Kristopher Micinski

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Personal Information

Education

Michigan State University   **East Lansing, MI**
BS, Electrical and Computer Engineering, Honors: Summa Cum Laude   *2008–2011*

University of Maryland, College Park   **College Park, MD**
PhD, Computer Science   *2011–2017*

Dissertation Topic

Title: Interaction-Based Security Policies for Mobile Apps

Employment

Syracuse University
Assistant Professor   *2019–Present*

Haverford College
Visiting Assistant Professor   *2017–2019*

University of Maryland
Research Assistant   *2012–2017*

University of Maryland
Teaching Assistant   *Fall 2011–2012*

Online Profiles

WWW: http://kmicinski.com

Twitter: https://twitter.com/krismicinski

Scholar: https://scholar.google.com/citations?user=HpJLJWUAAAAJ

Research, Scholarly, and Creative Activities

Conference Papers (Refereed)

○ Ke Fan, Thomas Gilray, Valerio Pascucci, Xuan Huang, Kristopher Micinski, and Sidharth Kumar. "Optimizing the Bruck Algorithm for Non-Uniform All-to-All Communication". In: *Proceedings of the 31st International Symposium on High-Performance Parallel and Distributed Computing*. HPDC '22. Minneapolis, MN, USA: Association for Computing Machinery, 2022, pp. 172–184. ISBN: 9781450391993. DOI: 10.1145/3502181.3531468. URL: https://doi.org/10.1145/3502181.3531468

○ Arash Sahebolamri, Thomas Gilray, and Kristopher Micinski. "Seamless Deductive Inference via Macros". In: *Proceedings of the 31st ACM SIGPLAN International Conference on Compiler Construction*. CC 2022. Seoul, South Korea: Association for Computing Machinery, 2022, pp. 77–88. ISBN: 9781450391832. DOI: 10.1145/3497776.3517779. URL: https://doi.org/10.1145/3497776.3517779

○ Thomas Gilray, Sidharth Kumar, and Kristopher Micinski. "Compiling Data-Parallel Datalog". In: *Proceedings of the 30th ACM SIGPLAN International Conference on Compiler Construction*. CC 2021. Virtual, Republic of Korea: Association for Computing Machinery, 2021, pp. 23–35. ISBN: 9781450383257. DOI: 10.1145/3446804.3446855. URL: https://doi.org/10.1145/3446804.3446855

○ Kristopher Micinski, David Darais, and Thomas Gilray. "Abstracting Faceted Execution". In: *2020 IEEE 33rd Computer Security Foundations Symposium (CSF '20)*. 2020, pp. 184–198. DOI: `10.1109/CSF49147.2020.00021`

○ Daniel Votipka, Seth M. Rabin, Kristopher Micinski, Jeffrey S. Foster, and Michelle M. Mazurek. "An observational investigation of reverse engineers' processes". English (US). in: *Proceedings of the 29th USENIX Security Symposium*. Proceedings of the 29th USENIX Security Symposium. (Acceptance rate: 16.1%). USENIX Association, 2020, pp. 1875–1892

○ Daniel Votipka, Seth M. Rabin, Kristopher Micinski, Thomas Gilray, Michelle L. Mazurek, and Jeffrey S. Foster. "User Comfort with Android Background Resource Accesses in Different Contexts". In: *Fourteenth Symposium on Usable Privacy and Security (SOUPS 2018)*. Baltimore, MD: USENIX Association, Aug. 2018, pp. 235–250. ISBN: 978-1-939133-10-6. URL: `https://www.usenix.org/conference/soups2018/presentation/votipka`

○ Kristopher Micinski, Daniel Votipka, Rock Stevens, Nikolaos Kofinas, Jeffrey S. Foster, and Michelle L. Mazurek. "User Interactions and Permission Use on Android". In: *Conference on Human Factors in Computing Systems (CHI '17)*. 2017. URL: `http://cs.umd.edu/~micinski/chi-2017.pdf`

○ Kristopher Micinski, Jonathan Fetter-Degges, Jinseong Jeon, Jeffrey S. Foster, and Michael R. Clarkson. "Checking Interaction-Based Declassification Policies for Android Using Symbolic Execution". In: *European Symposium on Research in Computer Security (ESORICS '15)*. Vol. 9327. Lecture Notes in Computer Science. Vienna, Austria, Sept. 2015, pp. 520–538. URL: `http://www.cs.cornell.edu/~clarkson/papers/clarkson_clickrelease.pdf`

○ Michael R. Clarkson, Bernd Finkbeiner, Masoud Koleini, Kristopher Micinski, Markus N. Rabe, and César Sánchez. "Temporal Logics for Hyperproperties". English. In: *Principles of Security and Trust*. Ed. by Martín Abadi and Steve Kremer. Vol. 8414. Lecture Notes in Computer Science. Springer Berlin Heidelberg, 2014, pp. 265–284. URL: `http://cs.umd.edu/~micinski/post14.pdf`

Workshop Papers (Refereed)..

