WILLIAM HAROLD ENCK

Professor • Department of Computer Science • North Carolina State University
Director, Wolfpack Security and Privacy Research (WSPR) Laboratory
co-Director, Secure Computing Institute (SCI)
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EDUCATION

Pennsylvania State University, University Park, PA
    Ph.D., Computer Science and Engineering, May 2011
    Thesis: *Analysis Techniques for Mobile Operating System Security*
    Advisor: Dr. Patrick McDaniel

Pennsylvania State University, University Park, PA
    M.S., Computer Science and Engineering, May 2006
    Thesis: *Analysis of Open-Functionality in SMS-Capable Cellular Networks*
    Advisor: Dr. Patrick McDaniel

Pennsylvania State University, University Park, PA
    B.S., Computer Engineering, May 2004
    Thesis: *Study of Adaptive Routing Algorithms for NoC Architectures*
    Advisor: Dr. Chita R. Das

ACADEMIC AND RESEARCH APPOINTMENTS

Professor	2021-present
Department of Computer Science, North Carolina State University	
co-Director	2019-present
Secure Computing Institute, North Carolina State University	
Associate Professor	2016-2021
Department of Computer Science, North Carolina State University	
Assistant Professor	2011-2016
Department of Computer Science, North Carolina State University	
Research Assistant	2005-2011
Computer Science and Engineering, Pennsylvania State University	
Lead Graduate Student	Jan 2009 - Aug 2010
Systems and Internet Infrastructure Security (SIIS) Laboratory, Pennsylvania State University	
co-Instructor, CSC597a: Mobile Phone Security	Spring 2009
Computer Science and Engineering, Pennsylvania State University	
Instructor, EE/CSE458: Communications Networks	Summer 2007
Computer Science and Engineering, Pennsylvania State University	
Teaching Assistant, CSE473: Microcomputer Laboratory	Spring 2005
Computer Science and Engineering, Pennsylvania State University	

INDUSTRIAL EXPERIENCE

Research Intern	Summer 2009
Intel Labs, Seattle, WA	
Research Intern	Summer 2006
AT&T Research, Florham Park, NJ	

Summer Intern   Summer 2003
IBM Corp., Poughkeepsie, NY
Systems Administrator   Summers 2000-2002, 2004
Lebanon MobileFone Inc., Lebanon, PA

STUDENT ADVISING

Current PhD Students	• Seaver Thorn *(expected 2026)* • K. Virgil English *(expected 2027)* • Elizabeth Lin *(expected 2027)* • Greg Tystahl *(expected 2027)* [co-advised with Dr. Alexandros Kapravelos] • Jonah Ghebremichael *(expected 2028)* [co-advised with Dr. Alexandros Kapravelos] • James Pangia *(expected 2028)* [co-advised with Dr. Alexandros Kapravelos]
Current PhD Committees	• Sathvik Prasad [advised by Dr. Brad Reaves] • Shaown Sarker [advised by Dr. Alexandros Kapravelos]
Past PhD Students	• Trevor Dunlap *(Summer 2024)* [co-advised with Dr. Brad Reaves] (now at Chainguard) • Samin Yaseer Mahmud *(Fall 2023)* (now at Meta) • Iffat Anjum *(Fall 2023)* (now Teaching Assistant Professor at University of Denver) • Isaac Polinsky *(Summer 2023)* (now at Google) • Albert Gorski *(Spring 2020)* (now at Booz Allen Hamilton) • Benjamin Andow *(Summer 2019)* (now at Google) • TJ OConnor *(Spring 2019)* (now Assistant Professor, Florida Institute of Technology) • Luke Deshotels *(Fall 2018)* (now at TikTok) • Michael Grace *(Summer 2017)* [co-advised with Dr. Xuxian Jiang] (now at Samsung Research America) • Adwait Nadkarni *(Spring 2017)* (now Associate Professor, William and Mary) • Ruowen Wang *(Spring 2016)* [co-advised with Dr. Peng Ning] (now at Google) • Jason Gionta *(Spring 2015)* [co-advised with Dr. Peng Ning]
Past Masters Students	• K. Virgil English *(Summer 2022)* • Seaver Thorn *(Fall 2020)* • Sanket Goutam *(Spring 2019)* [co-advised with Dr. Brad Reaves] • Akash Verma *(Fall 2016)* • Tsung-Hsuan (Anson) Ho *(Fall 2013)* [co-advised with Dr. Xiaohui (Helen) Gu] • Vasant Tendulkar *(Summer 2013)* • Andrew Branscomb *(Spring 2013)* [co-advised with Dr. Ting Yu] • Adwait Nadkarni *(Fall 2012)*
Past PhD Committees	• Alex Ross [advised by Dr. Brad Reaves] • Nikolaos Pantelaios [advised by Dr. Alexandros Kapravelos] • Sarah Elder [advised by Dr. Laurie Williams] • Yunsen Lie (Worcester Polytechnic Institute) [advised by Dr. Craig Shu] • Mu Zhu [advised by Dr. Munindar Singh] • Igibek Koishybayev [advised by Dr. Alexandros Kapravelos] • Pubali Datta (University of Illinois, Urbana-Champaign) [advised by Dr. Adam Bates] • Shaohu Zhang [advised by Dr. Anupam Das] • Nasif Imtiaz [advised by Dr. Laurie Williams] • Abida Haque [advised by Dr. Alessandra Scafuro] • Alex Freij (ECE Department) [advised by Dr. Huiyang Zhou] • William Brockelsby [advised by Dr. Rudra Dutta] • Jordan Jueckstock [advised by Dr. Alexandros Kapravelos] • Jie Duan (ECE Department) [advised by Dr. Mo-Yuen Chow] • Quan Chen [advised by Dr. Alexandros Kapravelos] • Hans Liljestrand (Aalto University) [advised by Dr. N. Asokan] • Xueqing Liu (University of Illinois, Urbana-Champaign) [advised by Dr. Tao Xie] • Justin Smith [advised by Dr. Emerson Murphy-Hill]

- Karthik Sheshadri [advised by Dr. Munindar Singh]
- Salahuddin Khan (Royal Holloway, University of London) [advised by Dr. Lorenzo Cavallaro]
- Nirav Ajmeri [advised by Dr. Munindar Singh]
- Micah Bushouse [advised by Dr. Douglas Reeves]
- Christopher Theisen [advised by Dr. Laurie Williams]
- Luka Malisa (ETH Zurich) [advised by Dr. Srdjan Capkun]
- Kimberly Tam (Royal Holloway, University of London) [advised by Dr. Lorenzo Cavallaro]
- Kamal K.C. [advised by Dr. Vincent Freeh]
- Daniel Dean [advised by Dr. Xiaohui (Helen) Gu]
- Rahul Pandita [advised by Dr. Laurie Williams]
- Chiachih Wu [advised by Dr. Xuxian Jiang]
- Xi Gi [advised by Dr. Emerson Murphy-Hill]
- Hiep Nguyen [advised by Dr. Xiaohui (Helen) Gu]
- Wu Zhou [advised by Dr. Xuxian Jiang]
- Wei Wei [advised by Dr. Ting Yu]
- Yongmin Tan [advised by Dr. Xiaohui (Helen) Gu]

Past Masters Committees

- Gurkirat Singh [advised by Dr. Munindar Singh]
- Aishwarya Seth [advised by Dr. Laurie Williams]
- Sen Qiao [advised by Dr. Kemafor Anyanwu Ogan]
- Yoonchul Ro [advised by Dr. Christopher Healey]
- Gregor Haas [advised by Dr. Aydin Aysu]
- Monica Metro [advised by Dr. Laurie Williams]
- Anoosha Vangaveeti [advised by Dr. Mladen Vouk]
- Roopak Venkatakrishnan [advised by Dr. Mladen Vouk]
- Ajay Saini [advised by Dr. Frank Mueller]
- Nishanth Balasubramanian [advised by Dr. Frank Mueller]
- Onkar Patil [advised by Dr. Frank Mueller]
- Shrinivas Panchamukhi [advised by Dr. Frank Mueller]
- Sandeep Kandula [advised by Dr. Frank Mueller]

HONORS

- **ACSAC Test of Time Award**, with co-authors Machigar Ongtang, Stephen McLaughlin, and Patrick McDaniel, December 2024, for 2009 ACSAC paper titled 'Semantically Rich Application-Centric Security in Android'.
- **Best Paper**, 2024 ACM Conference on Data and Application Security and Privacy (CODASPY), with co-authors K. Virgil English, Nathaniel Bennett, Seaver Thorn, Kevin Butler, and Patrick Traynor, June 2024.
- **Distinguished Paper**, 2024 ISOC Network and Distributed Systems Security Symposium (NDSS), with co-authors Elizabeth Lin, Igibek Koishybayev, Trevor Dunlap, and Alexandros Kapravelos, February 2024.
- **Best Paper**, 2022 Best Paper Award from IEEE Security & Privacy Magazine by the IEEE Computer Society Publications Board, with co-author Laurie Williams
- **Carla Savage Award for Professors**, October 2022, Department of Computer Science, NC State University
- **Best Student Paper**, 2022 ACM Symposium on Access Control Models and Technologies (SACMAT), with co-authors Iffat Anjum, Daniel Kostecki, Ethan Leba, Jessica Sokal, Rajit Bharambe, Cristina Nita-Rotaru, and Bradley Reaves, June 2022.
- **SIGOPS Hall of Fame Award**, with co-authors Peter Gilbert, Byung-Gon Chun, Landon P. Cox, Jaeyeon Jung, Patrick McDaniel, and Anmol N. Sheth, November 2020, for our 2010 OSDI paper titled 'TaintDroid: An Information-Flow Tracking System for Realtime Privacy Monitoring on Smartphones'.
- **Carla Savage Award for Associate Professors**, October 2020, Department of Computer Science, NC State University
- **Best Paper**, 12th ACM Conference on Security and Privacy in Wireless and Mobile Networks, with co-authors TJ OConnor and Brad Reaves, May 2019.
- **Distinguished Paper**, ACM Asia Conference on Computer and Communications Security (ASIACCS), with Ruowen Wang, Ahmed M. Azab, Ninghui Li, Peng Ning, Xun Chen, Wenbo Shen, and Yueqiang Cheng, April 2017.
- **Most Receptive Graduate Professor Outside of the Classroom Award**, Department of Computer Science, North Carolina State University, 2016
- **Best Paper**, 6th ACM Conference on Security and Privacy in Wireless and Mobile Networks, with co-authors Saurabh Chakradeo, Brad Reaves, and Patrick Traynor, April 2013.
- **National Science Foundation Faculty Early Career Development Award (CAREER)**, 2013.
- **CGS/ProQuest Distinguished Dissertation Award Nominee**, 2012.

