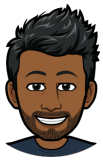

Akshith Gunasekaran

Publication

2021 **Recovery of Symbolic Mathematics and Software Re-Synthesis of Control Binaries**.
- Decompilation of Control Binaries
- Isolation of Symbolic Mathematical Expressions
- AST translation of Symbolic Expressions
- Software Re-Synthesis and Verification

2020 **MultiK: A Framework for Orchestrating Multiple Specialized Kernels**.
- Kernel 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 storage backend.
- Try it at photoencryption.org

Projects / Research In Progress

2022 **Adversarial Attacks on Code Completion Models**.
- Targeted and Non-Targeted Attacks on Code Completion Models
- Attacks on GPT-2 based code completion model
- Attacks on LSTM based code completion model
- Data poisoning and model poisoning attacks

2021 **Fine-grained Analysis of Kernel Non-Determinism**.
- Static and Dynamic analysis of non-deterministic code paths in the Linux kernel
- Improved code coverage for profilers.
- Effective bug finding and attack surface reduction.

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, Data flow analysis, Adversarial attacks on machine learning.
- Research Tools: LLVM, Qemu, GDB, Python, C/C++, TensorFlow, Adversarial Attacks
- Coursework: CS Theory (algorithms, graph theory, distributed systems), Security (operating systems, cryptography), AI (machine learning, reinforcement learning, machine learning security)

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 - Intelligent Systems Lab, PARC, a Xerox Company**.
- Locating and Isolating software features in binary application
- Automated test generation
- Designing search based techniques for software synthesis
- Methods for evaluating equivalency of software applications
- Evaluation of neural decompilation methods

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Winter 2017 **Winter Intern - MIT Media Lab, Human Dynamics Group**.
- Mentored by: Dazza Greenwood
- Investigate and design applications that use decentralized identities
- Prototyped a decentralized autonomous organization
- Tools: Node, Solidity, web3.js, Ethereum, 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 microservice 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

Winter 2021 **Teaching Assistant**, *CS427 Cryptography*.

Fall 2021 **Teaching Assistant**, *CS370 Introduction to Security*.

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*.

Summer 2018 **Volunteer**, *Pacific North West Cyber Camp*.

Fall 2017 **Teaching Assistant**, *CS290 Web Technologies and Web Security*.

Since 2015 **Research Mentor**, *Next Tech Lab*.
- A Multidisciplinary undergrad research lab
- International QS Award For Re-imagining Education
- I advise undergrads on Security and Privacy topics