

Dave Levin

Contact Info

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Education

University of Maryland, College Park, Maryland USA

Ph.D., Computer Science, September 2010

- Dissertation: Systems-compatible Incentives
- Advisors: Bobby Bhattacharjee, Neil Spring, and Aravind Srinivasan

B.S., Computer Science, May 2002

B.S., Mathematics, May 2002

University of Notre Dame, Notre Dame, Indiana USA

Attended August 1997 – May 1999

Honors and Awards

- Reviewer award, SIGCOMM 2012
 - Best paper, USENIX NSDI 2009, for *TrInc: Small Trusted Hardware for Large Distributed Systems*
 - Best presentation, Computer Science track of UMD Graduate Research Interaction Day, 2009
 - Microsoft Live Labs fellowship, awarded 2008
 - Dean's fellowship for excellence in research, Computer Science Dept., Univ. of Maryland, 2006
 - Outstanding undergraduate computer science teaching assistant award, Univ. of Maryland, 2002
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Refereed

Publications

1. **unCaptcha: A Low-Resource Defeat of reCaptcha's Audio Challenge**
Kevin Bock, Daven Patel, George Hughey, Dave Levin
USENIX WOOT 2017 (Workshop on Offensive Technologies)
2. **DeTor: Provably Avoiding Geographic Regions in Tor**
Zhihao Li, Stephen Herwig, Dave Levin
USENIX Security 2017
3. **A Longitudinal, End-to-End View of the DNSSEC Ecosystem**
Taejoong Chung, Roland van Rijswijk-Deij, Balakrishnan Chandrasekaran, David Choffnes, Dave Levin, Bruce M. Maggs, Alan Mislove, Christo Wilson
USENIX Security 2017
4. **CRLite: A Scalable System for Pushing All TLS Revocations to All Browsers**
James Larisch, David Choffnes, Dave Levin, Bruce M. Maggs, Alan Mislove, Christo Wilson
IEEE Symposium on Security and Privacy 2017
5. **Measuring and Applying Invalid SSL Certificates: The Silent Majority**
Taejoong Chung, Yabing Liu, David Choffnes, Dave Levin, Bruce M. Maggs, Alan Mislove, Christo Wilson
ACM IMC 2016 (Internet Measurement Conference) Long paper
6. **Measurement and Analysis of Private Key Sharing in the HTTPS Ecosystem**
Frank Cangialosi, Taejoong Chung, David Choffnes, Dave Levin, Bruce M. Maggs, Alan Mislove, Christo Wilson
ACM CCS 2016 (Conference on Computer and Communications Security)
7. **Build It, Break It, Fix It: Contesting Secure Development**
Andrew Ruef, Michael Hicks, James Parker, Dave Levin, Michelle Mazurek, Piotr Mardziel
ACM CCS 2016 (Conference on Computer and Communications Security)