- **Alumni Association Dissertation Award**, Pennsylvania State University, 2010-2011.
- **Graduate Research Assistant Award**, Department of Computer Science and Engineering, The Pennsylvania State University, April 2010.
- **Best Paper**, 25th Annual Computer Security Applications Conference, with co-authors Machigar Ongtang, Stephen McLaughlin, and Patrick McDaniel, December 2009.
- **Google Security and Product Safety Acknowledgement**, in recognition of efforts in improving the security of the Google Android cellular phone operating system.
- **USENIX Student Travel Awards**, USENIX Security, 2007; USENIX Security, 2008; USENIX OSDI, 2010.
- **ACM Student Travel Award**, ACM CCS, 2009.
- **National Science Foundation Graduate Research Fellowship**, Honorable Mention, 2006.
- **H. Thomas and Dorothy Willits Hallowell Scholarship**, Pennsylvania State University, 2003.
- **Chris Mader Scholarship**, Pennsylvania State University, 2002.
- **Lockheed Martin Engineering Scholars Award**, Pennsylvania State University, 2002.
- **Richard A. McQuade Memorial Scholarship**, Pennsylvania State University, 2001.

AFFILIATIONS

- The Association for Computing Machinery (ACM)
- The Institute of Electrical and Electronics Engineers (IEEE)
- USENIX Advanced Computing Systems Association (USENIX)
- Information Systems Security Association (ISSA)

PROFESSIONAL ACTIVITIES

University Service

- NCSU Institutional Review Board (IRB) Full Board Member: 2018-2020, 2020-2023
- Chair faculty search (sub-)committee for security: 2014, 2015, 2016, 2017, 2018, 2022, 2023
- Focus group lead for NCSU CSC security courses: 2018-2024
- Chair of NCSU CSC Departmental BPC Plan task force: 2021-2022
- Point of Contact (PoC), NSA Center of Academic Excellence in Research (CAE-R): 2014-present

Professional Societies

- Vice President, USENIX Association Board of Directors: 2024-2026
- Secretary, USENIX Association Board of Directors: 2022-2024
- Director at Large, USENIX Association Board of Directors: 2020-2022
- Board Member (USENIX Representative), Computer Research Association (CRA) Board of Directors: 2024-present

Journal Editorial Positions

- Associate Editor: ACM Transactions on Privacy and Security (TOPS), 2020-2024.
- Associate Editor: ACM Transactions on Internet Technology (TOIT), 2015-2020.
- Department Editor: IEEE Security and Privacy Magazine, 2016-2023.
- Guest Editor: Special issue on the 2018 USENIX Security Symposium, IEEE Security and Privacy Magazine, 2019.
- Guest Editor: Special issue on Security and Privacy in Mobile Platforms, IEEE Transactions on Dependable and Secure Computing (TDSC), 2013.

Conference and Workshop Organization

- Steering Committee: USENIX Security Symposium, 2019-present.
- Steering Committee: ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec), 2016-2021.
- Steering Committee: ACM CCS Workshop on Security and Privacy in Smartphones and Mobile Devices (SPSM), 2014-2016.
- PC co-Chair: IEEE Symposium on Security and Privacy (S&P), 2024, 2025.
- co-Lead: CAE-R Special Topics Workshop - Software Supply Chain Security, 2024.
- Program co-Chair: CAE-R CoP Research Symposium, 2023.
- Program co-Chair: NSF Secure and Trustworthy Cyberspace Principal Investigators' Meeting (SaTC PI Meeting), 2022.
- PC co-Chair: USENIX Security Symposium, 2018.

- PC co-Chair: ACM CCS Workshop on Security and Privacy in Smartphones and Mobile Devices (SPSM), 2011, 2012.
- PC co-Chair: ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec), 2016.
- PC co-Chair: USENIX Workshop on Offensive Technologies (WOOT), 2017.
- Student PC Chair: IEEE Symposium on Security and Privacy (S&P), 2017.
- Shadow PC co-Chair: ACM ASIA Conference on Computer and Communications Security (ASIACCS), 2017.
- General Chair: ACM CCS Workshop on Security and Privacy in Smartphones and Mobile Devices (SPSM), 2013.
- Poster Session Chair: USENIX Security Symposium, 2013.
- Poster PC Member: ACM Conference on Computer and Communications Security (CCS), 2011, 2013.

Technical Program Committees (total = 118)

- ACM Conference on Computer and Communications Security (CCS): 2014, 2015, 2016.
- IEEE Symposium on Security and Privacy (S&P): 2012, 2013, 2014, 2023.
- ISOC Network and Distributed System Security Symposium (NDSS): 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021.
- USENIX Security Symposium: 2011, 2012, 2013, 2015, 2017, 2019, 2020, 2021, 2022, 2023.
- ACM CCS Workshop on IoT Security and Privacy: 2017.
- ACM ASIA Conference on Computer and Communications Security (ASIACCS): 2017, 2021, 2022.
- ACM Conference on Data and Application Security and Privacy (CODASPY): 2013, 2014, 2015, 2016.
- ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec): 2013, 2015, 2017, 2019, 2020, 2021, 2022, 2023.
- ACM CCS Workshop on Software Supply Chain Offensive Research and Ecosystem Defenses (SCORED): 2022, 2023.
- ACM Symposium on Access Control Models and Technology (SACMAT): 2020, 2021, 2022.
- Annual Computer Security Applications Conference (ACSAC): 2013, 2014, 2015, 2019, 2020.
- CoronaDef Workshop: 2021.
- AsiaCCS Workshop on Security in Embedded Systems and Smartphones (SESP): 2013.
- DFRWS Annual Digital Forensics Conference: 2012, 2013, 2014, 2015.
- Financial Cryptography and Data Security (FC): 2013, 2014, 2015, 2019, 2020, 2021.
- ICDE Workshop on Secure Data Management on Smartphones and Mobiles: 2012.
- IEEE LCN Workshop on Security in Communications Networks (SICK): 2012.
- Information Security Conference (ISC): 2009.
- Innovations in Mobile Privacy and Security (IMPS): 2016, 2017.
- International Conference on Information Security and Assurance (ISA): 2009.
- International Conference on Information Systems Security (ICISS): 2007, 2012, 2013, 2014, 2015.
- International Conference on Information Technology (ICIT): 2009.
- International Conference on Internet Monitoring and Protection (ICIMP): 2009, 2010, 2011, 2012, 2013.
- International Conference on Mobile Systems, Applications, and Services (MobiSys): 2014.
- International Conference on Parallel and Distributed Systems (ICPADS): 2013.
- International Conference on Privacy and Security in Mobile Systems (PRISMS): 2013.
- International Conference on Trust and Trustworthy Computing (TRUST): 2013.
- International ICST Conference on Security and Privacy in Mobile Information and Communication Systems (MobiSec): 2012.
- International Symposium on Engineering Secure Software and Systems (ESSoS): 2017.
- International Symposium on Research in Attacks, Intrusions and Defenses (RAID): 2015, 2016.
- International Workshop on Ethics in Computer Security (EthiCS): 2022.
- International Workshop on Secure Internet of Things (SIoT): 2016, 2017, 2019.
- International Workshop on Security (IWSEC): 2010, 2011.
- International Workshop on Trustworthy Embedded Devices (TrustED): 2011, 2012, 2013.
- International World Wide Web Conference (WWW): 2012, 2016, 2019.
- Mobile Security Technologies Workshop (MoST): 2014, 2015.
- New Security Paradigms Workshop (NSPW): 2012, 2013.
- Privacy Enhancing Technologies Symposium (PETS): 2015, 2016.
- Symposium and Bootcamp on the Science of Security (HotSoS): 2014, 2015, 2017, 2019, 2023.
- Symposium on Usable Privacy and Security (SOUPS): 2015.
- USENIX Workshop on Hot Topics in Security (HotSec): 2012.
- USENIX Workshop on Offensive Technologies (WOOT): 2016, 2018.
- Workshop on Cyber Security Experimentation and Test (CSET): 2016, 2019.

