Aravind Machiry

AFFILIATION	Assistant Professor, Department of Electrical and Computer Engineering, Purdue University.

CONTACT
INFORMATION

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RESEARCH
INTERESTS

My research focuses on various aspects of system security, such as vulnerability detection, mobile security, trusted execution environments, static and dynamic analysis of source code, and binaries. I am also interested in developing novel static/dynamic program analysis techniques for system security problems. My research resulted in various Open-source security tools and several Common Vulnerability Exposures (CVEs) in critical system software such as kernel drivers and bootloaders.

POSITIONS &
EDUCATION

Assistant Professor (PurS3 Lab)   2021-Present
Department of Electrical and Computer Engineering
Purdue University, West Lafayette, USA

Postdoctoral Researcher   Aug 2020-Dec 2020
University of Pennsylvania, Philadelphia, PA, USA
Advisor: Mayur Naik

Ph.D in Computer Science   2014-2020
University of California, Santa Barbara, USA
Advisors: Christopher Kruegel and Giovanni Vigna
Thesis: Securing smart devices from the bottom-up

Visiting Researcher   Jul 2019-Sep 2019
University of Maryland, College Park, USA
Advisor: Micheal Hicks
Project: Automatically converting legacy code to Checked C

Research Intern   Jul 2018-Sep 2018
Symantec Research Labs (SRL), LA, USA
Advisor: Daniel Marino
Project: Interactive static vulnerability detection

Graduate Research Assistant   Sep 2014-Present
University of California, Santa Barbara, USA
Advisors: Giovanni Vigna, and Christopher Kruegel

Software Security Engineer   2013-2014
Qualcomm, R&D, USA
Project: Static type checkers to find multiple address space vulnerabilities

M.S in Information Security   2011-2013
Georgia Institute of Technology, Atlanta, USA
Advisor: Mayur Naik
Thesis: Dynodroid: Automated testing of Smartphone Apps

HONORS &
AWARDS

- **CS Outstanding Dissertation Award**   UCSB 2020
- **CSAW Applied Research** Finalist for DIFUZE   CSAW 2017
- **Internet Defense Prize** Runner up for DR.CHECKER   USENIX Security 2017
- **Distinguished Paper Award** for Ramblr   NDSS 2017
- **Best Paper Award Award** for CLAPP   Grad Workshop 2016
- **Distinguished Artifact Award** for Dynodroid   FSE 2013
- **College of Computing MS Research award**   2013

PUBLICATIONS

[23] C. Salls, **Aravind Machiry**, A. Doupe, Y. Shoshitaishvili, C. Kruegel, and G. Vigna. "Exploring Abstraction Functions in Fuzzing." *Proceedings of the 2020 IEEE Conference on Communications and Network Security (CNS)*, **2020**

[22] C. Spensky, **Aravind Machiry**, M. Busch, K. Leach, R. Housley, C. Kruegel, and G. Vigna. "TRUST.IO: Protecting Physical Interfaces on Cyber-physical Systems." *Proceedings of the 2020 IEEE Conference on Communications and Network Security (CNS)*, **2020**

[21] **Aravind Machiry**, N. Redini, E. Cammellini, C. Kruegel and G. Vigna. "SPIDER: Enabling Fast Patch Propagation in Related Software Repositories." *Proceedings of the 41st IEEE Symposium on Security and Privacy (S&P)*, **2020**

[20] N. Redini, **Aravind Machiry**, R. Wang, C. Spensky, A. Continella Y. Shoshitaishvili, C. Kruegel and G. Vigna. "KARONTE: Detecting Insecure Multi-binary Interactions in Embedded Firmware." *Proceedings of the 41st IEEE Symposium on Security and Privacy (S&P)*, **2020**

[19] **Aravind Machiry**, H. Touma, R. Chen, M. Hicks. "(POSTER) Automated conversion of legacy code to Checked C." *Proceedings of the IEEE Secure Development Conference (SecDev)*, **2019**

[18] E. Gustafson, M. Muench, C. Spensky, N. Redini, **Aravind Machiry**, Y. Fratantonio, D. Balzarotti, A. Francillon, Y. E. Choe, C. Kruegel, G. Vigna. "Toward the Analysis of Embedded Firmware through Automated Re-hosting." *Proceedings of the 22nd International Symposium on Research in Attacks, Intrusions and Defenses (RAID)*, **2019**

[17] N. Redini, R. Wang, **Aravind Machiry**, Y. Shoshitaishvili, C. Kruegel and G. Vigna. "BinTrimmer: Towards Static Binary Debloating Through Abstract Interpretation." *Proceedings of the 16th International Conference on Detection of Intrusions and Malware, and Vulnerability Assessment (DIMVA)*, **2019**

[16] **Aravind Machiry**, N. Redini, E. Gustafson, H. Aghakhani, C. Kruegel and G. Vigna. "Detecting Deceptive Reviews using Generative Adversarial Networks." *Proceedings of the 2nd Binary Analysis Research Workshop (BAR)*, **2019**.

[15] **Aravind Machiry**, N. Redini, E. Gustafson, Y. Fratantonio, Y. E. Choe, C. Kruegel and G. Vigna. "Using Loops For Malware Classification Resilient to Feature-unaware Perturbations." *Proceedings of the 34th Annual Application Security Application Conference (ACSAC)*, **2018**

[14] H. Aghakhani, **Aravind Machiry**, S. Nilizadeh, C. Kruegel and G. Vigna. "Detecting Deceptive Reviews using Generative Adversarial Networks." *Proceedings of the 1st Deep Learning and Security Workshop (DLS)*, **2018**.

