Aviel D. Rubin, Ph.D.

Professor Emeritus, Johns Hopkins University
Chief Scientist & Founder, Harbor Labs

avirubin@gmail.com
https://www.linkedin.com/in/avirubin/

Overview

Avi Rubin is a Computer Scientist with almost a decade of industry experience followed by over 20 years in academia. After receiving his Ph.D. in Computer Science from the University of Michigan in 1994, Dr. Rubin worked as a researcher at Bellcore and then at AT&T Labs. In 2003, he joined the Computer Science faculty at Johns Hopkins University and was promoted to Full Professor with Tenure in 2004. During his over 20 years at Johns Hopkins, Dr. Rubin was Technical Director of the JHU Information Security Institute, along with his regular faculty position. In 2023, he was appointed Computer Science Professor Emeritus at Johns Hopkins and joined Harbor Labs, a company he founded in 2011, as Chief Scientist. Dr. Rubin is a frequent keynote speaker at industry and academic conferences and delivered widely viewed TED talks in 2011 and 2015. He has testified about information and network security before Congress on multiple occasions and frequently testifies as an expert witness in Federal court. His awards include Fulbright Scholar, Baltimorean of the Year, and the EFF Pioneer Award.

Academic Degrees

- 1994, **Ph.D.**, Computer Science and Engineering, University of Michigan, Ann Arbor
- 1991, **M.S.E.**, Computer Science and Engineering, University of Michigan, Ann Arbor
- 1989, **B.S.**, Computer Science (Honors), University of Michigan, Ann Arbor

Academic Appointments

September, 2023 - present
Professor Emeritus, Johns Hopkins University

April, 2004 - August, 2023
Professor (with tenure), Johns Hopkins University

August, 2010 - July, 2011
Visiting Research Professor, Fulbright Scholar, Tel Aviv University, Israel

January, 2003 - April, 2004
Associate Professor, Johns Hopkins University

January, 2003 - August, 2023
Technical Director, Johns Hopkins University Information Security Institute

2006 - 2010
Director and Principal Investigator (PI), NSF ACCURATE Center

1995 - 1999
Adjunct Professor, New York University
Summer, 1999
Visiting Professor, École Normale Supérieure, Paris, France
1988 - 1993
Teaching Assistant, University of Michigan

Doctoral Committees

Doctoral Thesis Advisor: David Inyangson, JHU
Doctoral Thesis Advisor: Logan Kostick, JHU
Doctoral Thesis Advisor: Atheer Almogbil, JHU
Doctoral Thesis Advisor: Tushar Jois, JHU (May, 2023)
Doctoral Thesis Advisor: Random Gwinn, JHU (May, 2022)
Doctoral Thesis Advisor: Karl Siil, JHU (May, 2022)
Doctoral Thesis Advisor: James Cervini, JHU (May, 2022)
Doctoral Thesis Advisor: Jeff Chavis, JHU (May, 2021)
Doctoral Thesis Advisor: Gabe Kaptchuk, JHU (May, 2020)
Dissertation Committee: Thomas Tantillo, JHU (September, 2018)
Doctoral Thesis Advisor: Paul Martin, JHU (February, 2016)
Doctoral Thesis Advisor: Michael Rushanan, JHU (May, 2016)
Doctoral Thesis Advisor: Ayo Akinyele, JHU (December, 2013)
Doctoral Thesis Advisor: Matthew Pagano, JHU (August, 2013)
Doctoral Thesis Advisor: Ryan Gardner, JHU (August, 2009)
Doctoral Thesis Advisor: Sam Small, JHU (May, 2009)
Doctoral Thesis Advisor: Sujata Doshi, JHU (May, 2009)
Doctoral Thesis Advisor: Joshua Mason, JHU (June, 2009).
Dissertation Committee: J. Alex Halderman, Princeton University (May, 2009).
Dissertation Committee: Sophie Qiu (May, 2007).
Doctoral Thesis Advisor: Adam Stubblefield (April, 2005).
Dissertation Committee: Kevin FU, MIT (February, 2005).
Dissertation Committee: Robert Fischer, Harvard University (June, 2003).
Dissertation Committee: Marc Waldman, New York University, (April, 2003).
Dissertation Committee: Patrick McDaniel, U. of Michigan (September, 2001).
Doctoral Thesis Advisor: Fabian Monrose, New York University (April, 1999).
Dissertation Committee: Mike Just, Carleton University (November, 1998).
Dissertation Committee: Trent Jaeger, University of Michigan (October, 1996).

Industry Experience

2011 - present
Harbor Labs, Founder & Chief Scientist
2005 - 2011
Independent Security Evaluators, Founder & President
1997 - 2002
AT&T Labs -- Research, Secure Systems Research Department
1994 - 1996
Bellcore, Cryptography and Network Security Research Group

Summer, 1990

Great Lakes Software Co., Programmer, Howell, MI

Summer, 1989

IBM, Programmer, Meyers Corners Lab, Poughkeepsie, NY

Books

- Aviel D. Rubin, *Brave New Ballot*, Random House, (September, 2006).
- William R. Cheswick, Steven M. Bellovin and Aviel D. Rubin, *Firewalls and Internet Security: Repelling the Wily Hacker (2e)*, Addison Wesley Publishing Company, Inc., (February, 2003).
- **Chapter 4**, *Communications Policy and Information Technology: Promises, Problems, Prospects*, MIT Press, Lorrie Faith Cranor and Shane Mitchell Greenstein, eds., (2002).
- Aviel D. Rubin, *Whitehat Security Arsenal*, Addison Wesley Publishing Company, Inc., (June, 2001).
- **Chapter 8**, Publius and **Chapter 14**, Trust in Distributed Systems, Marc Waldman, Lorrie Faith Cranor, and Aviel D. Rubin, *PeertoPeer*, O'Reilly & Associates, Inc., (February, 2001).
- Aviel D. Rubin, Daniel Geer, Marcus J. Ranum, *Web Security Sourcebook*, John Wiley & Sons, Inc , (June, 1997).
- **Ph.D. dissertation**: *Nonmonotonic Cryptographic Protocols*, University of Michigan, Ann Arbor (April, 1994).

Refereed Journal Publications

- David Kotz, Kevin Fu, Carl Gunter, Avi Rubin, *Security for Mobile and Cloud Frontiers in Healthcare*, Communications of the ACM (July, 2015).
- Ayo Akinyele, Christina Garman, Matthew D. Green, Ian Miers, Matthew Pagano, Aviel D. Rubin, Michael Rushanan, *Charm: A Framework for Rapidly Prototyping Cryptosystems*, Journal of Cryptographic Engineering (JCEN), (January, 2013).
- Ryan Gardner, Sujata Garera, and Aviel D. Rubin, *Detecting Code Alteration by Creating a Temporary Memory Bottleneck*, IEEE Transactions on Information Forensics and Security: Special Issue on Electronic Voting, (December, 2009).
- Matt Blaze, John Ioannidis, Angelos D. Keromytis, Tal Malkin, Avi Rubin, *Anonymity in Wireless Broadcast Networks*, International Journal of Network Security (IJNS), (January, 2008).
- Stephen Bono, Aviel Rubin, Adam Stubblefield, and Matthew Green, *Security Through Legality*, Communications of the ACM (June, 2006).
- Adam Stubblefield, Dan S. Wallach, and Aviel D. Rubin, *Managing the Performance Impact of Web Security*, Electronic Commerce Research Journal, February, 2005.
- David Jefferson, Aviel D. Rubin, Barbara Simons, David Wagner, *Analyzing Internet Voting Security*, Communications of the ACM (October, 2004).
- Simon Byers, Aviel D. Rubin, and David Kormann, *Defending Against an Internet-based Attack on the Physical World*, ACM Transactions on Internet Technology (TOIT), August, 2004.
- Adam Stubblefield, John Ioannidis, and Aviel D. Rubin, *A Key Recovery Attack on the 802.11b Wired Equivalent Privacy Protocol (WEP)* ACM Transactions on Information and System Security, May, 2004.