PUBLICATIONS

BOOK CHAPTERS

1. Mohammad Sujan Miah, Mu Zhu, Alonso Granados, Nazia Sharmin, Iffat Anjum, Anthony Ortiz, Christopher Kiekintveld, William Enck, and Munindar P. Singh, **Optimizing Honey Traffic Using Game Theory and Adversarial Learning**, in *Cyber Deception: Techniques, Strategies, and Human Aspects*, Cham: Springer International Publishing, 2023, pp. 97–124.
2. Răzvan Deaconescu, William Enck, Mihai Chiroiu, and Luke Deshotels, **iOS Security Framework: Understanding the Security of Mobile Phone Platforms**, in *Encyclopedia of Cryptography and Security*, S. Jajodia, P. Samarati, and M. Yung, Eds. Springer Berlin Heidelberg, 2021, pp. 1–5. Living Reference Work.
3. William Enck and Adwait Nadkarni, **Android's Security Framework-Understanding the Security of Mobile Phone Platforms**, in *Encyclopedia of Cryptography and Security*, S. Jajodia, P. Samarati, and M. Yung, Eds. Springer Berlin Heidelberg, 2021, pp. 1–5. Living Reference Work.
4. Reham Mohamed, Terrence O'Connor, Markus Miettinen, William Enck, and Ahmad-Reza Sadeghi, **HONEYSCOPE: IoT Device Protection with Deceptive Network Views**, in *Autonomous Cyber Deception: Reasoning, Adaptive Planning, and Evaluation of HoneyThings*, E. Al-Shaer, J. Wei, K. W. Hamlen, and C. Wang, Eds. Springer, 2019.
5. Adwait Nadkarni, Akash Verma, Vasant Tendulkar, and William Enck, **Reliable Ad Hoc Smartphone Application Creation for End Users**, in *Intrusion Detection and Prevention for Mobile Ecosystems*, G. Kambourakis, A. Shabtai, K. Kolias, and D. Damopoulos, Eds. CRC Press, 2017.
6. William Enck, **Android's Security Framework-Understanding the Security of Mobile Phone Platforms**, in *Encyclopedia of Cryptography and Security*, H. C. A. Tilborg and S. Jajodia, Eds. Springer, 2011, pp. 34–37.
7. William Enck, **ARP Spoofing**, in *Encyclopedia of Cryptography and Security*, H. C. A. Tilborg and S. Jajodia, Eds. Springer, 2011, pp. 48–49.
8. Kevin Butler, William Enck, Patrick Traynor, Jennifer Plaster, and Patrick McDaniel, **Privacy Preserving Web-Based Email**, in *Algorithms, Architectures and Information Systems Security, Statistical Science and Interdisciplinary Research*, S. N. Bhargab Bhattacharya Susmita Sur-Kolay and A. Bagchi, Eds. World Scientific Computing, 2008.
   (extends iciss06b)

JOURNAL ARTICLES

1. Laurie Williams, Giacomo Benedetti, Sivana Hamer, Ranindya Paramitha, Imranur Rahman, Mahzabin Tamanna, Greg Tystahl, Nusrat Zahan, Patrick Morrison, Yasemin Acar, Michel Cukier, Christian Kästner, Alexandros Kapravelos, Dominik Wermke, and William Enck, **Research Directions in Software Supply Chain Security**, *ACM Transactions on Software Engineering and Methodology (TOSEM)*, 2025. (to appear).
2. Yu-Tsung Lee, Haining Chen, William Enck, Hayawardh Vijayakumar, Ninghui Li, Zhiyun Qian, Giuseppe Petracca, and Trent Jaeger, **PolyScope: Multi-Policy Access Control Analysis to Triage Android Scoped Storage**, *IEEE Transactions on Dependable and Secure Computing*, Aug. 2023.
3. Stephan Heuser, Bradley Reaves, Praveen Kumar Pendyala, Henry Carter, Alexandra Dmitrienko, William Enck, Negar Kiyavash, Ahmad-Reza Sadeghi, and Patrick Traynor, **Phonion: Practical Protection of Metadata in Telephony Networks**, *Proceedings on Privacy Enhancing Technologies (PoPETS)*, vol. 2017, no. 1, Jan. 2017.
4. Bradley Reaves, Jasmine Bowers, Sigmund Albert Gorski III, Olabode Anise, Rahul Bobhate, Raymond Cho, Hiranava Das, Sharique Hussain, Hamza Karachiwala, Nolen Scaife, Byron Wright, Kevin Butler, William Enck, and Patrick Traynor, ***droid: Assessment and Evaluation of Android Application Analysis Tools**, *ACM Computing Surveys (CSUR)*, vol. 49, no. 3, Dec. 2016.
5. Rui Shu, Peipei Wang, Sigmund A. Gorski III, Benjamin Andow, Adwait Nadkarni, Luke Deshotels, Jason Gionta, William Enck, and Xiaohui Gu, **A Study of Security Isolation Techniques**, *ACM Computing Surveys (CSUR)*, vol. 49, no. 3, Dec. 2016.
6. William Enck, Peter Gilbert, Seungyeop Han, Vasant Tendulkar, Byung-Gon Chun, Landon Cox, Jaeyeon Jung, Patrick McDaniel, and Anmol Sheth, **TaintDroid: An Information-Flow Tracking System for Realtime Privacy Monitoring on Smartphones**, *ACM Transactions on Computer Systems (TOCS)*, vol. 32, no. 2, Jun. 2014.
   (extends egc+10)
7. William Enck, Peter Gilbert, Byung-Gon Chun, Landon P. Cox, Jaeyeon Jung, Patrick McDaniel, and Anmol N. Sheth, **TaintDroid: An Information-Flow Tracking System for Realtime Privacy Monitoring on Smartphones**, *Communications of the ACM*, vol. 57, no. 3, Mar. 2014. Research Highlight.
8. Machigar Ongtang, Stephen McLaughlin, William Enck, and Patrick McDaniel, **Semantically Rich Application-Centric Security in Android**, *Journal of Security and Communication Networks*, vol. 5, no. 6, pp. 658–673, Jun. 2012.
   (extends omem09)
9. Patrick Traynor, Kevin Butler, William Enck, Kevin Borders, and Patrick McDaniel, **malnets: Large-Scale Malicious**

Networks via Compromised Wireless Access Points, *Journal of Security and Communication Networks*, vol. 3, no. 2, pp. 102–113, Mar. 2010.

(supercedes NAS-0048)

10. Heesook Choi, William Enck, Jaesheung Shin, Patrick McDaniel, and Thomas La Porta, **ASR: Anonymous and Secure Reporting of Traffic Forwarding Activity in Mobile Ad Hoc Networks**, *Wireless Networks (WINET)*, vol. 15, no. 4, pp. 525–539, May 2009. (Published online October 2007).

(extends ces+05) (supercedes NAS-0034)

11. William Enck, Thomas Moyer, Patrick McDaniel, Subhabrata Sen, Panagiotis Sebos, Sylke Spoerel, Albert Greenberg, Yu-Wei Eric Sung, Sanjay Rao, and William Aiello, **Configuration Management at Massive Scale: System Design and Experience**, *IEEE Journal on Selected Areas in Communications (JSAC)*, vol. 27, no. 3, pp. 323–335, Apr. 2009.

(extends ems+07)

12. Patrick Traynor, William Enck, Patrick McDaniel, and Thomas La Porta, **Mitigating Attacks on Open Functionality in SMS-Capable Cellular Networks**, *IEEE/ACM Transactions on Networking (TON)*, vol. 17, no. 1, Feb. 2009.

(extends teml06)

13. William Enck, Machigar Ongtang, and Patrick McDaniel, **Understanding Android Security**, *IEEE Security and Privacy Magazine*, vol. 7, no. 1, pp. 50–57, Jan. 2009.

14. Patrick Traynor, William Enck, Patrick McDaniel, and Thomas La Porta, **Exploiting Open Functionality in SMS-Capable Cellular Networks**, *Journal of Computer Security*, vol. 16, no. 6, Dec. 2008.

(extends etml05)

15. Wesam Lootah, William Enck, and Patrick McDaniel, **TARP: Ticket-based Address Resolution Protocol**, *Computer Networks*, vol. 51, no. 15, pp. 4322–4337, Oct. 2007.

(extends lem05)

CONFERENCE PUBLICATIONS

1. Giacomo Benedetti, Oreofe Solarin, Courtney Miller, Greg Tystahl, William Enck, Christian Kästner, Alexandros Kapravelos, Alessio Merlo, and Luca Verderame, **An Empirical Study on Reproducible Packaging in Open-Source Ecosystems**, in *Proceedings of the IEEE/ACM International Conference on Software Engineering (ICSE)*, 2025.

2. Nathaniel Bennett, Weidong Zhu, Benjamin Simon, Ryon Kennedy, William Enck, Patrick Traynor, and Kevin Butler, **RANsacked: A Domain-Informed Approach for Fuzzing LTE and 5G RAN-Core Interfaces**, in *Proceedings of the ACM Conference on Computer and Communications Security (CCS)*, 2024.

3. Trevor Dunlap, John Speed Meyers, Brad Reaves, and William Enck, **Pairing Security Advisories with Vulnerable Functions Using Open-Source LLMs**, in *Proceedings of the Conference on Detection of Intrusions and Malware & Vulnerability Assessment (DIMVA)*, 2024.

