

# Zakir Durumeric

Assistant Professor  
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## Research Overview

My research brings a data-driven approach to the study of computer and network security. I have built systems and tools to facilitate Internet-scale security measurement (e.g., ZMap and Censys) and used them to discover and correct vulnerabilities that only emerge when studied at global scale. My work has helped strengthen the Internet's most important cryptographic protocols (TLS, SSH, secure email transport, and the HTTPS PKI), defend the Internet's core infrastructure, and guide the design and deployment of widely-used systems.

## Positions

- Assistant Professor, Stanford University, September 2018
- Co-Founder and CTO, Censys, Inc., August 2017

## Education

- Ph.D. in Computer Science and Engineering, University of Michigan, August 2017  
*Advisor:* J. Alex Halderman  
*Committee:* Vern Paxson, Michael Bailey, Peter Honeyman, Florian Schaub
- M.S. in Computer Science and Engineering, University of Michigan, May 2013
- B.S. in Computer Science and Mathematics, University of Iowa, May 2011

## Honors and Awards

- Best Paper Award, ACM CCS (2015)
- Best Paper Award, ACM IMC (2014)
- Best Paper Award, USENIX Security (2012)
- IETF/IRTF Applied Networking Research Prize (2016)
- Pwnie Award for Most Innovative Research (2015)
- MIT Technology Review's "35 Innovators Under 35" (2015)
- Google Ph.D. Fellowship in Computer Security (2014)

## Top-Tier Conference Publications

- [1] **Tracking Certificate Misissuance in the Wild**  
Deepak Kumar, Zhengping Wang, Matthew Hyder, Joseph Dickinson, Gabrielle Beck, David Adrian, Joshua Mason, Zakir Durumeric, J. Alex Halderman, Michael Bailey  
*IEEE Symposium on Security & Privacy* (“Oakland”), May 2018.
  - [2] **Target Generation for IPv6 Scanning**  
Austin Murdock, Frank Li, Paul Bramsen, Zakir Durumeric, and Vern Paxson  
*ACM Internet Measurement Conference (IMC)*, Nov. 2017.
  - [3] **Understanding the Mirai Botnet**  
Manos Antonakakis, Tim April, Michael Bailey, Matt Bernhard, Elie Bursztein, Jaime Cochran, Zakir Durumeric, J. Alex Halderman, Luca Invernizzi, Michalis Kallitsis, Deepak Kumar, Chaz Lever, Zane Ma, Joshua Mason, Damian Menscher, Chad Seaman, Nick Sullivan, Kurt Thomas, Yi Zhou  
*USENIX Security Symposium (USENIX Security)*, Aug. 2017.
  - [4] **The Security Impact of HTTPS Interception**  
Zakir Durumeric, Zane Ma, Drew Springall, Richard Barnes, Nick Sullivan, Elie Bursztein, Michael Bailey, J. Alex Halderman, and Vern Paxson  
*Network and Distributed System Security Symposium (NDSS)*, Feb. 2017.
  - [5] **Measuring the Security Harm of TLS Crypto Shortcuts**  
Drew Springall, Zakir Durumeric, and J. Alex Halderman  
*ACM Internet Measurement Conference (IMC)*, Nov. 2016.
  - [6] **Towards a Complete View of the Certificate Ecosystem**  
Benjamin VanderSloot, Johanna Amann, Matthew Bernhard, Zakir Durumeric, Michael Bailey, and J. Alex Halderman  
*ACM Internet Measurement Conference (IMC)*, Nov. 2016.
  - [7] **You’ve Got Vulnerability: Exploring Effective Vulnerability Notifications**  
Frank Li, Zakir Durumeric, Jakub Czyz, Mohammad Karami, Michael Bailey, Damon McCoy, Stefan Savage, and Vern Paxson  
*USENIX Security Symposium (USENIX Security)*, Aug. 2016.
  - [8] **Users Really Do Plug in USB Drives They Find**  
Matthew Tischer, Zakir Durumeric, Sam Foster, Sunny Duan, Alec Mori, Elie Bursztein, and Michael Bailey  
*IEEE Symposium on Security & Privacy* (“Oakland”), May 2016.
  - [9] **Neither Snow Nor Rain Nor MITM... An Empirical Analysis of Email Delivery Security**  
Zakir Durumeric, David Adrian, Ariana Mirian, James Kasten, Elie Bursztein, Nicholas Lidzborski, Kurt Thomas, Vijay Eranti, Michael Bailey, and J. Alex Halderman  
*ACM Internet Measurement Conference (IMC)*, Oct. 2015.
- ★ **IETF/IRTF Applied Networking Research Prize**