8. **Picocenter: Supporting long-lived, mostly-idle applications in cloud environments**
Liang Zhang, James Litton, Frank Cangialosi, Theophilus Benson, Dave Levin, Alan Mislove
EuroSys 2016 (European Conference on Computer Systems)
9. **Anomaly Detection on D-root**
Zhihao Li, Dave Levin, Bobby Bhattacharjee, Neil Spring
DINR Workshop 2016 (DNS and Internet Naming Research Directions)
10. **DNSql: Processing Massive DNS Collections**
Stephen Herwig, Dave Levin, Bobby Bhattacharjee, Neil Spring
DINR Workshop 2016 (DNS and Internet Naming Research Directions)
11. **Ting: Measuring and Exploiting Latencies Between All Tor Nodes**
Frank Cangialosi, Dave Levin, Neil Spring
ACM IMC 2015 (Internet Measurement Conference) Long paper
12. **An End-to-End Measurement of Certificate Revocation in the Web's PKI**
Yabing Liu, Will Tome, Liang Zhang, David Choffnes, Dave Levin, Bruce Maggs, Alan Mislove, Aaron Schulman, Christo Wilson
ACM IMC 2015 (Internet Measurement Conference) Long paper
13. **Alibi Routing**
Dave Levin, Youndo Lee, Luke Valenta, Zhihao Li, Victoria Lai, Cristian Lumezanu, Neil Spring, Bobby Bhattacharjee
ACM SIGCOMM 2015
14. **Build It Break It: Measuring and Comparing Development Security**
Andrew Ruef, Michael Hicks, James Parker, Dave Levin, Atif Memon, Jan Plane, Piotr Mardziel
CSET 2015 (Workshop on Cyber Security Experimentation and Test)
15. **Programming Slick Network Functions**
Bilal Anwer, Theophilus Benson, Nick Feamster, Dave Levin
SOSR 2015 (Symposium on SDN Research)
16. **UAv6: Alias Resolution in IPv6 Using Unused Addresses**
Ramakrishna Padmanabhan, Zhihao Li, Dave Levin, Neil Spring
PAM 2015 (Passive and Active Measurement Conference)
17. **RevCast: Fast, Private Certificate Revocation over FM Radio**
Aaron Schulman, Dave Levin, Neil Spring
ACM CCS 2014 (Conference on Computer and Communications Security)
18. **Analysis of SSL Certificate Reissues and Revocations in the Wake of Heartbleed**
Liang Zhang, Dave Choffnes, Tudor Dumitras, Dave Levin, Alan Mislove, Aaron Schulman, Christo Wilson
ACM IMC 2014 (Internet Measurement Conference) Long paper
Invited to appear as a Research Highlight in Communications of the ACM (in process)
19. **D-mystifying the D-root Address Change**
Matthew Lentz, Dave Levin, Jason Castonguay, Neil Spring, Bobby Bhattacharjee
ACM IMC 2013 (Internet Measurement Conference) Short paper
20. **A Slick Control Plane for Network Middleboxes**
Bilal Anwer, Theophilus Benson, Nick Feamster, Dave Levin, Jennifer Rexford
Poster at HotSDN 2013 (Hot Topics in Software Defined Networking), and paper at ONS 2013 (Open Network Summit)
21. **SDX: A Software Defined Internet Exchange**
Josh Bailey, Russ Clark, Nick Feamster, Dave Levin, Jennifer Rexford, Scott Shenker
ONS 2013 (Open Network Summit)

22. **Making Currency Cheap with iOwe**
Dave Levin, Aaron Schulman, Katrina LaCurts, Neil Spring, Bobby Bhattacharjee
NetEcon 2011 (Workshop on the Economics of Networks, Systems, and Computation)
23. **Secure Sharing in Distributed Information Management Applications: Problems and Directions**
Piotr Mardziel, Adam Bender, Michael Hicks, Dave Levin, Mudhakar Srivatsa, Jonathan Katz
ACITA 2010 (Annual Conference of the International Technology Alliance)
24. **Don't Love Thy Nearest Neighbor**
Cristian Lumezanu, Dave Levin, Bo Han, Neil Spring, Bobby Bhattacharjee
IPTPS 2010 (International Workshop on Peer-to-Peer Systems)
25. **Stay or go? Participation in Under-Provisioned Video Streams**
Dave Levin, Daniel Malter, Neil Spring, Bobby Bhattacharjee
NetEcon 2009 (Workshop on the Economics of Networks, Systems, and Computation)
26. **TrInc: Small Trusted Hardware for Large Distributed Systems**
Dave Levin, John R. Douceur, Jacob R. Lorch, and Thomas Moscibroda
NSDI 2009 (USENIX Symposium on Networked Systems Design and Implementation)
27. **Symbiotic Relationships in Internet Routing Overlays**
Cristian Lumezanu, Randy Baden, Dave Levin, Neil Spring, and Bobby Bhattacharjee
NSDI 2009 (USENIX Symposium on Networked Systems Design and Implementation)
28. **BitTorrent is an Auction: Analyzing and Improving BitTorrent's Incentives**
Dave Levin, Katrina LaCurts, Neil Spring, and Bobby Bhattacharjee.
ACM SIGCOMM 2008
29. **Motivating Participation in Internet Routing Overlays**
Dave Levin, Randolph Baden, Cristian Lumezanu, Neil Spring, and Bobby Bhattacharjee
NetEcon 2008 (Workshop on the Economics of Networks, Systems, and Computation)
30. **On the Fidelity of 802.11 Packet Traces**
Aaron Schulman, Dave Levin and Neil Spring.
PAM 2008 (Passive and Active Measurement Conference)
31. **Capacity of Asynchronous Random-Access Scheduling in Wireless Networks**
Deepti Chafekar, Anil Kumar, Dave Levin, Madhav Marathe, Srinivasan Parthasarathy and Aravind Srinivasan.
INFOCOM 2008 (IEEE Conference on Computer Communications)
32. **PeerWise Discovery and Negotiation of Faster Paths**
Cristian Lumezanu, Dave Levin and Neil Spring.
HotNets 2007 (Workshop on Hot Topics in Networks)
33. **Backbone Construction in Selfish Wireless Networks**
Seungjoon Lee, Dave Levin, Vijay Gopalakrishnan and Bobby Bhattacharjee.
SIGMETRICS 2007 (ACM Int'l. Conference on Measurement and Modeling of Computer Systems)
34. **Boycotting and Extorting Nodes in an Internetwork**
Dave Levin, Adam Bender, Cristian Lumezanu, Neil Spring and Bobby Bhattacharjee.
NetEcon+IBC 2007 (Workshop on the Econ. of Networked Systems / Incentive-Based Computing)
35. **Accountability as a Service**
Adam Bender, Neil Spring, Dave Levin and Bobby Bhattacharjee.
SRUTI 2007 (Workshop on Steps to Reducing Unwanted Traffic in the Internet)
36. **Punishment in Selfish Wireless Networks: A Game Theoretic Analysis**
Dave Levin.
NetEcon 2006 (Workshop on the Economics of Networked Systems)

