Kaushal Kafle Room 101A, McGlothlin Street Hall, Williamsburg, VA-23187 <u>kkafle@wm.edu | +1 (757) 472-8662 | www.kaushalkafle.com</u>

EDUCATION

William & Mary, Williamsburg, USA PhD in Computer Science Advisor: Dr. Adwait Nadkarni Expected graduation: August, 2024

Pulchowk Campus, Tribhuvan University

BE in Computer Engineering

PUBLICATIONS

Conference Papers

- [1] **Kaushal Kafle**, Prianka Mandal, Kapil Singh, Benjamin Andow, and Adwait Nadkarni, "Understanding the Privacy Practices of Political Campaigns: A Perspective from the 2020 US Election Websites", In *Proceedings of the 45th IEEE Symposium on Security and Privacy (IEEE S&P)*, CA, USA, 2024. [Pre-print]
- [2] **Kaushal Kafle**, Kirti Jagtap, Mansoor Ahmed-Rengers, Trent Jaeger, Adwait Nadkarni, "Practical Integrity Validation in the Smart Home with HomeEndorser", In *Proceedings of the 17th ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)*, Seoul, Korea, 2024. [Pre-print]
- [3] Xin Jin*, Sunil Manandhar*, **Kaushal Kafle**, Zhiqiang Lin, and Adwait Nadkarni. "Understanding IoT Security from a Market-Scale Perspective". In *Proceedings of the 29th ACM Conference on Computer and Communications Security (CCS)*, Los Angeles, CA, USA, Nov 2022. *Co-first Authors. [PDF]
- [4] 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. [PDF]
- [5] 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 *Proceedings of the 43rd IEEE Symposium on Security and Privacy (IEEE S&P)*, 2022. [PDF]
- [6] Sunil Manandhar, Kevin Moran, **Kaushal Kafle**, Ruhao Tang, Denys Poshyvanyk, and Adwait Nadkarni. "Towards a Natural Perspective of Smart Homes for Practical Security and Safety Analyses." In *Proceedings* of the 41st IEEE Symposium on Security and Privacy (S&P), San Francisco, CA, USA, May 2020. [PDF]
- [7] 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]
- [8] 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, Aug 2018. [Source code] [PDF]

Journal Papers

[9] 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. [PDF]

August 2017 - Present

Nov 2011 - Nov 2015

[10] **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. [PDF]

Tool Demo Papers

- [11] Prianka Mandal, Sunil Manandhar, **Kaushal Kafle**, Kevin Moran, Denys Poshyvanyk, and Adwait Nadkarni. "Helion: Enabling Natural Testing of Smart Homes". In Proceedings of the ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), Demonstration Track, Dec 2023. [PDF]
- [12] Amit Seal Ami, Syed Yusuf Ahmed, Radowan Mahmud Redoy, Nathan Cooper, **Kaushal Kafle**, Kevin Moran, Denys Poshyvanyk, and Adwait Nadkarni. "MASC: A Tool for Mutation-based Evaluation of Static Crypto-API Misuse Detectors". In *Proceedings of the ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), Demonstration Track*, Dec 2023. [PDF]
- [13] Amit Seal Ami, **Kaushal Kafle**, Kevin Moran, Adwait Nadkarni, and Denys Poshyvanyk. "Demo: Mutationbased Evaluation of Security-focused Static Analysis Tools for Android." In *Proceedings of the 43rd IEEE/ACM International Conference on Software Engineering (ICSE'21), Formal Tool Demonstration,* May 2021, [PDF]