4. Trevor Dunlap, Elizabeth Lin, William Enck, and Bradley Reaves, **VFCFinder: Pairing Security Advisories and Patches**, in *Proceedings of the ACM ASIA Conference on Computer and Communications Security (AsiaCCS)*, 2024.

(acceptance rate=19.4%) (supercedes arXiv:2311.01532)

5. K. Virgil English, Nathaniel Bennett, Seaver Thorn, Kevin Butler, William Enck, and Patrick Traynor, **Examining Cryptography and Randomness Failures in Open-Source Cellular Cores**, in *Proceedings of the ACM Conference on Data and Application Security and Privacy (CODASPY)*, 2024. **(best paper)**.

(acceptance rate=21.25%)

6. Seaver Thorn, K. Virgil English, Kevin Butler, and William Enck, **5GAC-Analyzer: Identifying Over-Privilege Between 5G Core Network Functions**, in *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)*, 2024.

(acceptance rate=21.1%)

7. Isaac Polinsky, Pubali Datta, Adam Bates, and William Enck, **GRASP: Hardening Serverless Applications through Graph Reachability Analysis of Security Policies**, in *Proceedings of ACM The Web Conference*, 2024.

(acceptance rate=20.2%)

8. Elizabeth Lin, Igibek Koishybayev, Trevor Dunlap, William Enck, and Alexandros Kapravelos, **UntrustIDE: Exploiting Weaknesses in VS Code Extensions**, in *Proceedings of the ISOC Network and Distributed Systems Symposium (NDSS)*, 2024. **(distinguished paper)**.

9. Siddharth Muralee, Igibek Koishybayev, Aleksandr Nahapetyan, Greg Tystahl, Brad Reaves, Antonio Bianchi, William Enck, Alexandros Kapravelos, and Aravind Machiry, **ARGUS: A Framework for Staged Static Taint Analysis of GitHub Workflows and Actions**, in *Proceedings of the USENIX Security Symposium*, 2023, pp. 6983–7000.

(acceptance rate=29%)

10. Trevor Dunlap, Seaver Thorn, William Enck, and Bradley Reaves, **Finding Fixed Vulnerabilities with Off-the-Shelf Static Analysis**, in *Proceedings of the IEEE European Symposium on Security and Privacy (EuroS&P)*, 2023, pp. 489–505.

(acceptance rate=35.0%)

11. Iffat Anjum, Jessica Sokal, Hafiza Ramzah Rehman, Ben Weintraub, Ethan Leba, William Enck, Cristina Nitarotaru, and

Bradley Reaves, **MSNetViews: Geographically Distributed Management of Enterprise Network Security Policy**, in *Proceedings of the ACM Symposium on Access Control Models and Technologies (SACMAT)*, 2023, pp. 121–132.
(acceptance rate=20.4%)

12. Marcel Fourné, Dominik Wermke, William Enck, Sascha Fahl, and Yasemin Acar, **It's like flossing your teeth: On the Importance and Challenges of Reproducible Builds for Software Supply Chain Security**, in *Proceedings of the IEEE Symposium on Security and Privacy (S&P)*, 2023, pp. 1527–1544.
(acceptance rate=17%)

13. Samin Yaseer Mahmud, K. Virgil English, Seaver Thorn, William Enck, Adam Oest, and Muhammad Saad, **Analysis of Payment Service Provider SDKs in Android**, in *Proceedings of the Annual Computer Security Applications Conference (ACSAC)*, 2022, pp. 576–590.
(acceptance rate=24.1%)

14. Pubali Datta, Isaac Polinsky, Muhammad Adil Inam, Adam Bates, and William Enck, **ALASTOR: Reconstructing the Provenance of Serverless Intrusions**, in *Proceedings of the USENIX Security Symposium*, 2022, pp. 2443–2460.
(acceptance rate=18%)

15. Sigmund Albert Gorski III, Seaver Thorn, William Enck, and Haining Chen, **FReD: Identifying File Re-Delegation in Android System Services**, in *Proceedings of the USENIX Security Symposium*, 2022, pp. 1526–1542.
(acceptance rate=18%)

16. Iffat Anjum, Daniel Kostecki, Ethan Leba, Jessica Sokal, Rajit Bharambe, William Enck, Cristina Nita-Rotaru, and Bradley Reaves, **Removing the Reliance on Perimeters for Security using Network Views**, in *Proceedings of the ACM Symposium on Access Control Models and Technologies (SACMAT)*, 2022, pp. 151–162. **(best student paper)**.

17. Trevor Dunap, William Enck, and Bradley Reaves, **A Study of Application Sandbox Policies in Linux**, in *Proceedings of the ACM Symposium on Access Control Models and Technologies (SACMAT)*, 2022, pp. 19–30.

18. Yu-Tsung Lee, William Enck, Haining Chen, Zhiyun Qian, Ninghui Li, Hayawardh Vijayakumar, Trent Jaeger, Giuseppe Petracca, and Daimeng Wang, **PolyScope: Multi-Policy Access Control Analysis to Compute Authorized Attack Operations in Android Systems**, in *Proceedings of the USENIX Security Symposium*, 2021, pp. 2579–2596.
(acceptance rate=18.8%)

19. Isaac Polinsky, Pubali Datta, Adam Bates, and William Enck, **SCIFFS: Enabling Secure Third-Party Security Analytics using Serverless Computing**, in *Proceedings of the ACM Symposium on Access Control Models and Technologies (SACMAT)*, 2021, pp. 175–186.

20. Iffat Anjum, Mu Zhu, Isaac Polinsky, William Enck, Michael K. Reiter, and Munindar Singh, **Role-Based Deception in Enterprise Networks**, in *Proceedings of the ACM Conference on Data and Application Security and Privacy (CODASPY)*, 2021, pp. 65–76.
(acceptance rate=24.5%)

21. Christopher Lentzsch, Sheel Jayesh Shah, Martin Degeling, Benjamin Andow, Anupam Das, and William Enck, **Hey Alexa, is this Skill Safe?: Taking a Closer Look at the Alexa Skill Ecosystem**, in *Proceedings of the ISOC Network and Distributed Systems Symposium (NDSS)*, 2021.
(acceptance rate=15.2%)

22. Richard Mitev, Anna Pazii, Markus Miettinen, William Enck, and Ahmad-Reza Sadeghi, **LeakyPick: IoT Audio Spy Detector**, in *Proceedings of the Annual Computer Security Applications Conference (ACSAC)*, 2020, pp. 694–705.
(acceptance rate=23.2%)

23. Samin Yaseer Mahmud, Akhil Acharya, Benjamin Andow, William Enck, and Bradley Reaves, **Cardpliance: PCI DSS Compliance of Android Applications**, in *Proceedings of the USENIX Security Symposium*, Boston, MA, 2020, pp. 1517–1533.
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24. Benjamin Andow, Samin Yaseer Mahmud, Justin Whitaker, William Enck, Bradley Reaves, Kapil Singh, and Serge Egelman, **Actions Speak Louder than Words: Entity-Sensitive Privacy Policy and Data Flow Analysis with PoliCheck**, in *Proceedings of the USENIX Security Symposium*, Boston, MA, 2020, pp. 985–1002.
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25. Luke Deshotels, Costin Carabas, Jordan Beichler, Razvan Deaconescu, and William Enck, **Kobold: Evaluating Decentralized Access Control for Remote NSXPC Methods on iOS**, in *Proceedings of the IEEE Symposium on Security and Privacy (S&P)*, San Francisco, CA, 2020, pp. 1056–1070.
(acceptance rate=12.3%)

26. Isaac Polinsky, Kyle Martin, William Enck, and Mike Reiter, **n-m-Variant Systems: Adversarial-Resistant Software Rejuvenation for Cloud-Based Web Applications**, in *Proceedings of the ACM Conference on Data and Application Security and Privacy (CODASPY)*, New Orleans, LA, 2020, pp. 235–246.
(acceptance rate=20%)

27. Justin Whitaker, Sathvik Prasad, Bradley Reaves, and William Enck, **Thou Shalt Discuss Security: Quantifying the Impacts of Instructions to RFC Authors**, in *Proceedings of the Conference on Security Standards Research (SSR)*, 2019, pp. 57–68.
(acceptance rate=35%)

28. Benjamin Andow, Samin Yaseer Mahmud, Wenyu Wang, Justin Whitaker, William Enck, Bradley Reaves, Kapil Singh, and Tao Xie, **PolicyLint: Investigating Internal Privacy Policy Contradictions on Google Play**, in *Proceedings of the USENIX Security Symposium*, Santa Clara, CA, 2019, pp. 585–602.
    (acceptance rate=16%)

29. TJ OConnor, Reham Mohamed, Markus Miettinen, William Enck, Bradley Reaves, and Ahmad-Reza Sadeghi, **HomeSnitch: Behavior Transparency and Control for Smart Home IoT Devices**, in *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)*, Miami, FL, 2019, pp. 128–138.
    (acceptance rate=25.6%)

30. TJ OConnor, William Enck, and Bradley Reaves, **Blinded and Confused: Uncovering Systemic Flaws in Device Telemetry for Smart-Home Internet of Things**, in *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)*, Miami, FL, 2019, pp. 140–150. **(best paper)**.
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31. Sigmund Albert Gorski III and William Enck, **ARF: Identifying Re-Delegation Vulnerabilities in Android System Services**, in *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)*, Miami, FL, 2019, pp. 151–161.
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32. Sanket Goutam, William Enck, and Bradley Reaves, **Hestia: Simple Least Privilege Network Policies for Smart Homes**, in *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)*, Miami, FL, 2019, pp. 215–220. (short paper).
    (acceptance rate=32.2%)