○ Ke Fan, Kristopher Micinski, Thomas Gilray, and Sidharth Kumar. "Exploring MPI Collective I/O and File-per-process I/O for Checkpointing a Logical Inference Task". In: *2021 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW '21)*. 2021, pp. 965–972. DOI: `10.1109/IPDPSW52791.2021.00153`

○ Davis Ross Silverman, Yihao Sun, Kristopher K. Micinski, and Thomas Gilray. "So You Want to Analyze Scheme Programs With Datalog?" In: *CoRR* abs/2107.12909 (2021). arXiv: `2107.12909`. URL: `https://arxiv.org/abs/2107.12909`

○ Yihao Sun, Jeffrey Ching, and Kristopher Micinski. "Declarative Demand-Driven Reverse Engineering". In: *Workshop on Binary Analysis Research (BAR '21) at NDSS 2021*. Feb. 2021. URL: `https://bar2021.moyix.net/bar2021-preprint16.pdf`

○ Kristopher Micinski, Thomas Gilray, Daniel Votipka, Jeffrey S. Foster, and Michelle L. Mazurek. *Symbolic Path Tracing to Find Android Permission-Use Triggers*. Feb. 2019. URL: `https://www.ndss-symposium.org/wp-content/uploads/bar2019_83_Micinski_paper.pdf`

○ Kristopher Micinski, Philip Phelps, and Jeffrey S. Foster. "An Empirical Study of Location Truncation on Android". In: *Mobile Security Technologies (MoST '13)*. San Francisco, CA, May 2013. URL: `http://www.cs.umd.edu/~jfoster/papers/most13.pdf`

○ Jinseong Jeon, Kristopher Micinski, Jeffrey A. Vaughan, Ari Fogel, Nikhilesh Reddy, Jeffrey S. Foster, and Todd Millstein. "Dr. Android and Mr. Hide: Fine-grained Permissions in Android Applications". In: *ACM CCS Workshop on Security and Privacy in Smartphones and Mobile Devices (SPSM '12)*. Raleigh, NC, USA, Oct. 2012, pp. 3–14. URL: `http://cs.umd.edu/~jfoster/papers/spsm12.pdf`

Journal Articles (Refereed)

○ M. Taghizadeh, K. Micinski, S. Biswas, C. Ofria, and E. Torng. "Distributed Cooperative Caching in Social Wireless Networks". In: *IEEE Transactions on Mobile Computing* 12.6 (June 2013), pp. 1037–1053. ISSN: 1536-1233. DOI: 10.1109/TMC.2012.66

Tech Reports

○ Jinseong Jeon, Kristopher K. Micinski, Jeffrey A. Vaughan, Nikhilesh Reddy, Yixin Zhu, Jeffrey S. Foster, and Todd Millstein. *Dr. Android and Mr. Hide: Fine-grained security policies on unmodified Android*. Tech. rep. CS-TR-5006. Department of Computer Science, University of Maryland, College Park, Dec. 2011

○ Jinseong Jeon, Kristopher Micinski, and Jeffrey S. Foster. *SymDroid: Symbolic Execution for Dalvik Bytecode*. Tech. rep. CS-TR-5022. Department of Computer Science, University of Maryland, College Park, July 2012. URL: http://www.cs.umd.edu/~jfoster/papers/cs-tr-5022.pdf

○ Masoud Koleini, Michael R. Clarkson, and Kristopher K. Micinski. "A Temporal Logic of Security". In: *CoRR* abs/1306.5678 (2013). URL: http://arxiv.org/abs/1306.5678

○ Kristopher K. Micinski, Jonathan Fetter-Degges, Jinseong Jeon, Jeffrey S. Foster, and Michael R. Clarkson. "Checking Interaction-Based Declassification Policies for Android Using Symbolic Execution". In: *CoRR* abs/1504.03711 (2015). URL: http://arxiv.org/abs/1504.03711

Federal Research Grants (SU portion)

Labratory for Telecommunication Sciences: Scaling Malware Analysis Pipelines. Fall 2021–Spring 2025. Amount: $430,691 (negotiated so far).