- Aviel D. Rubin, *Security Considerations for Remote Electronic Voting*, Communications of the ACM (December, 2002).
- Marc Waldman, Aviel D. Rubin, and Lorrie F. Cranor, *The Architecture of Robust Publishing Systems*, ACM Transactions on Internet Technology (TOIT), (November, 2001).
- David P. Kormann and Aviel D. Rubin, *Risks of the Passport Single-Signon Protocol*, Computer Networks, (July, 2000).
- Christian Gilmore, David P. Kormann, and Aviel D. Rubin, *Secure Remote Access to an Internal Web Server*, IEEE Network, (November, 1999).
- Fabian Monrose and Aviel D. Rubin, *Keystroke Dynamics as a Biometric for Authentication,* Future Generation Computer Systems, (March, 2000).
- Michael K. Reiter and Aviel D. Rubin, *Anonymity Loves Company: Anonymous Web Transactions with Crowds*, Communications of the ACM (February, 1999).
- Aviel D. Rubin and Daniel E. Geer, Jr., *Mobile Code Security*, IEEE Internet Computing (November/December, 1998).
- Aviel D. Rubin and Daniel E. Geer, Jr., *A Survey of Web Security*, IEEE Computer, (September, 1998).
- Michael K. Reiter and Aviel D. Rubin, *Crowds: Anonymity for Web Transactions*, ACM Transactions on Information and System Security, (June, 1998).
- Aviel D. Rubin, *An Experience Teaching a Graduate Course in Cryptography*, Cryptologia (April, 1997).
- Aviel D. Rubin, *Extending NCP for public Key Protocols*, Mobile Networks and Applications (ACM/Balzer), 2(3) (April, 1997).
- Aviel D. Rubin, *Independent One-Time Passwords*, USENIX Journal of Computer Systems (February, 1996).
- Aviel D. Rubin, *Secure Distribution of Documents in a Hostile Environment*, Computer Communications (June, 1995).

Refereed Conference Publications

- Tushar Jois, Gabrielle Beck, Sofia Belikovetsky, Joseph Carrigan, Alishah Chator, Logan Kostick, Maximilian Zinkus, Gabriel Kaptchuk, Aviel D. Rubin, *SocIoTy: Practical Cryptography in Smart Home Contexts,* Privacy Enhancing Technologies Symposium 2024 (PETS '24), (July, 2024).
- Samra Kasim, Nawal Valliani, Nelson Ka Ki Wong, Shahin Samadi, Lanier Watkins and Aviel Rubin, *Explainable Autonomic Cybersecurity for Industrial Control Systems*, IEEE 13th Annual Computing and Communication Workshop and Conference (CCWC), (March, 2023).
- Valeti Manoj, Shao Wenda, Niu Sihan, Christopher Rouff, Lanier Watkins, Aviel Rubin, *Cybersecurity as a Tic-Tac-Toe Game Using Autonomous Forwards (Attacking) And Backwards (Defending) Penetration Testing in a Cyber Adversarial Artificial Intelligence System*, IEEE International Conference of Computer Science and Information Technology (ICOSNIKOM),(October, 2022).
- James Cervini & Aviel D. Rubin, *Don't Drink the Cyber: Extrapolating the Possibilities of Oldsmar's Water Treatment Cyberattack*, ICCWS 17th International Conference on Cyber W arfare and Security, (July, 2022).
- Gabriel Kaptchuk, Tushar Jois, Matthew Green, Aviel Rubin, *Make Steganography Great Again — Before It's Too Late*, Real World Crypto 2022, (April, 2022).

- James Cervini, Daniel Muller, Alexander Beall, Joseph Maurio, Aviel Rubin & Lanier Watkins, *A Backfit Approach for Trusted Virtualization-Based Programmable Logic Controller Resilience*, Sixteenth Annual IFIP WG 11.10 International Conference on Critical Infrastructure Protection, (March, 2022).
- Hedin Beattie, Lanier Watkins, William H. Robinson, Aviel Rubin, Shari Watkins, *Measuring and Mitigating Bias in AI-Chatbots*, 2022 IEEE International Conference on Assured Autonomy (ICAA'22), (March, 2022).
- Random Gwinn, Mark Matties, Aviel D. Rubin, *Wavelet Selection and Employment for Side-Channel Disassembly*, IEEE International Conference on Physical Assurance and Inspection of Electronics (PAINE), (December, 2021).
- Karl A Siil , Aviel D. Rubin , Matthew C. Elder, Anton T Dahbura, Matthew Green, Lanier Watkins, *Cost-Effective Mission Assurance Engineering Through Simulation*, The 2021 International Conference on Internet of Things and Intelligence Systems (IoTaIS'21), (November, 2021).
- Gabriel Kaptchuk, Tushar Jois, Matthew Green, Aviel Rubin, *Meteor: Cryptographically Secure Steganography for Realistic Distributions*, 28th ACM Conference on Computer and Communications Security (CCS '21), (November, 2021).
- James Schaffter, Aviel Rubin and Lanier Watkins, *A Containerization-Based Backfit Approach for Industrial Control System Resiliency*, SafeThings '21 Workshop, (May, 2021).
- Tushar Jois, Claudia Moncaliano, Khir Henderson, Aviel D. Rubin, *WDPKR: Wireless Device Profiling Kit and Reconnaissance,* 2021 Hot Topics in the Science of Security (HotSoS) Symposium (April, 2021).
- Lanier Watkins, ChangHao Cho, John Hurley, Aviel D. Rubin, *Collaborative Global Impact Cloud Computing Risk Assessment Framework*, International IoT, Electronics and Mechatronics Conference (IEMTRONICS '21), (April, 2021).
- Jeffrey S. Chavis, Malcom Doster, Michelle Feng, Syeda Zeeshan, Samantha Fu, Elizabeth Aguirre, Antonio Davila, Kofi Nyarko, Aaron Kunz, Tracy Herriotts, Daniel Syed, Lanier Watkins, Anna Buczak, Aviel Rubin, *A Voice Assistant for IoT Cybersecurity*, Integrated STEM Education Conference (ISEC '21), (March, 2021).
- Lanier Watkins, Danzel Hamilton, Kevin Kornegay, Aviel Rubin, *Triaging Autonomous Drone Faults by Simultaneously Assuring Autonomy and Security in Autonomous Drones*, 55th Annual Conference on Information Sciences and Systems (CISS '21), (March, 2021).
- Lanier Watkins, James Ballard, Kevin Hamilton, William H. Robinson, Aviel Rubin, Cleon Davis*, Bio-Inspired, Host-based Firewall* (Refereed WIP paper), 23rd IEEE International Conference on Computational Science and Engineering (CSE), (December, 2020).
- Lanier Watkins, Yue Yu, Sifan Li, William H. Robinson, Aviel D. Rubin, *Using Deep Learning to Identify Security Risks of Personal Mobile Devices in Enterprise Networks*, The 11th IEEE Annual Ubiquitous Computing, Electronics, and Mobile Communications Conference (UEMCON), (October, 2020).
- Lanier Watkins, Kevin D. Fairbanks, Chengyu Li, Mengdi Yang, William H. Robinson, Aviel D. Rubin, *A Black Box Approach to Inferring Characterizing, and Breaking Native Device Tracking Autonomy*, The 11th IEEE Annual Ubiquitous Computing, Electronics, and Mobile Communications Conference (UEMCON), (October, 2020).

