Kaushal Kafle

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I am a PhD student in the Department of Computer Science at the College of William and Mary, being advised by Dr. Adwait Nadkarni. My research interests lie in analyzing the security interests lie in analyzing the security and privacy of modern operating systems as well as designing practical security frameworks for such systems. My work on the security analysis of smart home platforms has been featured in multiple news outlets! I currently lead the graduate student team at the Secure Platforms Lab (SPL) at William & Mary, which I helped found.

EDUCATION

College of William and Mary   **PhD in Computer Science**   **August 2017 - Present**
Advisor: Dr. Adwait Nadkarni

Pulchowk Campus, Tribhuvan University   **Bachelor's in Computer Engineering**   **Nov 2011- Nov 2015**

PUBLICATIONS

Conference Papers (Partial)

Kaushal Kafle, Kevin Moran, Sunil Manandhar, Adwait Nadkarni, and Denys Poshyvanyk. "A Study of Data Store-based Home Automation." In *Proceedings of the 9th ACM Conference on Data and Application Security and Privacy (CODASPY)*. Dallas, TX, USA, March 2019. ***Best Paper Award*** [PDF] [press coverage] 🏆

Sunil Manandhar, **Kaushal Kafle**, Benjamin Andow, Kapil Singh, and Adwait Nadkarni, "Smart Home Privacy Policies Demystified: A Study of Availability, Content, and Coverage". In *Proceedings of the 31st USENIX Security Symposium (USENIX)*, Boston, MA, USA, 2022. [Link]

Xin Jin, Sunil Manandhar, **Kaushal Kafle**, Zhiqiang Lin, and Adwait Nadkarni. "Understanding IoT Security from a Market-Scale Perspective." In *Proceedings of the 2022 ACM SIGSAC Conference on Computer and Communications Security(CCS)*, Los Angeles, CA, USA, 2022. [LINK]

Amit Seal Ami, Nathan Cooper, **Kaushal Kafle**, Kevin Moran, Denys Poshyvanyk, and Adwait Nadkarni, "Why Crypto-detectors Fail: A Systematic Evaluation of Cryptographic Misuse Detection Techniques," in *IEEE Symposium on Security and Privacy (IEEE S&P)*, 2022. [Link]

Richard Bonett, **Kaushal Kafle**, Kevin Moran, Adwait Nadkarni, and Denys Poshyvanyk. "Discovering Flaws in Security-Focused Static Analysis Tools for Android using Systematic Mutation." In Proceedings of the 27th USENIX Security Symposium. Baltimore, MD, USA, August 2018. [Source code] [PDF]

Journal Papers

Amit Seal Ami, **Kaushal Kafle**, Kevin Moran, Adwait Nadkarni, and Denys Poshyvanyk. "Systematic Mutation-based Evaluation of the Soundness of Security-focused Android Static Analysis Techniques". In *ACM Transactions on Security & Privacy (TOPS)*, 2021. [Link]

Kaushal Kafle, Kevin Moran, Sunil Manandhar, Adwait Nadkarni, and Denys Poshyvanyk. "Security in Centralized Data Store-based Home Automation Platforms- A Systematic Analysis of Nest and Hue." In *ACM Transactions on Cyber-Physical Systems (TCPS)*, 2020. [Link]

WORK EXPERIENCE

COVES Fellow, Host office: Department of Education   *May 2023 – Present*
- Support the strategic planning in VA to expand capacity, access, and participation in K-12 CS Education

Graduate Research Intern, Mojo Vision, Tectus Corp.   *Sep 2022 – Nov 2022*
- Understand the security and privacy implications of AR Contact Lens
- Design a new security framework for AR Contact Lens

Graduate Research Intern, IBM Research   *May 2022 – Aug 2022*
- Research the feasibility of mapping the behavior of software code to data policies

Research Assistant, Department of Computer Science, William & Mary   *Jan 2018 – Present*

Ongoing Research Projects (partial)
- **Policy to Behavior tracking in software code (Project Lead)**
  o *Ongoing*
- **Understanding Privacy in Politics (Project Lead)**
  o *Under submission*

Completed Research Projects (partial):
- **Security of Data-Store Based Home Automation (*Project Lead*):**
  o Won the **Best Paper Award** in *ACM CODASPY '19*
  o A journal extension was accepted to *ACM TCPS'20.*
  o [Press coverage](#)

