

Rachel King

PHD STUDENT · COMPUTER SCIENCES

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🏠 <https://rachelking.me>

Education

Ph.D. Computer Sciences

UNIVERSITY OF WISCONSIN-MADISON

2022 - Present

Advisor: Prof. Patrick McDaniel

M.S. Computer Science and Engineering

THE PENNSYLVANIA STATE UNIVERSITY

2021 - 2022

Advisor: Prof. Patrick McDaniel

B.S. Computer Science

THE PENNSYLVANIA STATE UNIVERSITY

2017 - 2021

Experience

Madison Security & Privacy (MadS&P) Laboratory

Madison, WI

RESEARCH ASSISTANT

Since August 2022

- Built secure and private systems for sustainability domains under various malicious threat models. Using cryptographic algorithms and trusted hardware modules, inputs are verified for compliance with sustainability goals.
- Developed a framework for accelerating the analysis of distributed intrusion detection system traces in the form of provenance graphs. A novel querying language is used to identify known threat patterns in system traces.

Systems and Internet Infrastructure Security Laboratory

University Park, PA

RESEARCH ASSISTANT

September 2020 - July 2022

- Researched the Tor anonymity network and how realistic applications of trusted execution environments can prevent various deanonymizing attacks on Tor users.
- Developed a framework for modeling and analyzing the security vs performance implications of deploying trusted execution environments of varying densities in Tor.

Charles Schwab

Austin, TX

SECURITY ANALYST INTERN

June 2020 - August 2020

- Analyzed internal company processes with Identity Access Management team and recommended improvements to strengthen the security and improve efficiency of the process.
- Developed Robotic Processing Automation bots using UiPath to automate internal company processes. Created bots to (1) automate security group creation and distribution group creation within Microsoft Active Directory and (2) automate the extraction of data from Outlook emails and record the data in Excel.

Siemens Digital Industries Software

State College, PA

SOFTWARE DEVELOPMENT INTERN

May 2019 - May 2020

- Debugged automated testing routines designed to validate Siemens product lifecycle management software, Teamcenter. Scrutinized failing test routines and modified test scheduling to ensure maximum coverage of tested software.
- Updated third-party software library use in Teamcenter Visualization. Updates were mandated by the Department of Defense to fix all security risks relating to previous versions of third-party software.

Publications

PUBLISHED

- Q. Burke, R. Sheatsley, **R. King**, O. Hines, M. Swift, and P. McDaniel, “On Scalable Integrity Checking For Secure Cloud Disks,” in *23rd USENIX Conference on File and Storage Technologies (FAST 25)*, USENIX Association, Feb. 2025.
- Y. Nam, **R. King**, Q. Burke, M. Zhou, P. McDaniel, and T. Rosing, “Efficient Host Intrusion Detection using Hyperdimensional Computing,” in *2024 IEEE International Conference on Big Data, 7th Annual Workshop on Cyber Threat Intelligence and Hunting (CyberHunt)*, IEEE, Dec. 2024.
- **R. King**, Q. Burke, Y. Beugin, B. Hoak, K. Li, E. Pauley, R. Sheatsley, and P. McDaniel, “ParTEETor: A System for Partial Deployments of TEEs within Tor,” in *Proceedings of the 23rd Workshop on Privacy in the Electronic Society (WPES)*, ACM, Oct. 2024.

- Q. Burke, Y. Beugin, B. Hoak, **R. King**, E. Pauley, R. Sheatsley, M. Yu, T. He, T. L. Porta, and P. McDaniel, “Securing Cloud File Systems with Shielded Execution,” *IEEE Transactions on Dependable and Secure Computing (TDSC)*, Sep. 2024.

THESIS

- **R. King**, “Evaluating Realistic Deployments of Trusted Execution Environments in the Tor Network,” Master’s Thesis, The Pennsylvania State University, Dec. 2022.

Invited Talks

SRC TECHCON

EFFICIENT HOST INTRUSION DETECTION USING HYPERDIMENSIONAL COMPUTING

Austin, TX

September 2024

Professional Activities

PROGRAM COMMITTEE

2023 **USENIX Security Symposium** Artifact PC Member

EXTERNAL REVIEWER

2023 **USENIX Security Symposium**

2023 **IEEE Symposium on Security and Privacy**

2023 **ACM Conference on Computer and Communications Security**

TEACHING EXPERIENCE

Fall 2021 **Introduction to C Programming** Teaching Assistant

Pennsylvania State University

Fall 2021 **Introduction to Systems Programming** Teaching Assistant

Pennsylvania State University

OUTREACH

Spring 2022 **Girls Who Code at Penn State** Volunteer

Pennsylvania State University

Summer 2021 **Computer Science and Engineering Camp for Girls** Volunteer

Pennsylvania State University

Skills

Languages

C, C++, Python, Java, Bash

Security Tools

Trusted Execution Environments (SGX), Trusted Platform Modules, Onion Routing (Tor), Intrusion Detection Systems