DARPA (subcontract of Galois Inc.): Verified Security and Performance Enhancement of Large Legacy Software (V-SPELLS). Fall 2021–Spring 2024. Amount: $400,000.

NSF PPoSS Planning: Principles and Practices of Scalable Systems. Award. 10/1/2022–9/30/2023. Total amount: $166k. Syracuse Portion: $83,768.

Book Chapters

Contributed Android-related material (approximately twenty pages) to the book "Operating Systems, Internals and Design Principles (8th Edition)." I coordinated with the main author, William Stallings, to integrate my material into his book.

Selected Public Talks

January 2022: "Massively-Parallel Declarative Analytics." To Galois Inc. Attendance of roughly 35 people.

Summer 2020: "A vision for the future of analysis-assisted reverse engineering." To "Empire Hacking" group (based in NYC). Attendance of roughly 50 people.

Spring 2016: "Interaction-Based Security Policies for Mobile Apps." PhD Proposal Defense.

Fall 2016: "User Interactions and Permission Use on Android." Presented at the New Jersey Programming Languages Seminar.

Fall 2015: "Checking Interaction-Based Declassification Policies for Android Using Symbolic Execution." Presented at ESORICS 2015.

Spring 2013: "An Empirical Study of Location Truncation on Android." Presented at Mobile Security Technologies (MoST).

Fall 2012: "Dr. Android and Mr. Hide: Fine-grained Permissions in Android Applications." Talk given at George Washinton University, Fall 2012.

Software

Assemblage: Generates large-scale datasets for malware analysis pipelines. Currently builds approximately

30-50k Windows binaries per day running at Syracuse University Research Computing Cluster. Funded by Labratory for Telecommunication Sciences

Ascent: A macro-embedded declarative language in Rust. Outperforms the Soufflé Datalog engine on a single thread, and exhibits good parallel performance at higher thread counts.

Slog: Massively-Parallel Declarative Logic Programming language. Developed in collaboration with the High-Performance Automated reasoning and Programming (HARP) lab, funded by DARPA V-SPELLS and NSF PPoSS planning.

Drew: Datalog-based Rewriter for Binaries, joint with Yihao Sun (PhD Student).

Redexer: Joint with Jinseong Jeon. A binary rewriter for Android. Redexer is publicly available at `https://github.com/plum-umd/redexer` and used by a variety of research groups to manipulate Android apps.

SymDroid: Joint with Jinseong Jeon, A symbolic executor for Android bytecode.

Teaching and Mentorship

Courses Taught (at Syracuse U)

CIS 700: Fall 2022, 8 students. **Language-Based Security.**

CIS 352: Fall 2022, 36 students. **Principles of Programming Languages.** `https://kmicinski.com/cis352-f22/` Lecture videos linked on website.

CIS 352: Spring 2022, 94 students. **Principles of Programming Languages.** `https://kmicinski.com/cis352-s22/`

CIS 400: Fall 2021, 30 students. **Compiler Design.** `https://kmicinski.com/cis400-f21/`

CIS 700: Fall 2021, 8 students. **Malware Analyais.** Graduate level seminar.

CIS 352: Spring 2021, 98 students. **Principles of Programming Languages.** `https://kmicinski.com/cis352-s21/`

CIS 700: Fall 2020, 3 students. **Formal Methods in Computer Security.** Graduate-level seminar.

CIS 352: Spring 2020, 95 students. **Principles of Programming Languages.** `https://kmicinski.com/cis400-f22/`

CIS 700: Fall 2019, 3 students. **Program Analysis.** Graduate-level seminar.

Courses Taught (at Haverford)

CMSC 395: Fall 2018, 18 students. At Haverford College. Mobile Apps for Social Change. A project-based course that teaches Android development by pairing students with nonprofits.

CMSC 107: Fall 2018, 30 students. At Haverford College. (Honors) Introductory programming in Python. `http://kmicinski.com/cs107`

CMSC 311: Spring 2018, 25-35 students. At Haverford College. Computer Security: Attacks and Defenses. `https://kmicinski.com/cybersecurity-course/`

CMSC 245: Fall 2017, 25 students. At Haverford College. Course: Principles of Programming Languages.