- Technical Reports
37. **Fair File Swarming with FOX**
Dave Levin, Rob Sherwood and Bobby Bhattacharjee.
IPTPS 2006 (International Workshop on Peer-to-Peer Systems)
 38. **ProofRite: A Paper-Augmented Word Processor**
Kevin Conroy, Dave Levin and François Guimbretière.
UIST 2004 Demonstration (ACM Symposium on User Interface Software and Technology)
 39. **Nurikabe: Private yet Accountable Online Advertising**
Dave Levin, Bobby Bhattacharjee, John R. Douceur, Jacob R. Lorch, James Mickens, and Thomas Moscibroda
 40. **Incentive-Compatible Bootstrapping**
Dave Levin, Katrina LaCurts, Aaron Schulman, Neil Spring, and Bobby Bhattacharjee
 41. **A Secure DHT via the Pigeonhole Principle**
Randy Baden, Adam Bender, Dave Levin, Rob Sherwood, Neil Spring and Bobby Bhattacharjee.
 42. **Paranoia: An Anonymous, Censorship-Resistant File Store**
Dave Levin and Bobby Bhattacharjee.
 43. **DDoS Detection in Multi-Homed Stub Domains**
Chris Kommareddy, Dave Levin, Bobby Bhattacharjee, Richard La, Mark Shayman and Vahid Tabatabaee.
 44. **Hoodnets: Mobile Users Bonding over Auctions**
Dave Levin, Robert Kiefer, Kevin McGehee, Kristin Stephens, Koyel Mukherjee, Neil Spring, and Bobby Bhattacharjee
- Invited Papers
45. **Systems-Compatible Incentives**
Dave Levin, Neil Spring, and Bobby Bhattacharjee
GameNets 2009 (International Conference on Game Theory for Networks)

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- Funding
- NSF CNS-1735563 **Student Travel to the Cornell, Maryland, Max Planck Pre-Doctoral Research School**, \$50,000. June 2017–2018. Co-Primary Investigator, joint with Bobby Bhattacharjee (PI).
 - NSF CNS-1564143 **TWC: Medium: Collaborative: Measuring and Improving the Management of Today's PKI**, \$1.2M (total) \$600,000 (UMD). July 2016–2020. Primary Investigator, joint with Tudor Dumitras (UMD), Alan Mislove (Northeastern University), David Choffnes (NEU), and Christo Wilson (NEU).
 - NSF CNS-1619048 **NeTS: Small: Residential Network Outage Detection**, \$366,000. October 2016–2019. Co-Primary Investigator, joint with Neil Spring (PI).
 - University of Maryland Partnership with the Laboratory for Telecommunications Sciences (LTS), **DNS and External Data Fusion Research**, \$344,593, Co-Primary Investigator, joint with Bobby Bhattacharjee and Neil Spring.
 - NSF CNS-1409249 **CSR: Medium: Collaborative Research: Towards Finer-grained Cloud Computing**, \$1.2M (total) \$400,000 (UMD). August 2014–2018. Primary Investigator, joint with Alan Mislove (Northeastern University) and Theophilus Benson (Duke University).
 - University of Maryland Partnership with the Laboratory for Telecommunications Sciences (LTS), **Securing Critical Network Infrastructure**, \$197,999, Co-Primary Investigator, joint with Bobby Bhattacharjee and Neil Spring.
 - University of Maryland Partnership with the Laboratory for Telecommunications Sciences (LTS), **Bitcoin: Detecting and Characterizing Attacks**, \$149,820, Co-Primary Investigator, joint with Bobby Bhattacharjee and Neil Spring.
 - NSF SaTC EDU-1319147 **EDU: Competing to Build Secure Systems**, \$300,000. September 2013–2015. Co-Primary Investigator, joint with Michael Hicks (PI), Atif Memon, and Jandelyn Plane.

