Stephen Checkoway — Curriculum Vitæ

Personal

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Appointments

7/2019–current	Assistant Professor, Oberlin College
11/2018–6/2019	Research Specialist, Oberlin College
7/2018–6/2019	Affiliate Scholar, Oberlin College
8/2015–7/2018	Assistant Professor, University of Illinois at Chicago
8/2012–7/2015	Assistant Research Professor, Johns Hopkins University.

Education

9/2005–6/2012	University of California San Diego. M.S., C.Phil., and Ph.D. in computer science. Advisor: Hovav Shacham.
9/2001–6/2005	University of Washington. B.S. in mathematics; B.S. in computer science; minor in physics.

Grants and gifts

10/2016–9/2021	National Science Foundation. *CPS: Synergy: Collaborative Research: Foundations of Security Cyber-Physical Systems of Systems.* PI. Award number: CNS-1646063. Award: $240,000 ($800,000 total project award).
9/2015	Mozilla Foundation. *Identify and preventing timing side-channel attacks.* PI. Gift: $61,000 ($67,115 total gift).
12/2013	Mozilla Foundation. *Securing the TLS Protocol.* PI. Gift: $65,433 (50% share).
9/2013–8/2018	National Science Foundation. *TWC: Frontier: Collaborative: Enabling Trustworthy Cybersystems for Health and Wellness.* Co-PI. PI: Aviel Rubin. Award number: CNS-1329737. Award: $2,000,000 ($10,000,000 total project award). (My involvement ended 7/2015.)
9/2013–9/2014	Department of Defense. *Teaching Real-world Tools and Techniques for Reverse Engineering.* PI. Award number: 115519. Award: $77,996.

Publications

Refereed papers

E. Johnson, M. Bland, Y. Zhou, J. Mason, S. Checkoway, S. Savage, and K. Levchenko. Jetset: Targeted firmware rehosting for embedded systems. In M. Bailey and R. Greenstadt, eds., *Proceedings of the USENIX Security Symposium 2021, (***USENIX***)*. USENIX, Aug. 2021. To appear.

L. Sun, B. Cao, J. Want, W. Srisa-an, P. S. Yu, A. D. Leow, and S. Checkoway. KOLLECTOR: Detecting fraudulent activities on mobile devices using deep learning. *IEEE Transactions on Mobile Computing (***TMC***)*, 2020.

S. Crow, B. Farinholt, B. Johannesmeyer, K. Koscher, S. Checkoway, S. Savage, A. Schulman, A. Snoeren, and K. Levchenko. Triton: A software-reconfigurable federated avionics testbed. In *Proceedings of the USENIX Workshop on Cyber Security Experimentation and Test 2019, (***CSET***)*. USENIX, Aug. 2019.

M. Ghasemisharif, A. Ramesh, S. Checkoway, C. Kanich, and J. Polakis. O single sign-off, where art thou? An empirical analysis of single sign-on account hijacking and session management on the web. In W. Enck and A. P. Felt, eds., *Proceedings of the USENIX Security Symposium 2018, (***USENIX***)*. USENIX, Aug. 2018.

P. D. Martin, D. Russel, M. B. Salem, S. Checkoway, and A. Rubin. Sentinel: Secure mode profiling and enforcement for embedded systems. In O. Landsiedel and K. Nahrstedt, eds., *Proceedings of the Internet of Things Design and Implementation 2018, (***IoTDI***)*, Apr. 2018.

S. Checkoway, J. Maskiewicz, C. Garman, J. Fried, S. Cohney, M. Green, N. Heninger, R. P. Weinmann, E. Rescorla, and H. Shacham. A systematic analysis of the Juniper Dual EC incident. In C. Kruegel, A. Myers, and S. Halevi, eds., *Proceedings of the ACM Conference on Computer and Communication Security 2016, (***CCS***)*, Oct. 2016. **CCS 2016 Best Paper Award; Internet Society 2017 Applied Networking Research Prize**.

M. Rushanan and S. Checkoway. Run-DMA. In F. Aurélien and T. Ptacek, eds., *Proceedings of the USENIX Workshop on Offensive Technologies 2015, (***WOOT***)*. USENIX, Aug. 2015.

D. Lundberg, B. Farinholt, E. Sullivan, R. Mast, S. Checkoway, S. Savage, A. C. Snoeren, and K. Levchenko. On the security of mobile cockpit information systems. In M. Yung and N. Li, eds., *Proceedings of the ACM Conference on Computer and Communication Security 2014, (***CCS***)*. ACM Press, Nov. 2014.

S. Checkoway, M. Fredrikson, R. Niederhagen, A. Everspaugh, M. Green, T. Lange, T. Ristenpart, D. J. Bernstein, J. Maskiewicz, and H. Shacham. On the practical exploitability of Dual EC in TLS implementations. In K. Fu, ed., *Proceedings of the USENIX Security Symposium 2014, (***USENIX***)*. USENIX, Aug. 2014.

