



Akshith Gunasekaran

Publication

- 2021 **Fine-grained Analysis of Kernel Non-Determinism.**
- LLVM pass to find non-deterministic code paths in the Linux kernel
 - Improves coverage of run time profilers.
 - Effective bug finding.
 - Effective attack surface reduction.
- 2020 **Multi-K: A multiplexing framework for specialized kernels.**
- Kernel is specialized per application to reduce the attack surface.
 - A kernel multiplexing framework with close to bare-metal context switching performance.
- NDSS 2019 **Balancing Image Privacy and Usability with Thumbnail-Preserving Encryption.**
- An image encryption scheme that balances privacy and usability.
 - Deployable with no changes to your cloud backend.
 - Try it at photoencryption.org

Education

- 2017 - 2022 **PhD - Computer Science, Oregon State University, Corvallis.**
- Area of Focus: System Security, Applied Cryptography, AI
 - Co-Advised by: Rakesh Bobba, Yeongjin Jang
 - Research: Linux Kernel Security, Static Analysis, Dynamic Analysis, Software Profiling, Data flow analysis, Fuzzing.
 - Research Tools: LLVM, Qemu, GDB, KLEE, Python, C/C++, ELF.
 - Coursework: CS Theory (algorithms, graph theory, distributed systems), Security (operating systems, cryptography), AI (machine learning, reinforcement learning)
- 2012 - 2016 **BTech - Computer Science, SRM University, Chennai.**
- Activities: ABU Asia-Pacific Robot Contest, Semantic Search Engine.
 - Venture: Simpl, a fin-tech startup.

Work

- Summer 2021 **Research Intern - Program Analysis and Software Synthesis, PARC, a Xerox Company.**
- Locating and Isolating software features in binary application
 - Automated test generation
 - Designed search based techniques for software synthesis
 - Methods for evaluating equivalency of software applications
- Winter 2017 **Winter Intern - MIT Media Lab, Human Dynamics Group.**
- Mentored by: Dazza Greenwood
 - Prototyped an authentication framework based on OAuth that directly translates permissions into enforceable contracts
 - Prototyped a decentralized autonomous organization to manage community loans
 - Tools: Node, Ethereum, web3.js, TravisCI
- 2014 - 2017 **Software Developer/Founding Team, Simpl.**
- A buy now, pay later service
 - Used by 5 Mil+ users
 - Scaled the service using an event-based/pub-sub micro-service architecture (1 of 4 devs)
 - Built the data engineering pipeline, for Business Intelligence queries (1 of 2 devs)
 - Tools: Golang, Ruby on Rails, Python, Redis, Kafka, RabbitMQ, Spark, Cassandra, Datadog

Activities

- Current **CTF Team, OSUSEC.**
○ Skills: Pwn, Reverse Engineering, Program Analysis, Forensics
- Summer 2019 **Instructor, Pacific North West Cyber Camp.**
○ A week long hands-on educational camp for high school students
○ Topics include basic computer/network security hardening, cyber ethics
○ Delivered the course material and instructed the lab sessions
- Summer 2018 **Volunteer, Pacific North West Cyber Camp.**
- 2020 **Poster Jury, IEEE Security and Privacy.**
- 2020 **Shadow Program Committee, IEEE Security and Privacy.**
- 2019 **External Reviewer, ACM Conference on Computer and Communications Security.**
- 2019 **External Reviewer, IEEE Real-Time and Embedded Technology and Applications Symposium.**
- 2019 **External Reviewer, IEEE International Conference on Dependable Systems and Network.**
- 2018 **Teaching Assistant, CS290 Web Technologies and Web Security.**
- Since 2017 **Research Mentor, Next Tech Lab.**
○ A Multidisciplinary undergrad research lab
○ International QS Award For Re-imagining Education
○ I advise undergrads on Privacy and Security topics.