33. Sigmund Albert Gorski III, Benjamin Andow, Adwait Nadkarni, Sunil Manandhar, William Enck, Eric Bodden, and Alexandre Bartel, **ACMiner: Extraction and Analysis of Authorization Checks in Android's Middleware**, in *Proceedings of the ACM Conference on Data and Application Security and Privacy (CODASPY)*, Dallas, TX, 2019, pp. 25–36.
    (acceptance rate=23.5%)

34. Luke Deshotels, Razvan Deaconescu, Costin Carabas, Iulia Manda, William Enck, Mihai Chiroiu, Ninghui Li, and Ahmad-Reza Sadeghi, **iOracle: Automated Evaluation of Access Control Policies in iOS**, in *Proceedings of the ACM Asia Conference on Computer and Communications Security (ASIACCS)*, Songdo, Incheon, Korea, 2018, pp. 117–131.
    (acceptance rate=20.0%)

35. TJ OConnor, William Enck, W. Michael Petullo, and Akash Verma, **PivotWall: SDN-Based Information Flow Control**, in *Proceedings of the ACM Symposium on SDN Research (SOSR)*, Los Angeles, CA, 2018, pp. 1–14.
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36. Haining Chen, Ninghui Li, William Enck, Yousra Aafer, and Xiangyu Zhang, **Analysis of SEAndroid Policies: Combining MAC and DAC in Android**, in *Proceedings of the Annual Computer Security Applications Conference (ACSAC)*, San Juan, Puerto Rico, USA, 2017.
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37. Benjamin Andow, Akhil Acharya, Dengfeng Li, William Enck, Kapil Singh, and Tao Xie, **UiRef: Analysis of Sensitive User Inputs in Android Applications**, in *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)*, 2017.
    (acceptance rate=22.3%)

38. Ruowen Wang, Ahmed M. Azab, William Enck, Ninghui Li, Peng Ning, Xun Chen, Wenbo Shen, and Yueqiang Cheng, **SPOKE: Scalable Knowledge Collection and Attack Surface Analysis of Access Control Policy for Security Enhanced Android**, in *Proceedings of the ACM Asia Conference on Computer and Communications Security (ASIACCS)*, 2017. **(distinguished paper)**.
    (acceptance rate=18.7%)

39. Rui Shu, Xiaohui Gu, and William Enck, **A Study of Security Vulnerabilities on Docker Hub**, in *Proceedings of the ACM Conference on Data and Application Security and Privacy (CODASPY)*, Scottsdale, Arizona, 2017.

40. Luke Deshotels, Razvan Deaconescu, Mihai Chiroiu, Lucas Davi, William Enck, and Ahmad-Reza Sadeghi, **SandScout: Automatic Detection of Flaws in iOS Sandbox Profiles**, in *Proceedings of the ACM Conference on Computer and Communications Security (CCS)*, Vienna, Austria, 2016.
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41. Jason Gionta, William Enck, and Per Larsen, **Preventing Kernel Code-Reuse Attacks Through Disclosure Resistant Code Diversification**, in *Proceedings of the IEEE Conference on Communications and Network Security (CNS)*, Philadelphia, PA, 2016.
    (acceptance rate=29.0%)

42. Adwait Nadkarni, Benjamin Andow, William Enck, and Somesh Jha, **Practical DIFC Enforcement on Android**, in *Proceedings of the USENIX Security Symposium*, Austin, TX, 2016.
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43. Terrence OConnor and William Enck, **Code-Stop: Code-Reuse Prevention By Context-Aware Traffic Proxying**, in *Proceedings of the International Conference on Internet Monitoring and Protection (ICIMP)*, Valencia, Spain, 2016.

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44. Ruowen Wang, William Enck, Douglas Reeves, Xinwen Zhang, Peng Ning, Dingbang Xu, Wu Zhou, and Ahmed Azab, **EASEAndroid: Automatic Policy Analysis and Refinement for Security Enhanced Android via Large-Scale Semi-Supervised Learning**, in *Proceedings of the USENIX Security Symposium*, Washington, DC, 2015. (acceptance rate=15.7%)

45. Daniel J. Dean, Peipei Wang, Xiaohui Gu, William Enck, and Guoliang Jin, **Automatic Server Hang Bug Diagnosis: Feasible Reality or Pipe Dream?**, in *Proceedings of the IEEE International Conference on Autonomic Computing (ICAC)*, Grenoble, France, 2015. (short paper). (acceptance rate=27.5%)

46. Wei Yang, Xusheng Xiao, Benjamin Andow, Sihan Li, Tao Xie, and William Enck, **AppContext: Differentiating Malicious and Benign Mobile App Behaviors Using Context**, in *Proceedings of the International Conference on Software Engineering (ICSE)*, Firenze, Italy, 2015. (acceptance rate=18.5%)

47. Jason Gionta, William Enck, and Peng Ning, **HideM: Protecting the Contents of Userspace Memory in the Face of Disclosure Vulnerabilities**, in *Proceedings of the ACM Conference on Data and Application Security and Privacy (CODASPY)*, San Antonio, TX, 2015. (acceptance rate=21.3%)

48. Jason Gionta, Ahmed Azab, William Enck, Peng Ning, and Xiaolan Zhang, **SEER: Practical Memory Virus Scanning as a Service**, in *Proceedings of the Annual Computer Security Applications Conference (ACSAC)*, New Orleans, LA, 2014. (acceptance rate=19.9%)

49. Stephan Heuser, Adwait Nadkarni, William Enck, and Ahmad-Reza Sadeghi, **ASM: A Programmable Interface for Extending Android Security**, in *Proceedings of the USENIX Security Symposium*, San Diego, CA, 2014. (acceptance rate=19.1%) (supercedes TUD-CS-2014-0063)

50. Adwait Nadkarni, Vasant Tendulkar, and William Enck, **NativeWrap: Ad Hoc Smartphone Application Creation for End Users**, in *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)*, Oxford, United Kingdom, 2014. (acceptance rate=26.0%)

51. Tsung-Hsuan Ho, Daniel Dean, Xiaohui Gu, and William Enck, **PREC: Practical Root Exploit Containment for Android Devices**, in *Proceedings of the ACM Conference on Data and Application Security and Privacy (CODASPY)*, San Antonio, TX, 2014. (acceptance rate=16.0%) (supercedes TR-2012-12)

52. Adwait Nadkarni and William Enck, **Preventing Accidental Data Disclosure in Modern Operating Systems**, in *Proceedings of the 20th ACM Conference on Computer and Communications Security (CCS)*, Berlin, Germany, 2013. (acceptance rate=19.8%)

53. Rahul Pandita, Xusheng Xiao, Wei Yang, William Enck, and Tao Xie, **WHYPER: Towards Automating Risk Assessment of Mobile Applications**, in *Proceedings of the USENIX Security Symposium*, Washington, D.C., 2013. (acceptance rate=16.2%)

54. Saurabh Chakradeo, Brad Reaves, Patrick Traynor, and William Enck, **MAST: Triage for Market-scale Mobile Malware Analysis**, in *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)*, Budapest, Hungary, 2013. **(best paper)**. (acceptance rate=15.1%)

55. Vaibhav Rastogi, Yan Chen, and William Enck, **AppsPlayground: Automatic Large-scale Dynamic Analysis of Android Applications**, in *Proceedings of the ACM Conference on Data and Application Security and Privacy (CODASPY)*, San Antonio, TX, 2013. (acceptance rate=23.1%)

56. Vasant Tendulkar, Joe Pletcher, Ashwin Shashidharan, Ryan Snyder, Kevin Butler, and William Enck, **Abusing Cloud-based Browsers for Fun and Profit**, in *Proceedings of the 28th Annual Computer Security Applications Conference (ACSAC)*, Orlando, FL, 2012. (acceptance rate=19.0%)

57. William Enck, Damien Octeau, Patrick McDaniel, and Swarat Chaudhuri, **A Study of Android Application Security**, in *Proceedings of the 20th USENIX Security Symposium*, San Francisco, CA, 2011. (acceptance rate=17.2%) (supercedes NAS-0144)

58. William Enck, Peter Gilbert, Byung-Gon Chun, Landon P. Cox, Jaeyeon Jung, Patrick McDaniel, and Anmol N. Sheth, **TaintDroid: An Information-Flow Tracking System for Realtime Privacy Monitoring on Smartphones**, in *Proceedings of the 9th USENIX Symposium on Operating Systems Design and Implementation (OSDI)*, Vancouver, BC, 2010. (acceptance rate=16.1%) (supercedes NAS-0120)

59. Machigar Ongtang, Stephen McLaughlin, William Enck, and Patrick McDaniel, **Semantically Rich Application-Centric Security in Android**, in *Proceedings of the 25th Annual Computer Security Applications Conference (ACSAC)*, Honolulu, HI, 2009. **(best paper)**.