- Karl Siil, Aviel Rubin, Matthew Elder, Anton Dahbura, Matthew Green, Lanier Watkins, *Mission Assurance for Autonomous Undersea Vehicles*, IEEE Workshop on Assured Autonomous Systems (WAAS), (May, 2020).
- Jeffrey Chavis, Aaron Kunz, Lanier Watkins, Anna Buczak, Aviel Rubin*, A Capability for Autonomous IoT System Security: Pushing IoT Assurance to the Edge*, IEEE Workshop on Assured Autonomous Systems (WAAS), (May, 2020).
- Lanier Watkins, Shane Sartalamacchia, Richard Bradt, Karan Dhareshwar, Harsimar Bagga, William H. Robinson, Aviel Rubin, *Defending Against Consumer Drone Privacy Attacks: A Blueprint For A Counter Autonomous Drone Tool,* ISOC Workshop on Decentralized IoT Systems and Security (DISS 2020), (February, 2020).
- Adrian Cartagena, Gerald Rimmer, Thomas Van Dalsen, Lanier Watkins, William H. Robinson, Aviel D. Rubin, *Privacy Violating Opensource Intelligence Threat Evaluation Framework: A Security Assessment Framework for Critical Infrastructure Owners*, 10th Annual Computing and Communications Workshop and Conference (IEEE CCWC 2020), (January, 2020).
- Jeffrey Chavis, Lanier Watkins, Anna Buczak, Aviel D. Rubin, *Connected Home Automated Security Monitor (CHASM): Protecting IoT Through Application of Machine Learning*, 10th Annual Computing and Communications Workshop and Conference (IEEE CCWC 2020), (January, 2020).
- Lanier Watkins, Shreya Aggarwal, Omotola Akeredolu, William H. Robinson and Aviel D. Rubin, *Tattle Tail Security: An Intrusion Detection System for Medical Body Area Networks*, Workshop on Decentralized IoT Systems and Security (DISS '19), (February, 2019).
- Lanier Watkins, Juan Ramon, Gaetano Snow, Jessica Vallejo, William H. Robinson, Aviel D. Rubin, Joshua Ciocco, Felix Jedrzejewski, Jinglun Liu, Chengyu Li, *Exploiting Multi-Vendor Vulnerabilities as BackDoors to Counter the Threat of Rogue Small Unmanned Aerial Systems*, ACM Workshop on Mobile IoT Sensing, Security, and Privacy (Mobile IoT SSP '18), (June, 2018).
- Paul D. Martin, David Russel, Malek Ben Salem, Stephen Checkoway, Aviel D. Rubin, *Sentinel: Secure Mode Profiling and Enforcement for Embedded Systems*, Proc. ACM/IEEE International Conference on Internet-of-Things Design and Implementation, (April, 2018).
- Gabriel Kaptchuk, Matthew D. Green and Aviel D. Rubin, *Outsourcing Medical Dataset Analysis: A Possible Solution*, Financial Cryptography Conference, (April, 2017).
- Michael Rushanan, David Russell and Aviel D. Rubin, *Mallory-Worker: Stealthy Computation and Covert Channels using Web Workers*, Proceedings of the 12th International Workshop on Security and Trust Management, (September, 2016).
- Paul Martin, Michael Rushanan, Thomas Tantillo, Christoph Lehmann and Aviel Rubin, *Applications of Secure Location Sensing in Healthcare*, Proceedings of the 7th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics, (October, 2016).
- Gabriel Kaptchuk and Aviel D. Rubin, *A Practical Implementation of a Multi-Device Split Application for Protecting Online Poker*, Proceedings of the 15th Annual Security Conference, (March, 2016).

- Aviel D. Rubin, *Taking Two-Factor to the Next Level: Protecting Online Poker, Banking, Healthcare and Other Applications*, Proceedings of the 2014 Annual Computer Security Applications Conference, Invited Keynote Essay, (December, 2014).
- Michael Rushanan, Aviel D. Rubin, Denis Foo Kune, Colleen M. Swanson, *Security and Privacy in Implantable Medical Devices and Body Area Networks*, IEEE Symposium on Security and Privacy-SoK Track (May, 2014).
- Christina Garman, Matthew Green, Ian Miers, Aviel D. Rubin, *Rational Zero: Economic Security for Zerocoin with Everlasting Anonymity*, 1st Workshop on Bitcoin Research (March, 2014).
- Paul Martin, Aviel Rubin and Rafae Bhatti, *Enforcing Minimum Necessary Access in Healthcare Through Integrated Audit and Access Control*, Health Informatics Symposium at the ACM Conference on Bioinformatics, Computational Biology, and Biomedical Informatics, (September, 2013).
- Ian M. Miers, Christina Garman, Matthew D. Green, Aviel D. Rubin, *Zerocoin: Anonymous Distributed e-Cash from Bitcoin*, Proc. IEEE Symposium on Security and Privacy (May, 2013).
- Ian M. Miers, Matthew D. Green, Christoph U. Lehmann, Aviel D. Rubin, *Vis-à-Vis Cryptography: Private and Trustworthy In-Person Certifications*, In Proceedings of the 3rd USENIX/HealthSec Workshop, (August, 2012).
- Joseph A. Akinyele, Matthew W. Pagano, Matthew D. Green, Christoph U. Lehmann, Zachary N. J. Peterson and Aviel D. Rubin, *Securing Electronic Medical Records Using Attribute-Based Encryption On Mobile Devices*, ACM CCS Workshop on Security and Privacy in Smartphones and Mobile Devices, (October, 2011).
- Matthew D. Green, Aviel D. Rubin, *A Research Roadmap for Healthcare IT Security inspired by the PCAST Health Information Technology Report 4-page Extended Abstract*, In Proceedings of the 2nd USENIX/HealthSec Workshop, (August, 2011).
- Ryan Gardner, Sujata Garera, Aviel D. Rubin, *Designing for Audit: A Voting Machine with a Tiny TCB*, Financial Cryptography Conference, (January, 2010).
- Ryan Gardner, Sujata Garera, Matthew W. Pagano, Matthew D. Green, Aviel D. Rubin, *Securing Medical Records on Smart Phones*, Workshop on Security and Privacy in Medical and Home-Care Systems, (November, 2009).
- Ryan Gardner, Sujata Garera, Aviel D. Rubin, *Coercion Resistant End-to-end Voting*, Financial Cryptography Conference, (February, 2009).
- Ryan Gardner, Sujata Garera, Anand Rajan, Carols Rozas, Aviel D. Rubin, Manoj Sastry, *Protecting Patient Records from Unwarranted Access*, Future of Trust in Computing, (July, 2008).
- Sujata Garera, Niels Provos, Monica Chew and Aviel D. Rubin, *A Framework for Detection and Measurement of Phishing Attacks*, 5th ACM Workshop on Recurring Malcode (WORM '07), (November, 2007).
- Sujata Garera and Aviel D. Rubin*, An Independent Audit Framework for Software Dependent Voting Systems*, 14th ACM Conference on Computer and Communications Security, (November, 2007).
- Ryan Gardner, Sujata Garera, and Aviel D. Rubin, *On the Difficulty of Validating Voting Machine Software with Software*, In Proceedings of the 2nd USENIX/ACCURATE Electronic Voting Technology Workshop (EVT '07), (August, 2007).

- Sujata Doshi, Fabian Monrose, and Aviel D. Rubin, *Efficient Memory Bound Puzzles using Pattern Databases*, 4th International Conference on Applied Cryptography and Network Security (ACNS'06), (June, 2006).
- Sophie Qiu, Patrick McDaniel, Fabian Monrose, and Aviel Rubin, *Characterizing Address Use Structure and Stability of Origin Advertisement in Interdomain Routing*, 11th IEEE Symposium on Computers and Communications, (June 2006).
- Zachary Peterson, Randal Burns, Joseph Herring, Adam Stubblefield, and Aviel D. Rubin, *Secure Deletion for a Versioning Filesystem*, Proc. USENIX Conference on File and Storage Technologies (FAST '05), (December, 2005).
- Stephen C. Bono, Matthew Green, Adam Stubblefield, Ari Juels, Aviel D. Rubin, Michael Szydlo, *Security Analysis of a Cryptographically-Enabled RFID Device,* 14th USENIX Security Symposium, (August, 2005).
- Tadayoshi Kohno, Adam Stubblefield, Aviel D. Rubin, and Dan S. Wallach, *Analysis of an Electronic Voting System*, Proc. IEEE Symposium on Security and Privacy (May, 2004).
- Nathanael Paul, David Evans, Aviel D. Rubin and Dan Wallach, *Authentication for Remote Voting*, ACM Workshop on Human-Computer Interaction and Security Systems (April, 2003).
- Matt Blaze, John Ioannidis, Angelos D. Keromytis, Tal Malkin, and Aviel Rubin, *Protocols for Anonymity in Wireless Networks*, Proc. 11th International Workshop on Security Protocols (April, 2003).
- Geoffrey Goodell, William Aiello, Timothy Griffin, John Ioannidis, Patrick McDaniel, Aviel Rubin, *Working Around BGP: An Incremental Approach to Improving Security and Accuracy of Interdomain Routing*, Proc. ISOC Symposium on Network and Distributed System Security (February, 2003).
- Simon Byers, Aviel D. Rubin, David Kormann, *Defending Against an Internet-based Attack on the Physical World*, ACM Workshop on Privacy in the Electronic Society (November, 2002).
- Adam Stubblefield, John Ioannidis, and Aviel D. Rubin, *Using the Fluhrer, Mantin, and Shamir Attack to Break WEP*, Proc. ISOC Symposium on Network and Distributed System Security (February, 2002).
- Aviel D. Rubin, *Security Considerations for Remote Electronic Voting*, 29th Research Conference on Communication, Information and Internet Policy (TPRC2001), (October, 2001).
- Aviel D. Rubin and Rebecca N. Wright, *Offline generation of limited-use credit card numbers*, Financial Cryptography Conference, (February, 2001).
- Marc Waldman, Aviel D. Rubin, and Lorrie F. Cranor, *Publius, A robust, tamper-evident and censorship-resistant web publishing system*, 9th USENIX Security Symposium, (August, 2000).
- David P. Kormann and Aviel D. Rubin, *Risks of the Passport Single Sign-on Protocol*, 9th International World Wide Web Conference, (May, 2000).
- Patrick McDaniel and Aviel D. Rubin, *A Response to "Can we Eliminate Certificate Revocation Lists?"*, Financial Cryptography Conference, (February, 2000).
- William A. Aiello, Aviel D. Rubin, and Martin J. Strauss, *Using smartcards to secure a personalized gambling device,* 6th ACM Conference on Computer and Communications Security, (November, 1999).