PhD Students

Arash Sahebolamri. Fall 2019–present. Planned graduation: Spring 2023.

Yihao Sun. Fall 2020–present. Planned graduation: Spring 2025.

Davis Silverman. Fall 2020–Fall 2022. Currently on leave working in industry.

Masters Students

Jeffrey Ching (graduated summer 2021). "Enhancing Usability of Malware Analysis Pipelines with Reverse Engineering"

Chang Liu (Spring 2020–present). Malware analysis and reverse engineering via machine learning. Chang is planning to transition to my PhD advisee in Spring 2023.

Usha Nalabolu. (Fall 2022–present). Collaborating on Slog.

Satyajeet Jha. (Fall 2022–present). Collaborating on Slog.

Daniel Lugo (Spring 2021–Summer 2021). Collaborated to build Assemblage

Undergraduate Students

Jay Morrisson. Summer 2021. Working on scaling malware analysis pipeline generation

Chandler Todd. 2017. Working on improvements to the Soot binary rewriting framework to enable dynamic analysis of Android apps.

Skyler Ellenburg. 2017. Working on automatically scraping, archiving, and warehousing apps automatically for automatic analysis.

Linyi Chen. 2017. Working on string analysis of Android apps to detect social-media API usage.

Tosin Alliyu. 2017. Working on a user study of perceptions towards social-media API permissions and their integration with Android apps.

Austin Wan. 2017. Studying how the Abstracting Abstracting Machines approach can be scaled up to real-world analysis frameworks.

Becky Lytle. 2017. Applying abstract interpretation to check algorithmic fairness of machine learning applications.

Daniel Chen. Fall 2016. Applied dynamic analysis to Android apps to decide what kind of data they backed up to cloud storage.

Philip Phelps. Summer 2012 and 2013. Collaborated on work to implement and test location fuzzing for Android apps.

Rebecca Norton. Summer 2012. Collaborated on extending Redexer and doing work to make it publicly released.

Service

Conference Activity

2023: Publicity chair for the ACM's 50th Conference on the Principles of Programming Languages (POPL '23)

2023: Chair of the AAAI "bridge" workshop "AP2S: Automated Program and Proof Synthesis Bridge Program." `https://garrettkatz.github.io/ap2s-bridge/`

2022: Program Committee for PLAS (The 17th Workshop on Programming Languages and Analysis for Security) `https://plas2022.github.io/`

2022: Program Committee for Scheme Workshop at ICFP 2022 `https://plas2022.github.io/`

2022: Junior Chair, Programming Languages Mentoring Workshop (PLMW) at ICFP `https://icfp22.sigplan.org/home/PLMW-ICFP-2022`. I ran the workshop in person and applied for the associated NSF grant.

2022: Program Committee Co-chair, NDSS workshop on Binary Analysis Research `https://www.ndss-symposium.org/ndss2022/cfp-bar-workshop/`.

2021: Program Committee, SADFE 2021: Systematic Approaches to Digital Forensic Engineering (SADFE) at 2021 IEEE S&P

2020: External Review Committee, OOPSLA 2021: Served as an external reviewer for OOPSLA '21

2019: General Chair, Scheme Workshop 2019 `https://gilray.org/scheme-2019/`

2017: Web chair for EUSEC '18: the 3rd European Conference on Usable Security.

2017: Member for poster review jury for SOUPS '18: the Symposium on Usable Security and Privacy.

Subreviews, community, and pre-faculty service

President of Graduate Student Executive Council

UMD Computer Science *2012–Present*

As the president of the executive council, I organized social events and served as a representative to the department on behalf of graduate students. During my time I organized numerous events of varying scale each year. These included departmental picnics, happy hours, game nights, and others.

Webmaster, PLUM Lab website

Programming Languages (PLUM) Lab, UMD *2013–Present*

I redid the PLUM group's website so that it was easier to modify as members and projects were reorganized. I currently maintain the site for the group.

Spring 2013: Organized Mid-Atlantic Programming Langauges Seminar (MAPLS).

Fall 2014: Student volunteer at the International Conference on Functional Programming (ICFP).

Fall 2011–2017: Subreviews for Jeffrey Foster, Michael Hicks, Michelle Mazurek, and Michael Clarkson. Reviewed papers from a variety of conferences including Oakland, PLDI, POPL, CSF, SOUPS, and more.

Fall 2017–Fall 2022: Active volunteer for CodedByKids Philadelphia: an organization that helps underrepresented students learn to program after school.