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60. William Enck, Machigar Ongtang, and Patrick McDaniel, **On Lightweight Mobile Phone Application Certification**, in *Proceedings of the 16th ACM Conference on Computer and Communications Security (CCS)*, Chicago, IL, 2009.
   (acceptance rate=18.4%) (supercedes NAS-00113)

61. William Enck, Patrick McDaniel, and Trent Jaeger, **PinUP: Pinning User Files to Known Applications**, in *Proceedings of the 24th Annual Computer Security Applications Conference (ACSAC)*, Anaheim, CA, 2008.
   (acceptance rate=24.3%) (supercedes NAS-0063)

62. William Enck, Kevin Butler, Thomas Richardson, Patrick McDaniel, and Adam Smith, **Defending Against Attacks on Main Memory Persistence**, in *Proceedings of the 24th Annual Computer Security Applications Conference (ACSAC)*, Anaheim, CA, 2008.
   (acceptance rate=24.3%) (supercedes NAS-0029)

63. Patrick Traynor, Kevin Butler, William Enck, and Patrick McDaniel, **Realizing Massive-Scale Conditional Access Systems Through Attribute-Based Cryptosystems**, in *Proceedings of the 15th Annual Network and Distributed System Security Symposium*, San Diego, CA, 2008.
   (acceptance rate=17.7%) (supercedes NAS-0070)

64. William Enck, Patrick McDaniel, Subhabrata Sen, Panagiotis Sebos, Sylke Spoerel, Albert Greenberg, Sanjay Rao, and William Aiello, **Configuration Management at Massive Scale: System Design and Experience**, in *Proceedings of the USENIX Annual Technical Conference*, Santa Clara, CA, 2007.
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65. Hosam Rowihy, William Enck, Patrick McDaniel, and Thomas La Porta, **Limiting Sybil Attacks in Structured P2P Networks**, in *Proceedings of the IEEE INFOCOM'07 Minisymposium*, 2007.
   (acceptance rate=25%) (supercedes NAS-0017)

66. Kevin Butler, William Enck, Jennifer Plasterr, Patrick Traynor, and Patrick McDaniel, **Privacy-Preserving Web-Based Email**, in *Proceedings of 2nd International Conference on Information Systems Security (ICISS)*, Kolkata, India, 2006.
   (acceptance rate=30.4%) (supercedes NAS-0009)

67. Patrick Traynor, William Enck, Patrick McDaniel, and Thomas La Porta, **Mitigating Attacks on Open Functionality in SMS-Capable Cellular Networks**, in *Proceedings of the Twelfth Annual International Conference on Mobile Computing and Networking (MobiCom)*, Los Angeles, CA, 2006.
   (acceptance rate=11.7%) (supercedes NAS-0051)

68. Wesam Lootah, William Enck, and Patrick McDaniel, **TARP: Ticket-Based Address Resolution Protocol**, in *21st Annual Computer Security Applications Conference (ACSAC)*, Tuscon, AZ, 2005, pp. 95–103.
   (acceptance rate=19.2%) (supercedes NAS-0010)

69. William Enck, Patrick Traynor, Patrick McDaniel, and Thomas La Porta, **Exploiting Open Functionality in SMS-Capable Cellular Networks**, in *Proceedings of the 12th ACM Conference on Computer and Communications Security (CCS)*, Alexandria, VA, 2005, pp. 393–404.
   (acceptance rate=15.0%) (supercedes NAS-0007)

70. Heesook Choi, William Enck, Jaesheung Shin, Patrick McDaniel, and Thomas La Porta, **Secure Reporting of Traffic Forwarding Activity in Mobile Ad Hoc Networks**, in *MobiQuitous 2005*, San Diego, CA, 2005.
   (acceptance rate=35%)

WORKSHOP PUBLICATIONS

1. Mu Zhu, Mohammad Miah, Nazia Sharmin, Iffat Anjum, Christopher Kiekintveld, William Enck, and Munindar Singh, **Optimizing Vulnerability-Driven Honey Traffic Using Game Theory**, in *Proceedings of the AAAI Workshop on Artificial Intelligence for Cyber Security (AICS)*, 2020.

2. Benjamin Andow, Adwait Nadkarni, Blake Bassett, William Enck, and Tao Xie, **A Study of Grayware on Google Play**, in *Proceedings of the IEEE Mobile Security Technologies workshop (MoST)*, 2016.
   (acceptance rate=28.6%)

3. Qian Liu, Anne Collins McLaughlin, Benjamin Watson, William Enck, and Agnes Davis, **Multitasking Increases Stress and Insecure Behavior on Mobile Devices**, in *Proceedings of the International Annual Meeting of the Human Factors and Ergonomics Society (HFES)*, 2015, pp. 1110–1114.

4. Jason Gionta, Ahmed Azab, William Enck, Peng Ning, and Xiaolan Zhang, **DACSA: A Decoupled Architecture for Cloud Security Analysis**, in *Proceedings of the 7th Workshop on Cyber Security Experimentation and Test (CSET)*, 2014.
   (acceptance rate=40.0%)

5. Vasant Tendulkar and William Enck, **An Application Package Configuration Approach to Mitigating Android SSL Vulnerabilities**, in *Proceedings of the IEEE Mobile Security Technologies workshop (MoST)*, 2014.
   (acceptance rate=36.7%)

6. David Barrera, William Enck, and Paul C. van Oorschot, **Meteor: Seeding a Security-Enhancing Infrastructure for Multi-market Application Ecosystems**, in *Proceedings of the IEEE Mobile Security Technologies workshop (MoST)*, 2012.

7. Kevin Butler, William Enck, Harri Hursti, Stephen McLaughlin, Patrick Traynor, and Patrick McDaniel, **Systemic Issues in the Hart InterCivic and Premier Voting Systems: Reflections Following Project EVEREST**, in *Proceedings of the USENIX/ACCURATE Electronic Voting Technology (EVT) Workshop*, 2008.
8. William Enck, Sandra Rueda, Yogesh Sreenivasan, Joshua Schiffman, Luke St. Clair, Trent Jaeger, and Patrick McDaniel, **Protecting Users from "Themselves"**, in *Proceedings of the 1st ACM Computer Security Architectures Workshop*, Alexandria, VA, 2007.

INVITED PAPERS

1. William Enck, **Defending Users Against Smartphone Apps: Techniques and Future Directions**, in *Proceedings of 7th International Conference on Information Systems Security (ICISS)*, Kolkata, India, 2011. (Invited).
2. Luke St. Clair, Lisa Johansen, William Enck, Matthew Pirretti, Patrick Traynor, Patrick McDaniel, and Trent Jaeger, **Password Exhaustion: Predicting the End of Password Usefulness**, in *Proceedings of 2nd International Conference on Information Systems Security (ICISS)*, Kolkata, India, 2006. (Invited).

COLUMNS

1. Nusrat Zahan, Elizabeth Lin, Mahzabin Tamanna, William Enck, and Laurie Williams, **Software Bills of Materials Are Required. Are We There Yet?**, *IEEE Security and Privacy Magazine*, vol. 21, no. 2, pp. 82–88, Mar. 2023. (column).
2. William Enck and Laurie Williams, **Top Five Challenges in Software Supply Chain Security: Observations From 30 Industry and Government Organizations**, *IEEE Security and Privacy Magazine*, vol. 20, no. 2, pp. 96–100, Mar. 2022. (column, **best paper**).
3. William Enck and Adwait Nadkarni, **What if the FBI tried to crack an Android phone? We attacked one to find out**, *The Conversation*, Mar. 2016.
4. Patrick McDaniel and William Enck, **Not So Great Expectations: Why Application Markets Haven't Failed Security**, *IEEE Security and Privacy Magazine*, vol. 8, no. 5, pp. 76–78, Sep. 2010. (Secure Systems issue column).

POSTER ABSTRACTS

1. Samin Yaseer Mahmud and William Enck, **A Study of Security Weaknesses in Android Payment Service Provider SDKs**, in *Proceedings of the Symposium and Bootcamp on the Science of Security (HotSoS) Poster Session*, 2022.
2. Rayhanur Rahman, William Enck, and Laurie Williams, **Do Configuration Management Tools Make Systems More Secure? An Empirical Research Plan**, in *Proceedings of the Symposium and Bootcamp on the Science of Security (HotSoS) Poster Session*, 2020.
3. Wei Yang, Xusheng Xiao, Rahul Pandita, William Enck, and Tao Xie, **Improving Mobile Application Security via Bridging User Expectations and Application Behaviors**, in *Proceedings of the Symposium and Bootcamp on the Science of Security (HotSoS) Poster Session*, 2014.
4. Agnes Davis, Ashwin Shashidharan, Qian Liu, William Enck, Anne Mclaughlin, and Benjamin Watson, **Insecure Behaviors on Mobile Devices under Stress**, in *Proceedings of the Symposium and Bootcamp on the Science of Security (HotSoS) Poster Session*, 2014.
5. Qian Liu, Juhee Bae, Benjamin Watson, and William Enck, **Modeling and Sensing Risky User Behavior based on Mobile Devices**, in *Proceedings of the Symposium and Bootcamp on the Science of Security (HotSoS) Poster Session*, 2014.

