

Kaushal Kafle

Room 331, McGlothlin Street Hall, Williamsburg, VA-23187
kkafle@cs.wm.edu | +1 (757) 472-8662 | www.kaushalkafle.com

I am a PhD student in the Department of Computer Science at the College of William and Mary, being advised by [Prof. Adwait Nadkarni](#). My research interests lie in analyzing the security practices employed in modern operating systems as well as designing practical security frameworks for such systems. I work at the [Secure Platforms Lab \(SPL\)](#) at William & Mary, where currently, I am involved in identifying and analyzing security problems in smart home platforms and devices, especially concerning home automation.

EDUCATION

College of William and Mary <i>Advisor:</i> Dr. Adwait Nadkarni	PhD in Computer Science	August 2017 - Present
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Relevant Courses:

Computer and Network Security, Cybersecurity Research Analysis, Systems Security, Advanced Software Engineering, Practice of Machine Learning, Analysis of Algorithms

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

Journal Papers

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)*. To appear. [\[Preprint\]](#) [\[press coverage\]](#)

Conference Papers

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. *To Appear in the Proceedings of the 41st IEEE Symposium on Security and Privacy (S&P)*, San Francisco, CA, USA, May 2020. [\[PDF\]](#)

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** [\[PDF\]](#) [\[press coverage\]](#)

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. [\[Source code\]](#) [\[PDF\]](#)

Short Papers

Kaushal Kafle, Diwas Sharma, Aayush Subedi, and Arun Kumar Timalsina. Improving Nepali Document Classification by Neural Network. In *Proceedings of IOE Graduate Conference* (pp. 317–322), Pulchowk, Kathmandu, Nepal, 2016. [\[PDF\]](#)

WORK EXPERIENCE

Research Assistant, Department of Computer Science, William & Mary	<i>Jan 2018 – Present</i>
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- Ongoing research on the security analysis of smart home devices and platforms

Recent Projects:

- **Helion:**
 - Designed a framework that leverages Natural Language Processing to generate natural home automation scenarios
 - Created safety policies by analyzing automation sequences generated from a user's automation preferences
 - To appear in *IEEE S&P '20*
- **Data-Store Based Home Automation:**
 - Analyzed the security of various components of smart home platforms that facilitate routines
 - Analysis done on two major platforms: *Google Nest* and *Philips Hue*
 - Analyzed components included the Cloud backend, corresponding third-party smart-apps of the platforms, smart-apps review process, SSL enforcement in the apps.
 - Won the **Best Paper Award** in *ACM CODASPY '19*
 - [Press coverage](#)
- **MUSE (MUtation-based Soundness Evaluation):**
 - Designed a framework that leverages mutation testing techniques to analyze the *soundness claims* of Android static analysis tools
 - *USENIX '18*

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

IT Manager, Lionize Travel and Tours, Patan, Nepal

Nov 2015 – May 2017

CONFERENCE PRESENTATIONS & INVITED TALKS

- **Journal Club** - William & Mary, Williamsburg, VA *Sep 26th, 2019*
 - “The Security of Smart Home Platforms”
- **9th ACM CODASPY** – Dallas, TX *Mar 25th, 2019*
 - “A Study of Data-store Based Home Automation”
- **18th Graduate Research Symposium** – William & Mary, Williamsburg, VA *Mar 15th, 2019*
 - “A Study of Data-store Based Home Automation”
- **USENIX'18** – Baltimore, MD *Aug 17th, 2018*
 - “Discovering Flaws in Security-Focused Static Analysis Tools for Android using Systematic Mutation”

AWARDS & HONORS

- **Best Paper Award**, ACM CODASPY, Dallas, TX, USA, March 2019
- **USENIX Travel Award** (USENIX Security Symposium 2018).

PROFESSIONAL SERVICE

- **Sub-reviewer for Conferences**
 - ISOC Network and Distributed System Security Symposium (NDSS), 2020
 - USENIX Security Symposium (USENIX), 2019
 - The International Conference on Information Systems Security (ICISS), 2019

OTHER ACTIVITIES

- 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