Science, Computer Science; GPA: 3.48 — *Sep. 2013 — Jun. 2017*

Experience

University of California, Santa Cruz — Santa Cruz, CA
Graduate Student Researcher, Storage Systems Research Center — *Apr. 2018 — Present*

- **Artifice**: Ongoing research into deniable storage systems. Red team forensic analysis and evalation of deniable storage systems.
- **Lethe**: Efficient secure deletion system for use with file systems or key value stores.

Teaching Assistant — *Sep. 2019 — Dec. 2019, Jan. 2018 — Mar. 2018*

- **CSE-13S**: Computer Systems and C Programming, Fall quarter 2019, approximately 35 students.
- **CMPS-111**: Introduction to Operating Systems, Spring quarter 2018, approximately 30 students.

DataStax — Santa Clara, CA
Information Security Intern — *Jul. 2017 — Dec. 2017, Jun. 2018 — Sep. 2018*

- **Single Sign-on API**: Designed and implemented a prototype single sign-on authentication API, database interfaces (AWS RDS and Apache Cassandra), and password handling utilities in Go for a SAAS database platform.
- **Deployment Setup and Hardening Automation**: Wrote setup and server hardening automation scripts for a distributed database system using Chef, Vagrant, and Docker. Security focused VPC log analytics API and web visualizations.

TidalScale — Los Gatos, CA
Software Engineer Intern — *Jun. 2016 — Sep. 2016*

- **TS-stats**: Python administration and monitoring utility for a distributed hypervisor. Collected metrics from multiple machines in a distributed system, stored them in a small time series database, and displayed using an ncurses GUI.
- **Ubuntu Server Certification**: Performed testing on a distributed hypervisor platform for the Ubuntu Server Certification process. Worked with kernel developers to identify and solve issues uncovered by the certification tests.

Immediate Insight — Los Altos, CA
Intern — *June 2014 — Sep. 2014, Jun. 2015 — Sep. 2015*

- **Kaiser Permanente Deployment**: Supported the deployment of a IT data analytics tool within the Kaiser Permanente IT infrastructure.
- **Product Testing**: Installation, capacity, reliability, and operational testing of an IT data analytics platform.

Research and Projects

Artifice: Deniable steganographic storage system written as a devicemapper virtual block device kernel module. Also red team testing and forensic analysis of the system to verify the security of Artifice's design and implementation. Work related to Artifice has been published in FOCI '19, MSST '20, and MASCOTS '21.
Lethe: Key derivation and encryption system that enables secure deletion of encrypted data by efficiently revoking a key through the use of keyed hash trees. Current implementation written in C/C++.
Vinz Clortho: Covert timing channel implemented as a netfilter Linux kernel module for the secure exfiltration of encryption keys from a distributed system relying on a gossip protocol.

Technical Skills

Languages: C, C++, Python, Go, Java, Lisp/Scheme
Technologies: FreeBSD, Linux, Windows, Git, Docker

Achievements

Eagle Scout: Troop 30, Los Altos, CA, 2012
NSF Award: Artifice research funded by NSF award #1814347 CSR Small: A Multi-layered Deniable Steganographic File System.