- Ian Jermyn, Alain Mayer, Fabian Monrose, Michael K. Reiter, and Aviel D. Rubin, *The Design and Analysis of Graphical Passwords*, 8th USENIX Security Symposium, (August, 1999).
- Christian Gilmore, David Kormann, and Aviel D. Rubin, *Secure Remote Access to an Internal Web Server*, Proc. ISOC Symposium on Network and Distributed System Security (February, 1999).
- Fabian Monrose, Peter Wykoff, and Aviel D. Rubin, *Distributed Execution with Remote Audit*, Proc. ISOC Symposium on Network and Distributed System Security (February, 1999).
- Dahlia Malkhi, Michael K. Reiter and Aviel D. Rubin, *Secure Execution of Java Applets using a Remote Playground,* Proc. IEEE Symposium on Security and Privacy (May, 1998).
- Aviel D. Rubin, Dan Boneh, and Kevin Fu, *Revocation of Unread Email in an Untrusted Network*, Second Australasian Conference on Information Security and Privacy (July, 1997).
- Fabian Monrose and Aviel D. Rubin, *Authentication via Keystroke Dynamics*, 4th ACM Conference on Computer and Communications Security (April, 1997).
- David M. Martin, Siviramakrishnan Rajagopalan, and Aviel D. Rubin, *Blocking Java Applets at the Firewall*, Proc. ISOC Symposium on Network and Distributed System Security (February, 1997).
- Trent Jaeger, Aviel D. Rubin and Atul Prakash, *A System Architecture for Flexible Control of Downloaded Executable Content*, 5th International Workshop on Object-Orientation in Operating Systems (October, 1996).
- Trent Jaeger, Aviel D. Rubin and Atul Prakash, *Building Systems that Flexibly Control Downloaded Executable Content,* Proc. 6th USENIX Security Symposium (July, 1996).
- Victor Shoup and Aviel D. Rubin, *Session Key Distribution Using Smart Cards*, Proc. of Eurocrypt '96 (May, 1996).
- Trent Jaeger & Aviel D. Rubin, *Preserving Integrity in Remote File Location and Retrieval*, Proc. ISOC Symposium on Network and Distributed System Security (February, 1996).
- Aviel D. Rubin, *Extending NCP for Public Key Protocols*, Proc. IEEE 4th International Conference on Computer Communications and Networks (September, 1995).
- Aviel D. Rubin*, PseudoRandom Functions for OneTime Passwords*, Proc. 5th USENIX UNIX Security Symposium (June, 1995).
- Aviel D. Rubin, *Trusted Distribution of Software Over the Internet*, Proc. ISOC Symposium on Network and Distributed System Security (February, 1995).
- Aviel D. Rubin & Peter Honeyman, *Nonmonotonic Cryptographic Protocols*, Proc. IEEE Computer Security Foundations Workshop VII (June, 1994).
- Aviel D. Rubin & Peter Honeyman, *Long Running Jobs in an Authenticated Environment*, Proc. 4th USENIX UNIX Security Symposium (October, 1993).

Patents

- Aviel D. Rubin, "Broadband Certified Mail", **US Patent Numbers 6,990,581**, (January 24, 2006) and 9,876,769, (January 23, 2018).
- Aviel D. Rubin, Utilization of multiple devices to secure online transactions, **US Patent Number 9,064,376**, (June 23, 2015).

- Steven M. Bellovin, Thomas J. Killian, Bruce LaRose, Aviel D. Rubin, Norman L. Schryer, Method and apparatus for connection to virtual private networks for secure transactions, **US Patent Numbers 8,239,531**, (August 7, 2012) and **8,676,916** (March 18, 2014).
- Christian A. Gilmore, David P. Kormann, and Aviel D. Rubin, Method and apparatus for secure remote access to an internal web server, **US Patent Number 7,334,126**, (February 19, 2008).
- Aviel D. Rubin, "Method for secure remote backup", **US Patent Number 7,222,233**, (May 22, 2007).
- Frederick Douglis, Michael Rabinovich, Aviel D. Rubin, and Oliver Spatscheck, "Method for content distribution in a network supporting a security protocol", **US Patent Number 7,149,803**, (December 12, 2006).
- William A. Aiello, Steven M. Bellovin, Charles Robert Kalmanek, Jr., William T Marshal, and Aviel D. Rubin, "Method and apparatus for enhanced security in a broadband telephony network", **US Patent Number 7,035,410**, (April 25, 2006).
- William A. Aiello, Aviel D. Rubin, and Martin J. Strauss, "Using smartcards to enable probabilistic transaction on an untrusted device", **US Patent Number 6,496,808**, (December 17, 2002).
- Aviel D. Rubin and Victor J. Shoup, "Session Key Distribution Using Smart Cards", **US Patent Number 5,809,140**, (September 15, 1998).
- Aviel D. Rubin, "Method for the Secure Distribution of Electronic Files in a Distributed Environment", **US Patent Number 5,638,446**, (June 10, 1997).

Professional Activities

Board of Directors

Director, Maryland Israel Development Center (MIDC), (2013-2018).
Director, USENIX Organization, elected by popular vote (2000-2004).

Editorial and Committees

Chair: IEEE Security & Privacy Symposium Test of Time Awards Committee for 2008-2010 Conferences, May, 2020.
Associate Editor: IEEE Transactions on Information Forensics and Security (2009 - 2011).
Associate Editor: Communications of the ACM (CACM), 2009 - 2017.
Guest Co-Editor: IEEE Transactions on Information Forensics and Security: Special Issue on Electronic Voting, December 1, 2009.
Guest Co-Editor: IEEE Security & Privacy Magazine, Special Issue on Electronic Voting, October/November, 2007.
Associate Editor: IEEE Transactions on Software Engineering (20052006). Editorial and
Advisory Board: International Journal of Information and Computer Security (IJICS) (2004 - 2006).
Guest Co-Editor: IEEE Computer Networks, Special Issue on Web Security, January, 2005.
Editorial Board: Journal of Privacy Technology (20042006).
Guest Co-Editor: IEEE Security & Privacy Magazine, Special Issue on Electronic Voting Security, January/February, 2004.
Member: Security Peer Review Group (SPRG) of the Federal Voting Assistance Program's (FVAP) Secure Electronic Registration and Voting Experiment (SERVE) Project, 2003 - 2004.
Member: DARPA Information Science And Technology Study Group (2003 - 2006).

Associate Editor: IEEE Security & Privacy Magazine (2003 - 2011).
Guest Editor: Communications of the ACM, Special Issue on Wireless Networking Security, May, 2003.
Associate Editor: ACM Transactions on Internet Technology (20022005).
Executive Committee Member: DIMACS Workshop Series with Special Focus on Network Security (2002 - 2004).
Advisory Board Member: Information Security and Cryptography Book Series, Springer, 2001- 2006.
Member: Steering Group, ISOC Symposium on Network and Distributed System Security, 2001 - 2004.
Member: Government Infosec Science and Technology Study Group on malicious code, 1999 - 2000.
Member: AT&T Internet Intellectual Property Review Team, 1999 - 2001. Associate Editor: Electronic Commerce Research Journal, Baltzer Science Publishers, 1999 - 2002.
CoEditor: Electronic Newsletter of the IEEE Technical Committee on Security & Privacy, with Paul Syverson, 1998.
Editorial Board: Bellcore Security Update Newsletter, 1995 - 1996.