TECH REPORTS

1. Trevor Dunlap, Elizabeth Lin, William Enck, and Bradley Reaves, **VFCFinder: Seamlessly Pairing Security Advisories and Patches**. Nov-2023. arXiv:2311.01532.
2. William Enck, Yasemin Acar, Michel Cukier, Alexandros Kapravelos, Christian Kästner, and Laurie Williams, **S3C2 Summit 2023-06: Government Secure Supply Chain Summit**. Aug-2023. arXiv:2308.06850.
3. Trevor Dunlap, Yasemin Acar, Michel Cucker, William Enck, Alexandros Kapravelos, Christian Kastner, and Laurie Williams, **S3C2 Summit 2023-02: Industry Secure Supply Chain Summit**. Jul-2023. arXiv:2307.16557.
4. Mindy Tran, Yasemin Acar, Michel Cucker, William Enck, Alexandros Kapravelos, Christian Kastner, and Laurie Williams, **S3C2 Summit 2022-09: Industry Secure Suppy Chain Summit**. Jul-2023. arXiv:2307.15642.
5. Razvan Deaconescu, Luke Deshotels, Mihai Bucicoiu, William Enck, Lucas Davi, and Ahmad-Reza Sadeghi, **SandBlaster: Reversing the Apple Sandbox**. Aug-2016. arXiv:1608.04303.

6. Adwait Nadkarni, Anmol Sheth, Udi Weinsberg, Nina Taft, and William Enck, **GraphAudit: Privacy Auditing for Massive Graph Mining**, North Carolina State University, Department of Computer Science, Raleigh, NC, TR-2014-10, Aug. 2014.
7. William Enck and Patrick McDaniel, **Federated Information Flow Control for Mobile Phones**, Network and Security Research Center, Department of Computer Science and Engineering, Pennsylvania State University, University Park, PA, USA, NAS-TR-0136-2010, Jul. 2010.
8. William Enck, Machigar Ongtang, and Patrick McDaniel, **Mitigating Android Software Misuse Before It Happens**, Network and Security Research Center, Department of Computer Science and Engineering, Pennsylvania State University, University Park, PA, USA, NAS-TR-0094-2008, Sep. 2008. Updated Nov 2008.
9. Lisa Johansen, Kevin Butler, William Enck, Patrick Traynor, and Patrick McDaniel, **Grains of SANs: Building Storage Area Networks from Memory Spots**, Network and Security Research Center, Department of Computer Science and Engineering, Pennsylvania State University, University Park, PA, USA, NAS-TR-0060-2007, Jan. 2007.

MISCELLANEOUS

1. William Enck, **17th USENIX Security Symposium Conference Summaries**. USENIX ;login Magazine, Dec-2008.
2. Patrick McDaniel, Kevin Butler, William Enck, Harri Hursti, Stephen McLaughlin, Patrick Traynor, Matt Blaze, Adam Aviv, Pavol Cerny, Sandy Clark, Eric Cronin, Gaurav Shah, Micah Sherr, Giovanni Vigna, Richard Kemmerer, David Balzarotti, Greg Banks, Marco Cova, Viktoria Felmetsger, William Robertson, Fredrik Valeur, Joseph Lorenzo Hall, and Laura Quilter, **EVEREST: Evaluation and Validation of Election-Related Equipment, Standards and Testing**. Dec-2007.
3. William Enck, **16th USENIX Security Symposium Conference Summaries**. USENIX ;login Magazine, Dec-2007.

PUBLIC SPEAKING

INVITED TALKS

1. Enhancing Vulnerability Information Using Automated Analysis, *East Carolina University (ECU)*, Greenville, NC (virtual), March, 2023.
2. Keynote - Reflections on a Decade of Mobile Security Research, *ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)*, San Antonio, TX, May, 2022.
3. Analysis of Access Control Enforcement in Android, *The Ohio State University*, Columbus, OH (virtual), November, 2020.
4. Keynote - Analysis of Access Control Enforcement in Android, *ACM Symposium on Access Control Models and Technologies (SACMAT)*, Barcelona, Spain (virtual), June, 2020.
5. Identifying File Re-Delegation in Android System Services, *Google ASPIRE Summit*, Mountain View, CA, February, 2020.
6. Analysis of Access Control Enforcement in Android, *Triangle Area Privacy and Security Day (TAPS)*, Durham, NC, October, 2019.
7. Risks Emerging as Innovation Moves Towards Greater use of 'Smart' Devices, *Looking Around the Corner: Emerging Risks and ERM Practices*, Raleigh, NC, October, 2019.
8. Analysis of Access Control Enforcement in Android, *College of William and Mary*, Williamsburg, VA, September, 2019.
9. Cybersecurity in an Academic Environment, *North Carolina Cyber Executive Summit*, Raleigh, NC, September, 2019.
10. Analysis of iOS Access Control Policy, *King's College London (KCL)*, London, UK, March, 2019.
11. Analysis of iOS Access Control Policy, *CyberSecurity@KAIST International Workshop*, Daejeon, Korea, June, 2018.
12. Using Text Analytics to Enhance Security Analysis of Mobile Applications, *ACM ASIACCS 2018*, Incheon, Korea, June, 2018.
13. Using Text Analytics to Enhance Security Analysis of Mobile Applications, *University of North Carolina Charlotte (UNCC)*, Charlotte, NC, January, 2018.
14. HONEYSCOPE: IoT Device Protection with Deceptive Network Views, *ARO Workshop on HoneyThings: Autonomous and Resilient Cyber Deception*, Charlotte, NC, January, 2018.
15. Analysis of iOS Access Control Policy, *BSides Raleigh*, Raleigh, NC, October, 2017.
16. Mobile Security, *Umicore USA Inc.*, Raleigh, NC, September, 2017.
17. Using Text Analytics to Enhance Security Analysis of Mobile Applications, *ETH Zurich*, Zurich, Switzerland, July, 2017.
18. Towards Practical Information Flow Control in Modern Operating Systems, *University of Florida*, Gainesville, FL, June, 2016.
19. Towards Practical Information Flow Control in Modern Operating Systems, *Royal Holloway, University of London*, Egham, Surrey, UK, April, 2016.
20. Android Security Modules, *Qualcomm Mobile Security Summit*, San Diego, CA, April, 2015.
21. Access Control in Modern Operating Systems, *TU Darmstadt*, Darmstadt, Germany, November, 2013.
22. WHYPER: Towards Automating Risk Assessment of Mobile Applications, *IBM*, Research Triangle Park, NC, October, 2013.
23. Smartphone Security, *Qualcomm*, Santa Clara, CA, May, 2013.
24. Smartphone Security: Concerns and Defenses, *The US Department of Justice and US Department of State West African Cybersecurity and Cybercrime Workshop*, Accra, Ghana, January, 2013.
25. Smartphone Security: Concerns and Defenses, *Black Data Processing Associates (BDPA), Triangle Chapter*, RTP, NC, November, 2012.
26. Defending Users Against Smartphone Apps: Techniques and Future Directions, *University of North Carolina, Chapel Hill*, Chapel Hill, NC, November, 2012.
27. Defending Users Against Smartphone Apps: Techniques and Future Directions, *Purdue University*, West Lafayette, IN, September, 2012.
28. Smartphone Security: Concerns and Defenses, *The US Department of Justice and US Department of State West African Cybersecurity and Cybercrime Workshop*, Dakar, Senegal, September, 2012.
29. Analysis Techniques for Mobile Operating System Security, *State of North Carolina OITS Security Liaisons Meeting*, Raleigh, NC, June, 2012.
30. Defending Users Against Smartphone Apps: Techniques and Future Directions, *University of Washington*, Seattle, WA, April, 2012.
31. Analysis Techniques for Mobile Operating System Security, *Raleigh ISSA Chapter*, Raleigh, NC, April, 2012.
32. Defending Users Against Smartphone Apps: Techniques and Future Directions, *Keynote - International Conference on Information Systems Security (ICISS)*, Kolkata, India, December, 2012.
33. Analysis Techniques for Mobile Operating System Security, *Georgetown University*, Washington, DC, March, 2011.
34. Analysis Techniques for Mobile Operating System Security, *University of Southern California*, Los Angeles, CA, February, 2011.
35. Analysis Techniques for Mobile Operating System Security, *University of Maryland*, College Park, MD, February, 2011.
36. Analysis Techniques for Mobile Operating System Security, *Naval Postgraduate School*, Monterey, CA, February, 2011.
37. Analysis Techniques for Mobile Operating System Security, *Polytechnic Institute of New York University*, New York, NY,

January, 2011.

38. Analysis Techniques for Mobile Operating System Security, *Carleton University*, Ottawa, ON, Canada, January, 2011.
39. Analysis Techniques for Mobile Operating System Security, *North Carolina State University*, Raleigh, NC, November, 2010.
40. TaintDroid: An Information-Flow Tracking System for Realtime Privacy Monitoring on Smartphones, *University of Pennsylvania*, Philadelphia, PA, October, 2010.
41. Enhanced Security Policy Frameworks for Android, *Carleton University*, Ottawa, ON, CA, March, 2010.
42. On Lightweight Mobile Phone Certification, *University of Delaware*, Newark, DE, March, 2010.
43. On Lightweight Mobile Phone Certification, *University of Notre Dame*, South Bend, IN, October, 2009.
44. Understanding Android's Security Framework, *University of Washington*, Seattle, WA, July, 2009.
45. Understanding Android's Security Framework, *Georgia Institute of Technology*, Atlanta, GA, January, 2009.