Classes Taught	• CMSC 818O (Graduate Computer and Network Security).	Fall 2017
	• CMSC 396H (Computer Science Honors Seminar).	Fall 2017
	• CMSC 389O (The Coding Interview). <i>Student-led class.</i>	Fall 2017
	• CMSC 818O (Graduate Computer and Network Security).	Spring 2017
	• CMSC 396H (Computer Science Honors Seminar).	Spring 2017
	• CMSC 414 (Computer and Network Security).	Spring 2016
	• CMSC 396H (Computer Science Honors Seminar).	Spring 2016
	• CMSC 499A (Independent Study: Analyzing CDNs' Roles in the Web's PKI).	Fall 2015
	• CMSC 499A (Independent Study: Obfuscated Communication through Skype Video).	Fall 2015
	• CMSC 414 (Computer and Network Security).	Spring 2015
	• CMSC 414 (Computer and Network Security).	Spring 2014
	• CMSC 499A (Independent Study: Anonymous DTN Routing).	Spring 2014
	• CMSC 330 (Organization of Programming Languages).	Spring 2013
• CMSC 499A (Independent Study: Provable Route Avoidance using Alibi Routing).	Spring 2013	
• CMSC 818F (Securing and Monetizing the Internet).	Spring 2013	

Service Activities	Program committee member:	
	• CSET 2016, 2017 (USENIX Workshop on Cyber Security Experimentation and Test)	
	• NetEcon 2011, 2013, 2014, 2015, 2016, 2017 (Workshop on the Economics of Networks, Systems, and Computation)	
	• SOSR 2016, 2017 (Symposium on SDN Research)	
	• IMC 2016 (ACM Internet Measurement Conference)	
	• SIGCOMM 2012, 2013 (ACM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communications), <i>Winner, best reviewer award (2012)</i>	
	• NSDI 2013 (USENIX Symposium on Networked Systems Design and Implementation)	
	• ICNP 2012 (IEEE International Conference on Network Protocols)	
	• DIALM-POMC 2010 (ACM International Workshop on Foundations of Mobile Computing)	

General chair:

- SOSR 2017 (ACM Symposium on SDN Research)
- HotNets 2013 (ACM Workshop on Hot Topics in Networks)

National Science Foundation panelist:

- NSF CSR 2016 (Computer Systems Research)
- NSF SaTC 2015 (Secure and Trustworthy Cyberspace)

Computing Research Association (CRA) Congressional Fly-in, 2015

Departmental Activities	• Chair, Computer Science Honors Program, 2016 – present.	
	• Co-founder of GTRG, a game theory reading group for the Computer Science Department (see https://www.cs.umd.edu/~dml/gtrg.html).	
	• Elected member of the Computer Science Department's Education Committee, 2005 – 2006.	
	• President of the Executive Council, the graduate student governing body for promoting interaction among students and faculty in the computer science department, 2004 – 2005.	

Invited Talks	<i>Securing the Internet by Proving the Impossible</i>	
	• University of Jordan. Hosted by Khair Eddin	September 2016