Conference Committees

- **Program Committee member:** NDSS Workshop: Innovative Secure IT Technologies Against COVID19, San Diego, CA, February, 2020.
- **Program Committee member:** Financial Cryptography '15 Barbados, February, 2015.
- **Program Committee member:** USENIX HealthTech Workshop on Health Information Technologies (HealthTech ’15), August 11, 2015.
- **Program Co-chair:** (w/Eugene Vasserman) USENIX HealthTech Workshop on Health Information Technologies (HealthTech ’14), August 19, 2014.
- **Program committee member**: 2nd USENIX Workshop on Health Security & Privacy (HealthSec ’11), August 9, 2011.
- **Program Co-chair**: (w/Kevin Fu & Yoshi Kohno), 1st USENIX Workshop on Health Security and Privacy (HealthSec '10), August 10, 2010.
- **Program Committee member:** First Security and Privacy in Medical and HomeCare Systems Workshop (SPIMACS), Chicago, IL, November 13, 2009.
- **Invited Talks Co-Coordinator**: 17th USENIX Security Symposium, San Jose, CA, July 28 August 1, 2008.
- **Program Co-chair**: (w/Patrick McDaniel): IEEE Symposium on Security and Privacy, Oakland, California, May 1822, 2008.
- Program Co-chair: (w/Giovani Di Crescenzo): Financial Cryptography '06 Anguilla BWI, February, 2006.
- **Program Committee member**: IEEE Symposium on Security and Privacy, Oakland, California, May 9-12, 2004.
- **Program Committee member**: Financial Cryptography '04 Key West, Florida, February 9-12, 2004.
- **Program Committee member**: 2nd ACM SIGSAC Workshop on Privacy in the Electronic Society Washington D.C., October 30, 2003.
- **Program Committee member**: 10th ACM Conference on Computer and Communications Security, Washington D.C., October 27-30, 2003.

- **Program Committee member**: 8th European Symposium on Research in Computer Science (ESORICS), Norway, October 13-15, 2002.
- **Program Vice Chair**: Security and Privacy Track, The Twelfth International World Wide Web Conference, Budapest, Hungary, May 2024, 2003.
- **Program Committee member**: IEEE Symposium on Security and Privacy, Oakland, California, May 1114, 2003.
- **Program Committee member**: Workshop on Security and Assurance in Ad hoc Networks, Orlando, FL, January 28, 2003.
- **Program Committee member**: 4th International Conference on Information and Communications Security (ICICS), Kent Ridge Digital Labs (KRDL), Singapore December 912, 2002.
- **Program Committee member**: ACM SIGSAC Workshop on Privacy in the Electronic Society Washington D.C., November 21, 2002.
- **Program Committee member**: 9th ACM Conference on Computer and Communications Security, Washington D.C., November 1721, 2002.
- **Program Committee member**: 5th International Conference on Electronic Commerce Research (ICECR5), Montreal, Canada, October 2327, 2002.
- **Program Committee member**: 2nd Symposium on Requirements Engineering for Information Security (SREIS), Raleigh, North Carolina, Oct 1415, 2002.
- **Program Committee member**: 7th European Symposium on Research in Computer Science (ESORICS), Zurich, Switzerland, October 1416, 2002.
- **Program Committee member**: 11th USENIX Security Symposium, San Francisco, Ca, August 59, 2002.
- **Program Committee member**: International Workshop on Global and Peer-to-Peer Computing at IEEE International Symposium on Cluster Computing and the Grid (CCGrid'2002), Berlin, Germany, May 2124, 2002.
- **Program Committee member**: 11th International World Wide Web Conference Honolulu, Hawaii, May 711, 2002.
- **Program Committee member**: 2nd Workshop on Privacy Enhancing Technologies San Francisco, CA, April 1415, 2002.
- **Program Committee member**: The 1st International Workshop on PeertoPeer Systems (IPTPS'02) MIT Faculty Club, Cambridge, MA, March 78, 2002.
- **Program Committee member**: The 4th International Conference on Telecommunications and Electronic Commerce Dallas, TX, November, 2001. Program Committee member: 10th USENIX Security Symposium, Washington D.C., August 1317, 2001.
- **Program Committee member**: Financial Cryptography '01 Grand Cayman, Cayman Islands, BWI, February, 2001.
- **Program Co-chair**: (w/Paul Van Oorschot): ISOC Symposium on Network and Distributed System Security, San Diego, CA, February 79, 2001.
- **Program Committee member**: The 3rd International Conference on Telecommunications and Electronic Commerce Dallas, TX, November 1619, 2000. Program Committee member: 9th USENIX Security Symposium, Denver, Colorado, August 1417, 2000.
- **Program Committee member**: Workshop on Design Issues in Anonymity and Unobservability Berkeley, California, July 2526, 2000.
- **Program Committee member**: Performance and Architecture of Web Servers (PAWS), Santa Clara, CA, June 18, 2000.

- **Program Co-chair**: (w/Gene Tsudik): ISOC Symposium on Network and Distributed System Security, San Diego, CA, February 24, 2000.
- **Program Committee member**: 1999 International Information Security Workshop (ISW'99), Kuala Lumpur, Malaysia, November 67, 1999.
- **Program Committee member**: 2nd Int'l. Conference on Telecommunications and Electronic Commerce, Nashville, TN, October 68, 1999.
- **Invited Talks coordinator**: 8th USENIX Security Symposium, Washington D.C., August, 1999.
- **Program Chair**: 24th USENIX Annual Technical Conference, Monterey, CA, June 711, 1999.
- **Program Committee member**: 8th International World Wide Web Conference , Toronto, Canada, May 1114, 1999.
- **Program Committee member**: 3rd USENIX workshop on Electronic Commerce , Boston, MA, August 31 September 3, 1998.
- **Program Committee member**: 5th ACM Conference on Computer and Communications Security, San Francisco, CA, November 35, 1998.
- **Program Chair**: 7th USENIX Security Symposium, San Antonio, TX, Jan. 2629, 1998.
- **Program Committee member**: 4th ACM Conference on Computer and Communications Security, Zurich, Switzerland, April 24, 1997.
- **Program Committee member**: 6th USENIX Security Symposium, San Jose, CA, July 2225, 1996.
- **Program Committee member**: ISOC Symposium on Network and Distributed System Security, San Diego, CA, February 2223, 1996.

Panels

- **Panelist:** CyberTech Global Conference: The Post-COVID Cyber Challenges in the Health Sector, UAE-Dubai (April 6, 2021).
- **Panel Organizer and Moderator**: USENIX Security Conference: The 2020 Election: Remote Voting, Disinformation, and Audit (August 12, 2020).
- **Panelist:** Cardozo Society Associated panel: Cybersecurity and Privacy Law in the Digital Era, Baltimore, MD (February 19, 2020).
- **Panelist**: Washington Post panel: Hacking Health, Washington DC (June 14, 2016).
- **Panelist**: Financial Cryptography Conference, Security & Privacy, Barbados (February 24, 2016).
- **Panelist**: RSA Conference, Social Networks Security Panel, San Francisco, CA (April 21, 2015).
- **Panelist**: Expert Witness in Mock Trial: FTC Data Security, 63rd American Bar Association Section of Antitrust Law Spring Meeting Washington DC, (April 15, 2015).
- **Panelist**: Security in Electronic Medical Records Databases, Medicine 2.0 Workshop, Haifa, Israel, (April 7, 2011).
- **Panelist**: Security in the Cloud, Workshop on Cloud Security, Israeli Defense Ministry, Tel Aviv, Israel, (February 15, 2011).
- **Panelist**: Securing Information Technology in Healthcare (SITH), Security and Usability of Electronic Health Records, Dartmouth College, NH, (May 17, 2010).
- **Panelist**: First Security and Privacy in Medical and HomeCare Systems Workshop (SPIMACS), Authentication in iHealthcare, Chicago, IL, (November 13, 2009).