M. Brocker and S. Checkoway. iSeeYou: Disabling the MacBook webcam indicator LED. In K. Fu, ed., *Proceedings of the USENIX Security Symposium*

*2014, (***USENIX***)*. USENIX, Aug. 2014.

K. Mowery, E. Wustrow, T. Wypych, C. Singleton, C. Comfort, E. Rescorla, S. Checkoway, J. A. Halderman, and H. Shacham. Security analysis of a full-body scanner. In K. Fu, ed., *Proceedings of the USENIX Security Symposium 2014, (***USENIX***)*. USENIX, Aug. 2014.

C. Tice, T. Roeder, P. Collingbourne, S. Checkoway, Ú. Erlingsson, L. Lozano, and G. Pike. Enforcing forward-edge control-flow integrity in GCC & LLVM. In K. Fu, ed., *Proceedings of the USENIX Security Symposium 2014, (***USENIX***)*. USENIX, Aug. 2014.

S. Checkoway and H. Shacham. Iago attacks: Why the system call API is a bad untrusted RPC interface. In R. Bodik, ed., *Proceedings of the International Conference on Architectural Support for Programming Languages and Operating Systems 2013, (***ASPLOS***)*. ACM Press, Mar. 2013.

A. Sarwate, S. Checkoway, and H. Shacham. Risk-limiting audits and the margin of victory in nonplurality elections. *Statistics, Politics and Policy (***SPP***)*, 4(1):29–64, Jan. 2013.

S. Checkoway. Portably solving the access(2)/open(2) race. *Tiny Transactions on Computer Science (***TinyToCS***)*, 1, Sept. 2012.

S. Checkoway, D. McCoy, D. Anderson, B. Kantor, H. Shacham, S. Savage, K. Koscher, A. Czeskis, F. Roesner, and T. Kohno. Comprehensive experimental analyses of automotive attack surfaces. In D. Wagner, ed., *Proceedings of the USENIX Security Symposium 2011, (***USENIX***)*. USENIX, Aug. 2011. Finalist for the 2011 NYU-Poly AT&T Best Applied Security Paper Award.

S. Meiklejohn, K. Mowery, S. Checkoway, and H. Shacham. The phantom tollbooth: Privacy-preserving electronic toll collection in the presence of driver collusion. In D. Wagner, ed., *Proceedings of the USENIX Security Symposium 2011, (***USENIX***)*. USENIX, Aug. 2011.

C. Kanich, S. Checkoway, and K. Mowery. Putting out a HIT: Crowdsourcing malware installs. In D. Brumley and M. Zalewski, eds., *Proceedings of the USENIX Workshop on Offensive Technologies 2011, (***WOOT***)*. USENIX, Aug. 2011.

S. Checkoway, L. Davi, A. Dmitrienko, A. R. Sadeghi, H. Shacham, and M. Winandy. Return-oriented programming without returns. In A. D. Keromytis and V. Shmatikov, eds., *Proceedings of the ACM Conference on Computer and Communications Security 2010, (***CCS***)*, pp. 559–572. ACM Press, Oct. 2010.

S. Checkoway, A. Sarwate, and H. Shacham. Single-ballot risk-limiting audits using convex optimization. In D. Jones, J. J. Quisquater, and E. Rescorla, eds., *Proceedings of the Electronic Voting Technology Workshop/Workshop on Trustworthy Elections 2010, (***EVT/WOTE***)*. USENIX/ACCURATE/IAVoSS, Aug. 2010.

K. Koscher, A. Czeskis, F. Roesner, S. Patel, T. Kohno, S. Checkoway, D. McCoy, B. Kantor, D. Anderson, H. Shacham, and S. Savage. Experimental security analysis of a modern automobile. In D. Evans and G. Vigna, eds., *Proceedings of the IEEE Symposium on Security and Privacy 2010, (***S&P***)*, pp. 447–462. IEEE Computer Society, May 2010. **S&P 2020 Test of Time Award**.

S. Checkoway, H. Shacham, and E. Rescorla. Are text-only data formats safe? Or, use this LaTeX class file to pwn your computer. In M. Bailey, ed., *Proceedings of the USENIX Workshop on Large-Scale Exploits and Emergent Threats 2010, (***LEET***)*. USENIX, Apr. 2010.

S. Checkoway, A. J. Feldman, B. Kantor, J. A. Halderman, E. W. Felten, and H. Shacham. Can DREs provide long-lasting security? The case of return-oriented programming and the AVC Advantage. In D. Jefferson, J. L. Hall, and T. Moran, eds., *Proceedings of the Electronic Voting Technologies Workshop/Workshop on Trustworthy Elections 2009, (***EVT/WOTE***)*. USENIX/ACCURATE/IAVoSS, Aug. 2009.

W. Zhang, S. Checkoway, B. Calder, and D. M. Tullsen. Dynamic code value specialization using the trace cache fill unit. In K. Rudd and C. Pixley, eds., *Proceedings of the IEEE International Conference on Computer Design 2006, (***ICCD***)*, pp. 10–16. IEEE Computer Society, Oct. 2006.