Posters

- [14] "Understanding the Privacy Practices of Political Campaigns", at the *Network and Distributed* System Security (NDSS) Symposium '24, San Diego, CA – Feb 2024 [PDF]
- [15] "Security and Privacy in the Smart Home Ecosystem", at the *Annual Virginia Academy of Science*, Engineering and Medicine (VASEM) Summit, Richmond, VA – Oct 2023 [PDF]
- [16] "Expanding Computer Science Learning Opportunities in K-12 Instruction in Virginia Schools", at the *Annual Virginia Academy of Science, Engineering and Medicine (VASEM) Summit*, Richmond, VA Oct 2023 [PDF]
- [17] "Understanding the Privacy Practices of Political Campaigns", at the *CCI Symposium* 23, Richmond, VA April 2023 *Best Poster Award* \P [PDF]
- [18] "Smart Home Privacy Demystified", at the CCI Symposium 2022, Richmond, VA April 2022 [PDF]
- [19] "A Study of Data Store-based Home Automation", at ACM CODASPY'19, Dallas, TX March 2019 [PDF]

CONTRIBUTION IN AWARDED GRANT

[1] <u>NSF Grant CNS – 2132281</u>

- a. Title: "Enabling Data-Driven Security and Safety Analyses for Cyber-Physical Systems"
- b. PI: Adwait Nadkarni, Kevin Moran, Co-PI: Denys Poshyvanyk, Contributor: Kaushal Kafle
- c. Award amount: \$799,839

RESEARCH EXPERIENCE

Graduate Research Assistant

Secure Platforms Lab (SPL), Department of Computer Science, William & Mary

Jan 2018 – Present

Research Overview: Under the advisership of Prof. Adwait Nadkarni at SPL, I have worked primarily in the analysis of security and/or privacy of diverse emergent and evolving consumer-oriented software systems.

Projects and Artifacts:

1. Polityzer, IEEE S&P'24 - <u>Source Code</u>

- 2. Security of Centralized Home Automation, Best Paper, ACM CODASPY'19 Press Coverage
- 3. IoTSpotter, ACM CCS'22 Source Code
- 4. Smart Home Privacy Policies Demystified, USENIX'22 Data
- 5. Helion, IEEE S&P'20 Source Code
- 6. HomeEndorser (To appear, WiSec'24): Data, Source code to be open-sourced
- 7. Mutation-based Soundness Evaluation (MUSE), USENIX'18 Source Code
- 8. Mutation Analysis for evaluating Static Crypto-API misuse detectors (MASC), IEEE S&P'22 Source Code

Lead Graduate Student

June 2022 – Present

Secure Platforms Lab (SPL), Department of Computer Science, William & Mary **Responsibilities:**

- Provided individual research mentorship and support to other graduate/undergraduate students
- Helped in fostering a good working environment among lab students
- Organized and led student-run weekly meetings, and other daily lab operational activities

INDUSTRY EXPERIENCE

Virginia Department of Education, Richmond, VA May 2023 – Aug 2023

Commonwealth of Virginia Engineering and Science (COVES) Policy Fellow

Mentors: Keisha Tennessee (Virginia Computer Science Coordinator), Professor Anita Jones (UVA) **Responsibilities**:

- Support the strategic planning in VA to expand capacity, access, and participation in K-12 Computer Science • Education
- Dataset collection, analysis and providing data-based recommendations •

Mojo Vision, Tectus Corp., Saratoga, CA Sep 2022 – Nov 2022 Graduate Research Intern, Mentor: Dr. Michael Grace

Responsibilities:

- Investigate the security and privacy implications of AR Contact Lens •
- Design a new security framework for AR Contact Lens

IBM Research, Yorktown Heights, NY	May 2022 – Aug 2022
Graduate Research Intern, Mentor: Dr. Kapil Singh	
Responsibilities:	

Investigate the feasibility of mapping specific privacy and data policies to the software code behavior

TEACHING EXPERIENCE

- Guest Lecturer, William & Mary

 1. Guest Lecture on "Practical Integrity in the Smart Home", in Concepts of Computer Security CSCI 667

 (Graduate-level course) – Spring 2022
 - 2. Guest Lecture on "Ramifications of SSL Issues in Mobile Apps for the Smart Home", in Mobile Application Security – CSCI 445 (Undergraduate-level course) – Fall 2021 – Online (over zoom)
 - 3. Guest Lecture on "Securing a Smart Home", in IoT Security and Safety CSCI 680 (Graduate-level course) -Spring 2021 – Online (over zoom)