- **Panelist**: Computers, Freedom, and Privacy Conference, Internet Voting for Overseas Americans, Washington DC, (June 4, 2009).
- **Panelist**: Workshop on Electronic Voting, Electronic Voting: Future Aspirations, Tel Aviv, Israel (May 18, 2009).
- **Panelist**: RSA Conference, Exploiting Online Games, San Francisco, CA (April 23, 2009).
- **Panelist**: American Association for the Advancement of Science, Revisiting the U.S. Voting System: A Research Inventory, Technology, Usability, and Security panel, Washington DC, (November 27, 2006).
- **Panelist**: California Secretary of State's Voting System Testing Summit, Security Panel, Sacramento, CA, (November 2829, 2005).
- **Panelist**: NIST Symposium on Voting System Threats, Configuration and Usability Threats, Gaithersburg, MD, (October 7, 2005).
- **Panelist**: Conference of State Supreme Court Chief Justices, Voting Technologies, Charleston, SC (August 1, 2005).
- **Panelist**: Workshop on observation of automated elections, The Carter Center, Atlanta, GA (March 18, 2005).
- **Panelist**: The Carter Center Venezuela Virtual Panel, (November, 2004).
- **Panelist**: Workshop on Voting, Vote Capture and Vote Counting, Harvard Kennedy School of Government, The Technologies of Voting, Cambridge, MA (June 1, 2004).
- **Panelist**: Computer Science and Telecommunications Board of The National Academy of Science Workshop on Dependable Software Systems, Case Study: Electronic Voting Washington D.C. (April 20, 2004).
- **Panelist**: USENIX Security 2003, Electronic Voting, Washington D.C. (August 6, 2003).
- **Panelist**: Democracy Now, 2003, Voter-Verifiable Elections: How Do We Get There?, Washington D.C. (November 23, 2003).
- **Panelist**: USENIX Security 2003, Electronic Voting, Washington D.C. (August 6, 2003).
- **Panelist**: IEEE Infocom 2002, Securing Wireless and Mobile Networks, Is It Possible?, New York City (June 25, 2002).
- **Participant**: 2002 Security Visionary Roundtable: A Roadmap for a Safer Wireless World, Washington D.C., (May 5-7, 2002).
- **Panelist**: Computers Freedom and Privacy 2002, Who Goes There? Privacy in Identity and Location Services, San Francisco (April 18, 2002).
- **Panel moderator**: Conference on Democracy and the Internet in an Enlarging Europe Overview of On-Line Voting: Systems and Issues, New York, NY (March, 2001).
- **Panelist**: Financial Cryptography 2001, The Business of Electronic Voting, Grand Cayman (February, 2001).
- Panelist: National Science Foundation E-voting workshop, Washington, D.C., (October, 2000).
- **Panelist**: 5th ACM Conference on Computer and Communications Security, Anonymity on the Internet, San Francisco, CA, (November, 1998).
- **Panelist**: Open Systems Security and ISSA Annual Conference, Securing the Web, Orlando, FL (March, 1998).
- **Panel organizer and moderator**: Implementation Issues for Electronic Commerce: What Every Developer Should Know. ISOC Symposium on Network and Distributed System Security, (March, 1998).

- **Panel organizer and moderator**: Downloadable Executable Content Past, Present and Future. ISOC Symposium on Network and Distributed System Security (February, 1997).
- **Panelist**: DIMACS Workshop on Network Threats, Web/Java Security Issues, New Brunswick, NJ (December 5, 1996).

Testimony

Before Government Bodies

- United Stated House Committee on Administration, Full Committee Hearing, Exploring the Feasibility and Security of Technology to Conduct Remote Voting in the House, Live via WebEx, (July 17, 2020).
- Maryland House, Expert Testimony, Hearing on HB 888, Consumer Protection, Security Features for Connected Devices, Economic Matters Committee, Annapolis, MD, (February 26, 2020).
- Maryland Senate, Expert Testimony, Hearing on SB 443 Security Features for Connected Devices, Finance Committee, Annapolis, MD, (February 19, 2020).
- Maryland Senate, Expert Testimony, Hearing on SB 553/HB 1276 Security Features for Connected Devices, Finance Committee, Annapolis, MD, (February 26, 2019). United States Pentagon, High Level Security Briefing on the Security of Embedded Devices (January 15, 2014).
- United Stated House Committee on Science, Space, and Technology, Full Committee Hearing Is My Data on Healthcare.gov Secure?, Washington, D.C., (November 19, 2013).
- United Stated House Committee on Oversight and Government Reform, hearing on electronic voting, Washington, D.C., (April 18, 2007).
- United Stated House Committee on Appropriations, hearing on ensuring the integrity of elections, Washington, D.C., (March 7, 2007).
- Maryland Senate Committee on Education, Health, and Environmental Affairs, Expert Testimony, Hearing on Senate Bill 392 for VoterVerified Records in Voting Systems, Annapolis, MD, (February 22, 2007).
- Maryland House Ways and Means Committee, Expert Testimony, Hearing on House Bill 18 for improving voting systems in Maryland, Annapolis, MD, (February 1, 2007).
- Maryland House Ways and Means Committee, Expert Testimony, Hearing on House Bill 244 requiring a voter verified paper record for voting machines in Maryland, Annapolis, MD, (February 1, 2006).
- United States Election Assistance Commission, Hearing on Voluntary Voting Systems Guidelines, Expert Testimony, Panel on Voter Verified Paper Audit Trail, Washington D.C. (June 30, 2005).
- Senate hearing: Voting in 2004: A Report to the Nation on America's Election Process, Expert Testimony, Absentee Ballot Panel, Dirksen Senate Office Building, Washington, DC (December 7, 2004).
- United States Election Assistance Commission, Technical Guidelines Development Committee, Technology Panel, Expert Testimony, Public Hearings on Computer Security and Transparency, National Institute of Standards and Technology, Gaithersburg, MD, (September 20, 2004).

- United States House Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census, Expert Testimony, Hearing on Electronic Voting, Washington, D.C. (July 20, 2004).
- United States House Committee on House Administration, Expert Testimony, Hearing on Security of Electronic Voting, Washington, D.C. (July 7, 2004).
- United States Federal Trade Commission, Written Expert Testimony, on a proposed Do Not Email Repository, (May 10, 2004).
- United States Election Assistance Commission, Expert Testimony, Hearing on Electronic Voting Security, Technology Panel, Washington D.C. (May 5, 2004).

As an Expert in Litigation

- **Milliman, Inc** and Vigilytics LLC, vs. Gradient A.I. Corp., Case # 1:21-cv-10865-NMG; K&L Gates, United States District Court, District of Massachusetts. (Patent Claim Construction, Patent Infringement, Patent Validity, Trade Secret)
  - Expert Testimony at deposition, Annapolis, MD (November 27, 2023).
  - Expert Testimony at deposition, Annapolis, MD (November 17, 2022).
- Microsoft Corporation vs. **Mediapointe, Inc**, Case # 2:22-cv-01009-MCS-MRW; Susman Godfrey, United States District Court, Central District of California. (Patent Infringement & Patent Validity)
  - Expert Testimony at deposition, Annapolis, MD (September 29, 2023).
- Akamai Technologies, Inc vs. **Mediapointe, Inc**, Case # 2:22-cv-06233-MCS-AFM; Susman Godfrey, United States District Court, Central District of California. (Patent Infringement & Patent Validity)
  - Expert Testimony at deposition, Annapolis, MD (September 22, 2023).
- Lauri Valjakka vs. **Netflix Inc**, Case # 4:22-cv-01490-JST, Perkins Coie, United States District Court, Northern District of California. (patent Non-infringement and patent invalidity)
  - Expert Testimony at Deposition, Annapolis, MD (September 8, 2023).
- **TecSec Inc** vs. Oracle, Case # 1:10CV 115 LO-TCB; Hunton & Williams, United States District Court, Eastern District of Virginia. (Patent Infringement, Patent Validity)
  - Expert Testimony at deposition, Annapolis, MD (June 13, 2023).
  - Expert Testimony at deposition, Annapolis, MD (September 11, 2020).
- Global Eticket Exchange Ltd. vs. **TicketMaster LLC**, Case # 6:21-cv-00399-ADA, Fish & Richardson, United States District Court, Western District of Texas. (Patent Non-infringement and validity)
  - Expert Testimony at Trial, Waco, TX (May 3, 2023).
  - Expert Testimony at Deposition, Annapolis, MD (January 31, 2023).
  - Expert Testimony at Deposition, Annapolis, MD (January 16, 2023).
- **Fanduel, Inc** vs. Winview, Inc, IPR 2022-01306, ArentFox Schiff, US Patent Trial and Appeal Board. (Patent Invalidity)
  - Expert Testimony at deposition, Annapolis, MD (April 20, 2023).
- **Fanduel, Inc** vs. Winview, Inc, IPR 2022-01307, ArentFox Schiff, US Patent Trial and Appeal Board. (Patent Invalidity)
  - Expert Testimony at deposition, Annapolis, MD (April 19, 2023).
- **TecSec Inc** vs. Cisco, Case # 1:10-CV 115 LO-TCB; Hunton & Williams, United States District Court, Eastern District of Virginia. (Patent Infringement, Patent Validity)
  - Expert Testimony at deposition, Washington DC (April 12, 2023).