- [10] **Imperfect Forward Secrecy: How Diffie-Hellman Fails in Practice**  
David Adrian, Karthikeyan Bhargavan, Zakir Durumeric, Pierrick Gaudry, Matthew Green, J. Alex Halderman, Nadia Heninger, Drew Springall, Emmanuel Thomé, Luke Valenta, Benjamin VanderSloot, Eric Wustrow, Santiago Zanella-Béguelin, and Paul Zimmermann  
*ACM Conference on Computer and Communications Security (CCS)*, Oct. 2015.  
★ **Best Paper Award**     ★ **Pwnie Award for Most Innovative Research**
- [11] **Censys: A Search Engine Backed by Internet-Wide Scanning**  
Zakir Durumeric, David Adrian, Ariana Mirian, Michael Bailey, and J. Alex Halderman  
*ACM Conference on Computer and Communications Security (CCS)*, Oct. 2015.
- [12] **The Matter of Heartbleed**  
Zakir Durumeric, Frank Li, James Kasten, Johanna Amann, Jethro Beekman, Mathias Payer, Nicolas Weaver, David Adrian, Vern Paxson, Michael Bailey, and J. Alex Halderman  
*ACM Internet Measurement Conference (IMC)*, Nov. 2014.  
★ **Best Paper Award**
- [13] **Security Analysis of the Estonian Internet Voting System**  
Drew Springall, Travis Finkenauer, Zakir Durumeric, Jason Kitcat, Harri Hursti, Margaret MacAlpine, and J. Alex Halderman  
*ACM Conference on Computer and Communications Security (CCS)*, Nov. 2014.
- [14] **An Internet-Wide View of Internet-Wide Scanning**  
Zakir Durumeric, Michael Bailey, and J. Alex Halderman  
*USENIX Security Symposium (USENIX Security)*, Aug. 2014.
- [15] **On the Mismanagement and Maliciousness of Networks**  
Jing Zhang, Zakir Durumeric, Michael Bailey, Manish Karir, and Mingyan Liu  
*Network and Distributed System Security Symposium (NDSS)*, Feb. 2014.
- [16] **Analysis of the HTTPS Certificate Ecosystem**  
Zakir Durumeric, James Kasten, Michael Bailey, and J. Alex Halderman  
*ACM Internet Measurement Conference (IMC)*, Oct. 2013.
- [17] **ZMap: Fast Internet-Wide Scanning and its Security Applications**  
Zakir Durumeric, Eric Wustrow, and J. Alex Halderman  
*USENIX Security Symposium (USENIX Security)*, Aug. 2013.
- [18] **Mining Your Ps and Qs: Detection of Widespread Weak Keys in Network Devices**  
Nadia Heninger, Zakir Durumeric, Eric Wustrow, and J. Alex Halderman  
*USENIX Security Symposium (USENIX Security)*, Aug. 2012.  
★ **Best Paper Award**  
★ Named one of *Computing Reviews*' Notable Computing Books and Articles of 2012

## Other Refereed Publications

- [19] **Scanning the Internet for Liveness**  
Shehar Bano, Philipp Richter, Mobin Javed, Srikanth Sundaresan, Zakir Durumeric, Steven Murdoch, Richard Mortier, Vern Paxson  
*SIGCOMM Computer Communication Review*, to appear.
- [20] **Security Challenges in an Increasingly Tangled Web**  
Deepak Kumar, Zane Ma, Zakir Durumeric, Ariana Mirian, Joshua Mason, Michael Bailey, and J. Alex Halderman  
*World Wide Web Conference (WWW)*, Apr. 2017.
- [21] **An Internet-Wide View of ICS Devices**  
Ariana Mirian, Zane Ma, David Adrian, Matthew Tischer, Thasphon Chuenchujit, Tim Yardley, Robin Berthier, Josh Mason, Zakir Durumeric, J. Alex Halderman and Michael Bailey  
*IEEE Conference on Privacy, Security, and Trust (PST)*, Dec. 2016.
- [22] **FTP: The Forgotten Cloud**  
Drew Springall, Zakir Durumeric, and J. Alex Halderman  
*IEEE/IFIP Conference on Dependable Systems and Networks (DSN)*, June 2016.
- [23] **Outsmarting Proctors with Smartwatches: A Case Study on Wearable Computing Security**  
Alex Migicovsky, Zakir Durumeric, Jeff Ringenberg, and J. Alex Halderman  
*Conference on Financial Cryptography and Data Security (Financial Crypto)*, Mar. 2014.
- [24] **Zippier ZMap: Internet-Wide Scanning at 10Gbps**  
David Adrian, Zakir Durumeric, Gulshan Singh, and J. Alex Halderman  
*USENIX Workshop on Offensive Technologies (WOOT)*, Aug. 2014.