Teaching Assistant, William & Mary Aug 2017 – May 2019 ____

- 4. Taught labs and graded assignments in *Computational Problem Solving* CSCI 141 (133 Students)
- 5. Taught labs and graded assignments in *Programming for Data Science* CSCI 140 (93 Students)
- 6. Graded assignments in Mobile App Security CSCI 520 Spring 2018 (20 Students), Fall 2018 (12 Students)

Conference Presentations

- 1. "Helion: Enabling Natural Testing of Smart Homes" at the Foundations of Software Engineering (FSE'23), Demonstrations Track, San Francisco, CA – December 2023
- 2. "A Study of Data-store Based Home Automation" at the 9th ACM CODASPY, Dallas, TX March 2019
- 3. "A Study of Data-store Based Home Automation" at the 18th Graduate Research Symposium, William & Mary, Williamsburg March 2019
- "Discovering Flaws in Security-Focused Static Analysis Tools for Android using Systematic Mutation" at the 27th USENIX Security Symposium, Baltimore – August 2018

Invited Talks and Outreach

- 5. "Guest Post: A PhD Student's Experience at the LiSPI Workshop", Leadership in Science Policy Institute (LiSPI) workshop, invited by Computing Research Association (CRA), Washington DC Nov 2023 [Link]
- 6. "Understanding the Security of Smart Home Platforms", as part of the Emerging Scholar Series, Public Scholarship Initiative, Williamsburg Regional Library March 2022
- 7. "*How hackable is your home?*", invited as an expert on smart home security in *Which? Investigates* podcast (Episode Link) October 2021
- 8. *"The Security of Smart Home Platforms"*, Research talk at the **Journal Club**, William & Mary, Williamsburg September 2019
- 9. "Enabling Safe and Secure Home Automation: Problems, Best Practices and Future Opportunities", William & Mary Developer Outreach to Williamsburg Developers Group, Williamsburg, VA, July 2019
- 10. Outreach to High School Students, invited by Advanced Technology Center, V. Beach, VA April 2019
- "Hacking Your Smart Home" podcast, invited to discuss my work on smart home security by News Radio WINA – December 2018

AWARDS & HONORS

- 1. Participant in the *Science Policy & Advocacy for Research Competition (SPARC) series*, *Universities Research Association (URA)*, 2024
- 2. Commonwealth of Virginia Engineering & Science (COVES) Policy Fellow, Selected by Virginia Academy of Science, Engineering and Medicine (VASEM), Host office Virginia Department of Education, 2023
- 3. Best Poster Award, CCI Symposium 2023, Richmond, VA, USA April 2023
- 4. Best Paper Award, ACM CODASPY, Dallas, TX, USA March 2019
- 5. Graduate Studies Advisory Board (GSAB) Research Grant, William & Mary Fall 2021
- 6. International Student Opportunity Award, William & Mary Spring 2020, Spring 2021
- 7. *Travel Award* IEEE S&P (2024), WiSec (2024), NDSS (2024), Computing Research Association (2023), USENIX Security Symposium (2018)

PROFESSIONAL SERVICE

1. Conference Program Committee Member

- a. *NDSS* Program Committee 2024
- b. USENIX Security Symposium (USENIX) Artifact Evaluation Committee 2021, 2022, 2023
- c. ACSAC Artifact Evaluation Committee 2023
- d. IEEE/ACM Workshop on Internet of Safe Things (SafeThings) Program Committee 2024
- 2. Conference External Reviewer
 - a. Top-tier conferences NDSS (2020, 2021, 2022, 2024), USENIX (2019, 2021)
 - b. Other conferences ACSAC (2022, 2023), ICISS (2019, 2022, 2023), ACNS (2024), CNS (2022)
- 3. 2024 COVES Fellow Selection Committee, Virginia Academy of Science, Engineering and Medicine (VASEM) 2024