- **MASC (Mutation-based Analysis of Static Crypto-misuse detection techniques):**
  o *IEEE S&P '22*

- **MUSE (MUtation-based Soundness Evaluation)**:
  o *USENIX '18*
  o A journal extension was accepted to *ACM TOPS'21.*

Teaching Assistant, Department of Computer Science, William & Mary   *Aug 2017 – May 2019*
Taught labs and graded assignments for the following classes:
- Computational Problem Solving (CSCI 141), Fall 2017   *– 133 Students*
- Programming for Data Science (CSCI 140), Spring 2019   *– 93 Students*

Graded assignments for the following classes:
- Mobile App Security (CSCI 520), Spring 2018   *– 20 Students*
- Mobile App Security (CSCI 520), Fall 2018   *– 12 Students*

CONFERENCE PRESENTATIONS & INVITED TALKS

- **Guest Lecture in Concepts of Computer Security (CSCI 667)**   *Apr 28th, 2022*
  o "Towards Practical Integrity in the Smart Home"
  o William & Mary, Williamsburg, VA
- **Emerging Scholar Series**, Public Scholarship Initiative   *Mar 3rd, 2022*
  o "Understanding the Security of Smart Home Platforms"
  o Hosted by Williamsburg Regional Library
- **Guest Lecture in Mobile Application Security (CSCI 445)**   *Oct 7th, 2021*
  o Ramifications of SSL issues in mobile apps for the smart home
  o William & Mary, Williamsburg, VA
- **Guest Lecture in IoT Security and Safety (CSCI 680)**   *Feb 7th, 2021*
  o "Securing a Smart home"
  o William & Mary, Williamsburg, VA
- **Journal Club** - William & Mary, Williamsburg, VA   *Sep 26th, 2019*

o "The Security of Smart Home Platforms"
- **9th ACM CODASPY** – Dallas, TX   *Mar 25th, 2019*
  o "A Study of Data-store Based Home Automation"
- **18th Graduate Research Symposium** – William & Mary, Williamsburg, VA   *Mar 15th, 2019*
  o "A Study of Data-store Based Home Automation"
- **USENIX'18** – Baltimore, MD   *Aug 17th, 2018*
  o "Discovering Flaws in Security-Focused Static Analysis Tools for Android using Systematic Mutation"

AWARDS & HONORS

- **COVES Fellow,** VASEM, 2023
- **Best Poster Award,** CCI Symposium, 2023
- **GSAB Research Grant,** William & Mary - Fall 2021
- **International Student Opportunity Award,** William & Mary - Spring 2020, Spring 2021
- **Best Paper Award**, ACM CODASPY, Dallas, TX, USA - March 2019
- **USENIX Security Symposium Travel Award** - 2018

PROFESSIONAL SERVICE

- **Reviewer for Conferences**
  o USENIX Artifact Evaluation Committee 2021, 2022, 2023
- **Sub-reviewer for Conferences**
  o NDSS - 2020, 2021, 2022
  o Annual Computer Security Applications Conference (ACSAC) – 2022, 2023
  o USENIX Security Symposium (USENIX) - 2019, 2021
  o The International Conference on Information Systems Security (ICISS) - 2019

OTHER ACTIVITIES

- Invited to participate in *Which? Investigates* podcast on smart home security (Link), Oct 2021
- My work featured in various news outlets (Links here)
- Lead Graduate Student of Secure Platforms Lab at William & Mary (Lab website)
- Volunteer, IOE Graduate Conference, Pulchowk, Lalitpur, Nepal 2015
- Volunteer, Latex Workshop at IOE Graduate Conference, Pulchowk, Lalitpur, Nepal 2015
- Organizer, Hackathon, Locus 2015
- Organizer, Yomari Codecamp, Locus 2015

REFERENCES

- *Dr. Adwait Nadkarni (PhD Advisor)*
  Assistant Professor, Department of Computer Science
  College of William and Mary, VA, USA
  Contact: apnadkarni@wm.edu

- *Dr. Trent Jaeger (Collaborator)*
  Professor, Department of Computer Science
  Pennsylvania State University, PA, USA
  Contact: trj1@psu.edu

- *Dr. Kapil Singh (Mentor at IBM Research)*
  Principal Research Staff Member
  IBM Research
  Contact: kapil@us.ibm.com