## Journal Publications

- [25] **Imperfect Forward Secrecy: How Diffie-Hellman Fails in Practice**  
David Adrian, Karthikeyan Bhargavan, Zakir Durumeric, Pierrick Gaudry, Matthew Green, J. Alex Halderman, Nadia Heninger, Drew Springall, Emmanuel Thomé, Luke Valenta, Benjamin VanderSloot, Eric Wustrow, Santiago Zanella-Béguelin, and Paul Zimmermann  
*Communications of the ACM*, to appear
- [26] **The Danger of USB Drives**  
Matthew Tischer, Zakir Durumeric, Elie Bursztein, and Michael Bailey  
*IEEE Security & Privacy (S&P Magazine)*

## Patents

- **Network Maliciousness Susceptibility Analysis and Rating**  
Mingyan Liu, Michael Bailey, Manish Karir, Jing Zhang, and Zakir Durumeric  
United States Patent No. 9729558B2

## Professional Service

### Program Committees

- USENIX Security Symposium (SEC), 2018–2019.
- ACM Internet Measurement Conference (IMC), 2018.
- ACM Conference on Computer and Communications Security (CCS), 2018.
- Symposium on Research in Attacks, Intrusions, and Defenses (RAID), 2018.
- International World Wide Web Conference (WWW), 2016–2018.
- Detection of Intrusions and Malware & Vulnerability Assessment (DIMVA), 2016, 2017.
- USENIX Workshop on Offensive Technologies (WOOT), 2015.

### Department and University Service

- Graduate Admissions Committee, Computer Science, Stanford University (2018)

## Teaching

- **Topics in Computer and Network Security** (CS 356), Stanford, Fall '18.  
Started new graduate course, which covers foundational research and current topics in computer and network security. Students read and discuss papers as well as complete an independent research project.

## Advising and Mentoring

Undergraduate and masters independent studies supervised:

- 2017: Alex Holland, Gabrielle Beck
- 2016: Alishah Chator, Noah Duncan
- 2015: Rose Howell, Vikas Kumar, Ariana Mirian
- 2014: Gulshan Singh, Saam Aghevli, Andrew Modell, Kollin Purcell, Jack Miner
- 2013: David Adrian, Jennifer O'Neil

## Speaking

- **Understanding the Mirai Botnet**  
Merit Member Conference, May 2018 (keynote); University of Iowa Computing Conference, Feb. 2018 (invited); Stanford University, Aug. 2017 (invited)
- **Five Years Later: A Retrospective on ZMap and Internet-Wide Scanning**  
M<sup>3</sup>AAWG 42nd General Meeting, Feb. 2018 (invited); Facebook, May 2018 (invited)
- **Internet-Wide Scanning: A New Security Perspective**  
Qatar Computing Research Institute, Nov. 2017 (invited); MIT Technology Review, EmTech, Nov. 2015 (invited); Google, May 2015 (invited)

- **The Security Impact of HTTPS Interception**  
Network and Distributed System Security Symposium (NDSS'17), Feb. 2017
- **Uncovering Cryptographic Failures with Internet-Wide Measurement**  
CMU CyLab, April 2016 (invited); Northeastern University, March 2016 (invited); Boston University, Mar. 2016 (invited); Stanford Security Seminar, Mar. 2016 (invited); MIT CSAIL Security Seminar, Nov. 2015 (invited)
- **Neither Snow Nor Rain Nor MITM... An Empirical Analysis of Email Delivery Security**  
Cloudflare Crypto Meetup, Apr. 2016 (invited); Internet Research Task Force (IRTF), Apr. 2016 (invited); Chaos Communication Congress (32c3), Dec. 2015 (invited); University of Iowa, 2018 Kurtz Lecture, Oct. 2018 (invited)
- **The Matter of Heartbleed**  
Chaos Communication Congress (31c3), Dec. 2014; Internet Measurement Conference (IMC '14), Nov. 2014; University of Illinois, Systems and Networking Seminar Series, Oct. 2014
- **An Internet-Wide View of Internet-Wide Scanning**  
USENIX Security, Aug. 2014
- **ZMap: Fast Internet-Wide Scanning and its Security Applications**  
IT University of Copenhagen, June 2014; Vrije Universiteit Amsterdam, June 2014; RIPE 68, May 2014; University of Michigan, Nov. 2013; Eurecom, Oct. 2013; USENIX Security, Aug. 2013
- **Analysis of the HTTPS Certificate Ecosystem**  
Internet Measurement Conference, Oct. 2013
- **Mining Your Ps and Qs: Detection of Widespread Weak Keys in Network Devices**  
USENIX Security, Aug. 2012; University of Iowa, June 2012

## References

**Vern Paxson**

Professor, U.C. Berkeley

**J. Alex Halderman**

Professor, University of Michigan

**Michael Bailey**

Associate Professor, University of Illinois Urbana-Champaign

**Stefan Savage**

Professor, U.C. San Diego