[13] A. Bianchi, Y. Fratantonio, **Aravind Machiry**, C. Kruegel, G. Vigna, S. Chung, W. Lee. "Broken Fingers: On the Usage of the Fingerprint API in Android." *Proceedings of the ISOC Network and Distributed System Security Symposium (NDSS)*, **2018**.

[12] A. Bianchi, K. Borgolte, J. Corbetta, F. Disperati, A. Dutcher, J. Grosen, P. Grosen, **Aravind Machiry**, C. Salls, N. Stephens, G. Vigna, R. Wang (Authors listed alphabetically). "Mechanical Phish: Resilient Autonomous Hacking." *IEEE Security & Privacy Magazine - SPSI: Hacking without Humans 2018*.

[11] N. Redini, **Aravind Machiry**, D. Das, Y. Fratantonio, A. Bianchi, E. Gustafson, Y. Shoshitaishvili, C. Kruegel, G. Vigna. "BootStomp: On the Security of Bootloaders in Mobile Devices." *Chaos Communication Congress (34C3)*, **2017**.

[10] J. Corina, **Aravind Machiry**, C. Salls, Y. Shoshitaishvili, Shuang Hao, C. Kruegel, and G. Vigna. "DI-FUZZING Android Kernel Drivers." *Black Hat Europe London, UK December (BH EU)*, **2017**.

[9] J. Corina, **Aravind Machiry**, C. Salls, Y. Shoshitaishvili, Shuang Hao, C. Kruegel, and G. Vigna. "DI-FUZE: Interface Aware Fuzzing for Kernel Drivers." *Proceedings of the 24th ACM Conference on Computer and Communications Security (CCS)*, **2017**. Finalist for **CSAW Applied Research Competition**.

[8] **Aravind Machiry**, C. Spensky, J. Corina, N. Stephens, C. Kruegel, G. Vigna. "DR.CHECKER: A Soundy Analysis for Linux Kernel Drivers." *Proceedings of the 26th USENIX Security Symposium (USENIX Security)*, **2017**. Runner up for **Facebook Internet Defense Prize**

[7] N. Redini, **Aravind Machiry**, D. Das, Y. Fratantonio, A. Bianchi, E. Gustafson, Y. Shoshitaishvili, C. Kruegel, G. Vigna. "BootStomp: On the Security of Bootloaders in Mobile Devices." *Proceedings of the 26th USENIX Security Symposium (**USENIX Security**)*, **2017**.

[6] **Aravind Machiry**, E. Gustafson, C. Spensky, C. Salls, N. D. Stephens, R. Wang, A. Bianchi, Y. E. Choe, C. Kruegel, G. Vigna. "BOOMERANG: Exploiting the Semantic Gap in Trusted Execution Environments." *Proceedings of the ISOC Network and Distributed System Security Symposium (**NDSS**)*, **2017**.

[5] R. Wang, Y. Shoshitaishvili, A. Bianchi, **Aravind Machiry**, J. Grosen, P. Grosen, C. Kruegel, G. Vigna. "Ramblr: Making Reassembly Great Again." *Proceedings of the ISOC Network and Distributed System Security Symposium (**NDSS**)*, **2017**. Won **Distinguished Paper Award**.

[4] A. Bianchi, K. Borgolte, J. Corbetta, F. Disperati, A. Dutcher, J. Grosen, P. Grosen, **Aravind Machiry**, C. Salls, N. Stephens, G. Vigna, R. Wang (Authors listed alphabetically). "Cyber Grand Shellphish." *Phrack*, **2017**.

[3] Y. Fratantonio, **Aravind Machiry**, A. Bianchi, C. Kruegel, G. Vigna. "CLAPP: Characterizing Loops in Android Applications." *Proceedings of the ACM Symposium on Foundations of Software Engineering (**FSE**)*, **2015**.

[2] Y. Fratantonio, **Aravind Machiry**, A. Bianchi, C. Kruegel, G. Vigna. "CLAPP: Characterizing Loops in Android Applications (Invited Talk)." *Proceedings of the International Workshop on Software Development Lifecycle for Mobile (**DeMobile**)*, **2015**.

[1] **Aravind Machiry**, R. Tahiliani, M. Naik. "Dynodroid: An Input Generation System for Android Apps." *Proceedings of the ACM Symposium on Foundations of Software Engineering (**FSE**)*, **2013**. Won **Distinguished Artifact Award**.

TALKS		
	• Unleashing D on Android Kernel Drivers	Nullcon 2018
	• Piston: Uncooperative Remote Runtime Patching	ACSAC 2018
	• Cyber Grand Shellphish	DEFCON, USA, 2016
	• Million Dollar Baby: Towards ANGRly conquering DARPA CGC	Nullcon 2016

PROFESSIONAL ACTIVITIES

Conferences
- Reviewer — BAR, NDSS 2018
- Program Committee Member, Shadow PC — S&P 2018
- External Reviewer — USENIX 2017
- External Reviewer — NDSS 2016

Journals
- Reviewer, Artificial Intelligence Review — 2018
- Reviewer, Journal of Information Security and Applications — 2018
- Reviewer, Journal of Information and Software Technology — 2017

TEACHING

ECE 46900 - Operating Systems Engineering, Purdue University — Spring 2021
Teaching Assistant, CS8 - Introduction to Computer Science — Summer 2018

REFERENCES

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Michael Hicks
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Antonio Bianchi
Assistant Professor at Purdue University
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Yan Shoshitaishvili
Assistant Professor at Arizona State University
yans@yancomm.net ✉