    - Expert Testimony at deposition, Annapolis, MD (September 14, 2020).
- **WSOU Investments, LLC**, vs. Cisco Systems Inc., Case # 6:21-cv-00128-ADA; Susman Godfrey, United States District Court, Western District of Texas. (Patent Infringement & Patent Validity)
    - Expert Testimony at deposition, Annapolis, MD (March 30, 2023).
    - Expert Testimony at deposition, Annapolis, MD (January 18 & 19, 2023).
- Finjan vs. **Palo Alto Networks**, Case # 4:14-CV-04908-PJH, Morrison and Foerster, United States District Court, Northern District of California.
    - Expert Testimony at Deposition, Annapolis, MD (March 17, 2022). (*Patent Non-infringement and invalidity)*
    - Expert Testimony at Deposition, Annapolis, MD (March 15, 2022). *Patent Non-infringement and invalidity)*
    - Expert Testimony at Deposition, Pikesville, MD (August 16, 2021). (*Claim Construction)*
- Centripetal Networks, Inc. vs. **Keysight Technologies, Inc**., Investigation No. 337-TA-1314-MJM, Reed Smith LLP, United States International Trade Commission (ITC). (Patent Non-infringement & Domestic Industry Technical Prong)
    - Expert Testimony at Trial, Washington DC (March 6, 2023).
    - Expert Testimony at Deposition, Las Vegas, NV (December 2, 2022).
- **Proxense, LLC**, vs. Samsung Electronics Co., Case # 6:21-cv-00210ADA; Susman Godfrey, United States District Court, Western District of Texas. (Patent Infringement & Patent Validity)
    - Expert Testimony at deposition, Annapolis, MD (January 12, 2023).
    - Expert Testimony at deposition, Annapolis, MD (September 30, 2022).
    - Expert Testimony at deposition, Annapolis, MD (September 29, 2022).
- **US Dominion, Inc**.. vs. Fox News Network, Case # N21C-03-257-EMD, Susman Godfrey, United States District Court, District of Delaware. (Defamation)
    - Expert Testimony at deposition, Annapolis, MD (January 10, 2022).
- **Rimini Street, Inc**. vs. Oracle International Corporation, et. al., Case # 2:14-CV-01699 LRHCWH, Gibson Dunn, United States District Court, District of Nevada. (Software security)
    - Expert Testimony at trial, Las Vegas, NV (December 9, 2022).
    - Expert Testimony at deposition, Baltimore, MD (August 30, 2018).
- **IOEngine, LLC**, vs. Ingenico Inc., Case # 1:18-cv-826 WCB; Dechert LLP, United States District Court, District of Delaware. (Patent Infringement & Patent Validity)
    - Expert Testimony at trial, Wilmington, DE (July 12 & 14, 2022).
    - Expert Testimony at deposition, Annapolis, MD (January 28, 2022).
    - Expert Testimony at deposition, Bonita Springs, FL (January 19, 2022).
- **WSOU Investments, LLC**, vs. Microsoft Corporation, Case # 6:20-cv-00464-ADA; Susman Godfrey, United States District Court, Western District of Texas. (Patent Infringement and Patent Validity)
    - Expert Testimony at deposition, Annapolis, MD (May 15 & 16, 2022).
- **10Tales Inc.** vs. TikTok PTE. LTD., Case # 4:21-cv-3868-YGR; Cozen O'Connor, United States District Court, Northern District of California. (Patent Claim Construction)
    - Expert Testimony at deposition, Annapolis, MD (May 11, 2022).

- **IOEngine, LLC**, vs. PayPal Holdings, Inc., Case # 1:18-cv-452-WCB; Dechert LLP, United States District Court, District of Delaware. (Patent infringement)
  - Expert Testimony at deposition, Bonita Springs, FL (January 18, 2022).
  - Expert Testimony at deposition, Bonita Springs, FL (January 26, 2022).
- AGIS Software Development LLC vs. **Uber Technologies Inc**., Case # 2:21-cv-00026-JRG-RSP, Gibson Dunn, United States District Court, Eastern District of Texas. (Non-infringement)
  - Expert Testimony at Deposition, Annapolis, MD (December 22, 2021).
- Sable Networks vs. **Splunk Inc.,** Case # 5:21-CV-00040-RWS, Morrison and Foerster, United States District Court, Eastern District of Texas. (Claim Construction)
  - Expert Testimony at Deposition, Annapolis, MD (December 13, 2021).
- Huawei Technologies Co. vs. **Verizon Communications Inc**., Case # 6:20-CV-00090, Quinn Emanuel, United States District Court, Western District of Texas. (Patent Non-infringement and patent invalidity)
  - Expert Testimony at Deposition, Pikesville, MD (July 1, 2021).
- Epic Games, Inv vs. **Apple Inc**., Case # 4:20-cv-05640-YGR-TSH, Gibson Dunn, United States District Court, Northern District of California. (Sherman Act)
  - Expert Testimony at Trial, Oakland, CA (May 2021, 2021).
  - Expert Testimony at Deposition, Pikesville, MD (March 26, 2021).
- Philips North America LLC ; Koninklujke Philips N.V. vs. **Summit Imaging Inc**., Case # 2:19cv01745JLR, Seed IP, United States District Court, Western District of Washington at Seattle. (DMCA and Copyright)
  - Expert Testimony at deposition, Pikesville, MD (March 16, 2021).
- **California Physicians Service, Inc D/B/A Blue Shield of California** vs. Healthplan Services Inc, Case # 3:18-cv-3730 Latham & Watkins, United States District Court, Northern District of California. (Contract Dispute: Software Quality and Security)
  - Expert Testimony at Deposition, Pikesville, MD (March 9, 2021).
- Finjan vs. **Qualys Inc**., Case # 4:18-cv-07229-YGR, Wilson Sonsini, United States District Court, Northern District of California. (patent invalidity and Non-infringement)
  - Expert Testimony at Deposition, Pikesville, MD (March 4, 2021).
- Finjan vs. **Sonicwall Inc**., Case # 5:17-cv-04467-BLF-HRL, Duane Morris, United States District Court, Northern District of California. (patent invalidity and Non-infringement)
  - Expert Testimony at deposition, Pikesville, MD (October 30, 2020).
  - Expert Testimony at deposition, Pikesville, MD (October 29, 2020).
- **Blackberry Limited** vs. Facebook, Inc, Case #2:18-cv-01844 (KSx), Quinn Emanuel Urquhart & Sullivan, LLP, United States District Court, Central District of California. Expert Testimony at Deposition, Baltimore, MD (December 20, 2019). (patent infringement & patent validity)
- **Netfuel, Inc**. vs. Cisco Systems, Inc, Case # 5:18-cv-2352-EJD, Susman Godfrey, United States District Court, Northern District of California.
  - Expert Testimony at Deposition, Baltimore, MD (December 16 & 17, 2019). (patent infringement & patent validity)
  - Expert Testimony at Deposition, Baltimore, MD (June 11, 2019). (patent infringement)