Dissertation and reports

S. Checkoway. *Low-Level Software Security: Exploiting Memory Safety Vulnerabilities and Assumptions*. Ph.D. thesis, University of California, San Diego, June 2012.

P. D. Martin, M. Rushanan, S. Checkoway, A. D. Rubin, and M. D. Green. Classifying network protocol implementation versions: An OpenSSL case study. Technical Report 13-01, Johns Hopkins University Department of Computer Science, 2013.

A. Sarwate, S. Checkoway, and H. Shacham. Risk-limiting audits for nonplurality elections. Technical Report CS2011-0967, UC San Diego, June 2011.

S. Checkoway and H. Shacham. Escape from return-oriented programming: Return-oriented programming without returns (on the x86). Technical Report CS2010-0954, UC San Diego, Feb. 2010.

S. Checkoway. Methods of post-election confidence-level auditing. Online: https://checkoway.net/papers/re/, Sept. 2008.

Articles

S. Checkoway, J. Maskiewicz, C. Garman, J. Fried, S. Cohney, M. Green, N. Heninger, R. P. Weinmann, E. Rescorla, and H. Shacham. Where did I leave my keys? Lessons from the Juniper Dual EC incident. *Communications of the ACM*, 61(11):148–155, Oct. 2018.

S. Checkoway, H. Shacham, and E. Rescorla. Don't take LaTeX files from strangers. *;login: The USENIX Magazine*, 35(4):17–22, Aug. 2010.

Invited talks

Oberlin College. "Electronic Voting Security." Oct. 2018.

Fastly Security Speaker Series. "A Systematic Analysis of the Juniper Dual EC Incident." Oct. 2017.

IRTF Applied Networking Research Prize talk at IETF 99. "A Systematic Analysis of the Juniper Dual EC Incident. Jul. 2017.

Code Freeze 2015: Security keynote. "Embedded Systems Security: The Need for a Holistic Approach." Jan. 2015.

Oberlin College. "iSeeYou: Disabling the MacBook webcam indicator LED." Oct. 2013.

National Cable & Telecommunications Association. "Electronic Voting Security." Apr. 2013.

Case Western Reserve University. "Motors, Voters, and the Future of Embedded Security." Nov. 2012.

Messaging Malware Mobile Anti-Abuse Working Group, keynote. "Electronic Voting Security." Oct. 2012.

Workshop on Embedded System Security keynote, joint talk with Karl Koscher. "Experimental Security Analysis of a Modern Automobile." Oct. 2011.

Professional Activities

Editorial board	JETS 2013–present.
Program committees	USENIX Security 2014, 2015, 2016, 2017, 2019, 2020
	IEEE Security & Privacy 2016, 2017, 2020
	USENIX CSET 2013, 2019, 2020
	AutoSec 2019, 2021
	IEEE LangSec 2018
	ROOTS 2017, 2018
	WWW 2016, 2017
	ACM CCS 2014, 2015
	CANS 2015
	PASSAT 2014
	ARES 2014
	USENIX WOOT 2011, 2013
	DIMVA 2012

USENIX EVT/WOTE 2011, 2012

Teaching

At Oberlin

Programming Abstractions
- Summer 2021 https://checkoway.net/teaching/cs275/2021-summer/
- Fall 2020 https://checkoway.net/teaching/cs275/2020-fall/

Computer Organization
- Spring 2021 (co-taught)

Computer and Information Security
- Fall 2020 https://checkoway.net/teaching/cs343/2020-fall/

Systems Programming
- Spring 2020 https://checkoway.net/teaching/cs241/2020-spring/
- Fall 2019 https://checkoway.net/teaching/cs241/2019-fall/

At UIC

Languages and Automata
- Spring 2018 https://checkoway.net/teaching/cs301/2018-spring/
- Fall 2015 https://checkoway.net/teaching/cs301/2015-fall/

Secure Computer Systems
- Fall 2017 https://checkoway.net/teaching/cs487/2017-fall/

Research Methods in Computer Science
- Spring 2017 https://checkoway.net/teaching/cs590/2017-spring/

Software Vulnerability Analysis
- Fall 2016 https://checkoway.net/teaching/cs491/2016-fall/

Advanced Computer Security
- Spring 2016 https://checkoway.net/teaching/cs594/2016-spring/

At JHU

Automata and Computation Theory
- Spring 2015 https://checkoway.net/teaching/cs271/2015-spring/
- Spring 2014 https://checkoway.net/teaching/cs271/2014-spring/

Software Vulnerability Analysis
- Fall 2014 https://checkoway.net/teaching/cs460/2014-fall/
- Fall 2013 https://checkoway.net/teaching/cs460/2013-fall/
- Fall 2012 https://checkoway.net/teaching/cs460/2012-fall/

Advanced Topics in Software Security
- Spring 2013 https://checkoway.net/teaching/cs668/2013-spring/