<i>Key Mismanagement in the Web's PKI</i>	
<ul style="list-style-type: none"> • CloudFlare. Hosted by Nick Sullivan • NEC Labs. Hosted by Cristian Lumezanu 	<p>August 2016 July 2016</p>
<i>The Ugly Truth about Certificate Revocation</i>	
<ul style="list-style-type: none"> • Maryland Cybersecurity Center Symposium • ICF Internationals CyberSci Summit • Duke University. Hosted by Theo Benson 	<p>December 2015 October 2015 August 2014</p>
<i>Alibi Routing</i>	
<ul style="list-style-type: none"> • SIGCOMM Conference 	August 2015
<i>Maritime Cybersecurity</i>	
<ul style="list-style-type: none"> • National Maritime Electronics Association (NMEA) Conference 	October 2015
<i>Analysis of SSL Certificate Reissues and Revocations in the Wake of Heartbleed</i>	
<ul style="list-style-type: none"> • NANOG 62 (Security track). Baltimore, MD 	October 2014
<i>D-mystifying the D-root Address Change</i>	
<ul style="list-style-type: none"> • NANOG 62 (DNS track). Baltimore, MD 	October 2014
<i>Tune-in to Tune-out: Using FM radio to revoke certificates</i>	
<ul style="list-style-type: none"> • Maryland Cybersecurity Center Symposium 	May 2014
<i>Avoiding Censors by Proving the Impossible</i>	
<ul style="list-style-type: none"> • Laboratory for Telecommunication Sciences (LTS) Symposium 	March 2014
<i>Proving the Impossible with Alibi Protocols</i>	
<ul style="list-style-type: none"> • Maryland Cybersecurity Center (MC2) Symposium 	May 2013
<i>Systems without Cooperation</i>	
<ul style="list-style-type: none"> • William and Mary College. • Stanford University Networking Seminar. • Georgia Tech. Hosted by Nick Feamster. • University of Wisconsin-Madison. Hosted by Suman Banerjee. 	<p>April 2013 July 2009 December 2008 December 2008</p>
<i>Making Currency Cheap with iOwe</i>	
<ul style="list-style-type: none"> • NetEcon Workshop 	July 2011
<i>Stay or Go? Participation in Under-provisioned Multicast Systems</i>	
<ul style="list-style-type: none"> • NetEcon Workshop 	July 2009
<i>Systems-Compatible Incentives</i>	
<ul style="list-style-type: none"> • GameNets Conference 	May 2009
<i>TrInc: Small Trusted Hardware for Large Distributed Systems</i>	
<ul style="list-style-type: none"> • NSDI Conference 	April 2009
<i>BitTorrent Is an Auction: Analyzing and Improving BitTorrent's Incentives</i>	
<ul style="list-style-type: none"> • SIGCOMM Conference 	August 2008
<i>Motivating Participation in Internet Routing Overlays</i>	
<ul style="list-style-type: none"> • NetEcon Workshop 	August 2008
<i>Boycotting and Extorting Nodes in an Internetwork</i>	
<ul style="list-style-type: none"> • NetEcon Workshop 	June 2007
<i>Punishment in Selfish Wireless Networks</i>	
<ul style="list-style-type: none"> • NetEcon Workshop 	June 2006

Fair File Swarming with FOX

- IPTPS Workshop
- University of Delaware. Hosted by Paul Amer.

February 2006
September 2005

Professional
Experience

University of Maryland, College Park, MD USA

Assistant Professor

2017 – present

My research focus is on systems and network security. I am also Chair of the Computer Science Undergraduate Honors program. I am affiliated with UMIACS, MC2, and the Maryland-Max-Planck PhD Program.

University of Maryland, College Park, MD USA

Assistant Research Scientist

2012 – 2016

Performed and advised research in a wide range of networked systems and security I also taught undergraduate and graduate courses, typically on computer security. I have served as a co-chair of the Computer Science Undergraduate Honors program since Fall 2015.

Hewlett Packard Labs, Palo Alto, California USA

Researcher

2010 – 2012

Worked in the Social Computing Group with Bernardo Huberman, with a focus on building systems that allow users to share network resources while addressing incentives, security, and usability concerns.

Microsoft Research, Redmond, Washington USA

Researcher; Summer Intern

2008 – 2009

Worked in the Distributed Systems and Security group with John Douceur, Jacob Lorch, James Mickens, and Thomas Moscibroda on the design of secure and incentive-compatible protocols. The two summers resulted in a best paper at NSDI 2009 and a submission to NSDI 2010.

Hewlett Packard Labs, Palo Alto, California USA

Researcher; Summer Intern

2006

Worked in Bernardo Huberman's Information Dynamics Lab. Worked closely with Kevin Lai on a source-initiated multicast protocol. Collaborated with other researchers on topics ranging from social networking to decentralized digital markets.

Space/Ground System Solutions, La Plata, Maryland USA

Software Engineer

2002 – 2003

Designed, developed, and supported application-level device drivers in C. Ported some of the code from legacy Fortran on a VAX.

TIPS Technology, Crofton, Maryland USA

Software Developer

2001

Designed, developed, and supported myriad web-based applications in Perl, MySQL, and Java.

Motorola, Arlington Heights, Illinois USA

Software Engineer; Summer Intern

1999 – 2000

Aided in design, coding, and testing of embedded software responsible for communication between 3G cell phones and base stations.

U.S. Department of Defense, Dahlgren, Virginia USA

Systems Administrator; Summer Intern

1996 – 1998

Administered a lab consisting of SGI, Sun, and Windows machines.