PRESENTATIONS

1. Expectation Context, *Google Security Research Summit*, Mountain View, CA, March, 2015.
2. Enhancing the Security and Access Control of Modern Operating Systems, *NSF SaTC PI Meeting*, Arlington, VA, January, 2015.
3. A Study of Android Application Security, *20th USENIX Security Symposium*, San Francisco, CA, August, 2011.
4. TaintDroid: An Information-Flow Tracking System for Realtime Privacy Monitoring on Smartphones, *9th USENIX Symposium on Operating Systems Design and Implementation (OSDI)*, Vancouver, BC, Canada, October, 2010.
5. On Lightweight Mobile Phone Certification, *16th ACM Conference on Computer and Communications Security (CCS)*, Chicago, IL, November, 2009.
6. Lightweight Information Tracking for Mobile Phones, *18th USENIX Security Symposium, Works in Progress Session*, Montreal, QC, CA, August, 2009.
7. Defending Against Attacks on Main Memory Persistence, *24th Annual Computer Security Applications Conference (ACSAC)*, Anaheim, CA, December, 2008.
8. PinUP: Pinning User Files to Known Applications, *24th Annual Computer Security Applications Conference (ACSAC)*, Anaheim, CA, December, 2008.
9. PinUP: Pinning User Files to Known Applications, *17th USENIX Security Symposium, Poster Session*, San Jose, CA, August, 2008.
10. Systematic Issues in the Hart InterCivic and Premier Voting Systems: Reflections Following Project EVEREST, *USENIX/ACCURATE Electronic Voting Technology Workshop*, San Jose, CA, July, 2008.
11. Protecting User Files by Reducing Application Access, *16th USENIX Security Symposium, Works in Progress Session*, Boston, MA, August, 2007.
12. PRESTO: A tool for Configuration Management at a Massive Scale, *USENIX Annual Technical Conference*, Santa Clara, CA, June, 2007.
13. PRESTO: A tool for Configuration Management at a Massive Scale, *Workshop on Programmable Routers for the Extensible Services of TOmorrow (PRESTO)*, Princeton, NJ, May, 2007.
14. Mitigating DoS Through Basic TPM Operations, *14th USENIX Security Symposium, Works in Progress Session*, Baltimore, MD, August, 2005.

TUTORIALS

1. Intro to Securing Android Applications, *Raleigh Chapter of ISSA*, Raleigh, NC, December, 2014.
2. Text Analysis for Security, *ACM Conference on Computer and Communications Security (CCS)*, Scottsdale, AZ, November, 2014.
3. Intro to Developing Android Applications, *Raleigh Chapter of ISSA*, Raleigh, NC, October, 2014.
4. Understanding Android's Security Framework, *15th ACM Conference on Computer and Communications Security (CCS)*, Alexandria, VA, October, 2008.

PANELS

1. CSAM 2020: Google Security Panel, *NC State University*, Raleigh, NC, October, 2020.
2. A Conversation on Cybersecurity, *PNC Thought Leadership Series*, Raleigh, NC, April, 2019.
3. Cyber Security Challenges, Trends and Research & Development Focus Areas, *Southeast Region Cyber Security & Technology Symposium*, Chapel Hill, NC, August, 2017.
4. Why-oT: What are the real security challenges in IoT? (Moderator), *ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)*, Boston, MA, July, 2017.
5. Experimental Testbeds for Mobile Devices and Large-scale Testing on Mobile Devices, *Workshop on Cyber Security Experimentation and Test (CSET), co-located with the USENIX Security Symposium*, Washington, DC, August, 2015.

6. Building Security into Modern Mobile Platforms, *Federal Trade Commission (FTC) public forum on Mobile Security: Potential Threats and Solutions*, Washington D.C., June, 2013 (link).
7. Mobile Security Issues, *The US Department of Justice and US Department of State West African Cybersecurity and Cybercrime Workshop*, Accra, Ghana, January, 2013.
8. Mobile Security Issues, *The US Department of Justice and US Department of State West African Cybersecurity and Cybercrime Workshop*, Dakar Senegal, September, 2012.

RESEARCH GRANTS

Grants as PI or Co-PI (Total: ~$12.6 Million)

- Title: **Collaborative: SaTC: Frontiers: Enabling a Secure and Trustworthy Software Supply Chain**
  Sponsor: **NSF SaTC**
  Award #: CNS-2207008
  NCSU Amount: $6,344,481
  Duration: 5 years (October 1, 2022 - September 30, 2027)
  Co-PI, PI: Laurie Williams (NCSU); Co-PI: Michel Cukier (UMD), Christian Kaestner (CMU), Alexandros Kapravelos (NCSU), Yasemine Acar (GWU)

- Title: **Collaborative Research: SaTC: CORE: Medium: Enabling Practically Secure Cellular Infrastructure**
  Sponsor: **NSF SaTC**
  Award #: CNS-2054911
  NCSU Amount: $601,966
  Duration: 3 years (January 1, 2022 - December 31, 2024)
  PI, Co-PI: Kevin Butler (Univ. Florida)

- Title: **SaTC: CORE: Small: Detecting Vulnerabilities and Remediations in Software Dependencies**
  Sponsor: **NSF SaTC**
  Award #: CNS-1946273
  Amount: $499,928
  Duration: 3 years (October 1, 2020 - September 30, 2023)
  PI, Co-PI: Brad Reaves

- Title: **Defining Security Policy in Distributed Environments using Network Views**
  Sponsor: **ONR**
  Award #: N00014-20-1-2696
  Amount: $1,033,306 (NCSU: $708,319)
  Duration: 3 years (December 1, 2019 - November 30, 2022)
  PI, Co-PIs: Cristina Nita-Rotaru (Northeastern), Brad Reaves (NC State)

- Title: **Detection of File Access Re-Delegation in Android APIs**
  Sponsor: **Google ASPIRE**
  Amount: $65,000
  Duration: 1 year (August 5, 2019 - August 4, 2020)
  Single PI

- Title: **P4: Reasoning about Accidental and Malicious Misuse via Formal Models of User Expectations and Software Systems**
  Sponsor: **NSA SoSL at NC State**
  Amount: $1,292,765
  Duration: 4 years (October 1, 2018 - September 30, 2022)
  Co-PI, PI: Munindar Singh, Co-PIs: Laurie Williams

- Title: **Correct Enforcement of Access Control Policy in Modern Operating Systems**
  Sponsor: **ARO**
  Award #: W911NF-16-1-0299
  Amount: $411,895
  Duration: 3 years (May 9, 2016 - May 8, 2019)
  Single PI

- Title: **Enhancing Network-level Defenses with End-Host Context**
  Sponsor: **NSA LAS DO6**
  Amount: $82,262
  Duration: 1 year (January 1, 2016 - December 31, 2016)
  Single PI

- Title: **TWC: Medium: Collaborative: Improving Mobile-Application Security via Text Analytics**
  Sponsor: **NSF SaTC**
  Award #: CNS-1513690
  NCSU Amount: $308,000
  Duration: 3 years (July 1, 2015 - June 30, 2018)
  NCSU PI; PI: Tao Xie (UIUC); co-PIs: Carl Gunter (UIUC), ChengXiang Zhai (UIUC)

- Title: **CAREER: Secure OS Views for Modern Computing Platforms**
  Sponsor: **NSF SaTC CAREER**
  Award #: CNS-1253346
  Amount: $400,000
  Duration: 5 years (February 1, 2013 - January 31, 2018)
  Single PI

- Title: **Enhancing Play Store Security and Privacy Hygiene with User Expectations**
  Sponsor: **Google Research Award**
  NCSU Amount: $47,500
  Duration: 1 year (August 26, 2014 - August 25, 2015)

- Title: **Refining Security Policy for Smartphone Applications**
  Sponsor: **ARO STIR**
  Amount: $49,726
  Duration: 9 mo (August 15, 2014 - May 14, 2015)
  Single PI

- Title: **R5: Smart Isolation in Large-scale Production Computing Infrastructures**
  Sponsor: **NSA SoSL at NCSU**
  Amount: $527,450 (estimated)
  Duration: 3 years (March 27, 2014 - March 27, 2017)
  Co-PI; PI: Xiaohui (Helen) Gu

- Title: **TWC: Small: Collaborative: Characterizing the Security Limitations of Accessing the Mobile Web**
  Sponsor: **NSF SaTC**
  Award #: CNS-1222680
  NCSU Amount: $167,000
  Duration: 3 years (October 1, 2012 - September 30, 2015)
  NCSU PI; PI: Patrick Traynor

- Title: **Attaining Least Privilege Through Automatic Partitioning of Hybrid Programs**
  Sponsor: **NSA SoSL at NCSU**
  Amount: $435,127
  Duration: 2.5 years (January 1, 2012 - June 24, 2014)
  PI; Co-PI: Xiaohui (Helen) Gu

- Title: **Modeling the Risk of User Behavior on Mobile Devices**
  Sponsor: **NSA SoSL at NCSU**
  Amount: $382,628
  Duration: 1.5 years (January 1, 2013 - June 24, 2014)
  Co-PI; PI: Ben Watson; Co-PI: Anne McLaughlin, Michael Rappa

Transferred Grants

- Title: **TWC: Frontier: Collaborative: Rethinking Security in the Era of Cloud Computing**
  Sponsor: **NSF SaTC**
  Award #: CNS-1330553
  NCSU Amount: $584,410
  Duration: 5 years (September 1, 2013 - August 31, 2018)
  NCSU PI: William Enck (transferred from Mladen Vouk; transferred from Peng Ning); PI: Mike Reiter (UNC-CH); co-PIs: Aditya Akella (UW-Madison), Jeff Chase (Duke), Ari Juels (Cornell Tech), Tom Ristenpart (Cornell Tech), Vyas Sekar (CMU), Mike Swift (UW Madison)