    - Expert Testimony at Markman Hearing, San Jose, CA (February 28, 2019). (courtroom tutorial)
    - Expert Testimony at deposition, Baltimore, MD (December 20, 2018). (claim construction)
- **Symantec Corporation** vs. Zscaler, Inc., Case # 3:17-CV-04414-JST, Baker Botts, United States District Court, Northern District of California.
    - Expert Testimony at Deposition, Baltimore, MD (December 6, 2019). (patent infringement)
    - Expert Testimony at Deposition, Baltimore, MD (August 2, 2019). (Assignor Estoppel)
- Koninklijke Philips vs. **Microsoft Inc**, Case # 4:18-cv-01885-HSG, Perkins Coie, United States District Court, Northern District of California. (patent Non-infringement and patent invalidity)
    - Expert Testimony at Deposition, Baltimore, MD (July 17, 2019).
- **Cypress Lake Software**, Inc. vs. Samsung Electronics & Dell Inc, Case # 6:18-cv-030-JKD and 6:18cv0138JDK, Garteiser Honea, United States District Court, Eastern District of Texas. (patent infringement and patent validity)
    - Expert Testimony at Deposition, Baltimore, MD (July 1011, 2019).
- Finjan vs. **Juniper Networks**, Case # 3:17-cv-05659-WHA , Irell and Manella, United States District Court, Northern District of California.
    - Expert Testimony at deposition, Baltimore, MD (April 2, 2019). (patent Non-infringement)
    - Expert Testimony at deposition, San Francisco, CA (March 9, 2019). (patent Non-infringement)
    - Expert Testimony at trial, San Francisco, CA (December 13, 2018). (patent Non-infringement and invalidity)
    - Expert Testimony at deposition, Baltimore, MD (November 9, 2018). (patent Non-infringement and invalidity)
    - Expert Testimony at deposition, Baltimore, MD (July 6, 2018). (patent Non-infringement)
    - Expert Testimony at deposition, Baltimore, MD (June 12, 2018). (patent Non-infringement)
- Grace et. al. vs. **Apple Inc**., Case # 5:17-CV-00551LHK (NC), Durie Tangri, United States District Court, Northern District of California. (class action)
    - Expert Testimony at deposition, Towson, MD (September 26, 2018).
- Grace et. al. vs. **Apple Inc**., Case # 5:17-CV-00551-LHK (NC), Kirkland & Ellis, United States District Court, Northern District of California. (class certification)
    - Expert Testimony at deposition, Pikesville, MD (July 3, 2018).
- **F5 Networks, Inc**. vs. Radware, LTD., IPR 2017-00124, Perkins Coie, US Patent Trial and Appeal Board. (patent Invalidity)
    - Expert Testimony at deposition, Baltimore, MD (January 24, 2018).
- **Amazon.com Inc., Hulu, LLC, and Netflix, Inc**, vs. Uniloc Luxembourg S.A., IPR 201700948, Perkins Coie, US Patent Trial and Appeal Board. (patent Invalidity)
    - Expert Testimony at deposition, Baltimore, MD (October 9, 2017).
- Phishme, Inc. vs. **Wombat Technologies, Inc,** Case # 16403-LPS-CJB, K&L Gates, United States District Court, Delaware. (patent claim construction)

  - Expert Testimony at deposition, Washington DC, (October 5, 2017).
- Finjan vs. **Symantec Corporation**., Case # 14-cv-02998-HSG, Quinn Emanuel, United States District Court, Northern District of California. (patent invalidity and Non-infringement)
  - Expert Testimony at deposition, Baltimore, MD (September 14-15, 2017).
- **Kudelski SA, Nagra USA, Inc., Nagravision SA, and OpenTV, Inc**. vs. Comcast Corporation, Case # 2:16-cv-1362-JRG, Covington, United States District Court, Eastern District of Texas. (patent claim construction).
  - Expert Testimony at deposition, Baltimore, MD (September 1, 2017).
- **F5 Networks, Inc**. vs. Radware, LTD., IPR 2017-00124, Perkins Coie, US Patent Trial and Appeal Board. (patent Invalidity)
  - Expert Testimony at deposition, Baltimore, MD (August 10, 2017).
- Intellectual Ventures vs. **JP Morgan Chase & Co.**, Case # 1:13-cv-03777, Kirkland & Ellis, United States District Court, Southern District of New York. (Patent Non-infringement).
  - Expert Testimony at deposition, Baltimore, MD (June 1, 2017).
- Nader AsghariKamrani and Kamran AsghariKamrani vs. **United Services Automobile Association**. Case # 2:15-CV-478, Fish & Richardson, United States District Court, Eastern District of Virginia. (Patent Written Description Support related to Inequitable Conduct).
  - Expert Testimony at trial, Norfolk, VA (April 21, 2017).
  - Expert Testimony at deposition, Baltimore, MD (March 21, 2017).
- **Sabre GLBL Inc**, vs. HP Enterprise Services LLC. Case # 1310022761, JAMS Binding Arbitration Hearing, Dallas, TX (Contract dispute).
  - Expert Testimony at arbitration hearing, Dallas, TX (April 5, 2017).
- **Al Cioffi et. al.** vs. Google, Case # 2:13cv103JRGRSP, Vasquez, Benisek & Lindgren, United States District Court, Eastern District of Texas. (patent Infringement).
  - Expert Testimony at trial, Marshall, TX (February 7, 2016).
  - Expert Testimony at deposition, Baltimore, MD (September 26, 2016).
- **Palo Alto Networks** vs. Finjan, IPR 2015-01979, Cooley, US Patent Trial and Appeal Board. (patent Invalidity)
  - Expert Testimony at deposition, Baltimore, MD (November 14, 2016).
- **Palo Alto Networks** vs. Finjan, IPR 2016-00151, Morrison & Foerster, US Patent Trial and Appeal Board. (patent Invalidity)
  - Expert Testimony at deposition, Baltimore, MD (August 19, 2016).
- **Palo Alto Networks** vs. Finjan, IPR 2015-01974, Cooley, US Patent Trial and Appeal Board. (patent Invalidity)
  - Expert Testimony at deposition, Baltimore, MD (August 2, 2016).
- **Palo Alto Networks** vs. Finjan, IPR 2015-02001 & IPR 2016-00157, Cooley, US Patent Trial and Appeal Board. (patent Invalidity)
  - Expert Testimony at deposition, Baltimore, MD (July 26 & 27, 2016).
- **Amazon.com, Inc** vs. Zitovault, LLC, IPR 2016-00021, Perkins Coie, US Patent Trial and Appeal Board. (patent Invalidity)
  - Expert Testimony at deposition, Baltimore, MD (July 22, 2016).
- **Palo Alto Networks** vs. Finjan, IPR 2015-01979, Cooley, US Patent Trial and Appeal Board. (patent Invalidity)

    - Expert Testimony at deposition, Baltimore, MD (May 20, 2016).
- Vir2us Inc. v. **Invincea, Inc. and Invincea Labs, LLC**, Case # 2:15-cv-l62; Cooley, United States District Court, Eastern District of Virginia. (Patent Non-infringement and Invalidity)
    - Expert Testimony at deposition, Reston, VA (April 20, 2016).
- TVIIM. v. **McAfee Inc**., Case # 3:13-cv-04545-VC; Wilmer Hale, United States District Court, District of N. California. (Patent Non-infringement and Invalidity)
    - Expert Testimony at trial, San Francisco, CA (July, 2015).
    - Expert Testimony at deposition, Baltimore, MD (February, 2015).
- Intellectual Ventures vs. **Symantec**, Case # 1:10-cv-01067-LPS; Latham & Watkins, United States District Court, District of Delaware. (Patent Invalidity)
    - Expert Testimony at trial, Wilmington, DE (February, 2015).
    - Expert Testimony at deposition, Baltimore, MD (May, 2013).
- **Rovi Solutions & Veracode** vs. Appthority, Case # 1210487-DPW; Goodwin Procter, United States District Court, District of Massachusetts. (Patent Infringement and Validity)
    - Expert Testimony at trial, Boston, MA (August 11, 2014).
    - Expert Testimony at deposition, Baltimore, MD (April 4, 2014).
- **Juniper** vs. Palo Alto Networks, Case # 1:11-CV-01258-SLR; Irell & Manella, United States District Court, District of Delaware. (Patent Infringement)
    - Expert Testimony at trial, Wilmington, DE (February, 2014).
    - Expert Testimony in court hearing, Wilmington, DE (November 14, 2013).
    - Expert Testimony at deposition, Baltimore, MD (June, 2013).
- Prism Technologies. v. **Adobe Systems Inc.,** Case # 8:10-cv-00220-LEST-DT; DLA Piper, United States District Court, District of Nebraska. (Patent Invalidity)
    - Expert Testimony at deposition, Baltimore, MD (August, 2012).
- Finjan Inc. vs. **McAfee, Inc**., Case # 10593 (GSM), Kirkland & Ellis, United States District Court, District of Delaware. (Patent Non-infringement)
    - Expert Testimony at deposition, Washington, DC (June, 2012).
- Avaya Inc. vs. **Telecom Labs Inc,. TeamTLI.com Corp., and Continuant Technologies**, Case # 3:06-cv-02490 (GEB); K&L Gates, United States District Court, District of New Jersey. (Contract Dispute)
    - Expert Testimony at deposition, Newark, NJ (August, 2011).
- **Lear Automotive** vs. Johnson Controls Inc (JCI), Case # 04-CV-73461; Flachsbart & Greenspoon, United States District Court, Eastern District of Michigan. (Patent Infringement and Validity)
    - Expert Testimony at trial, Detroit, MI (February, 2011).
    - Expert Testimony at deposition, Baltimore, MD (December, 2005).
- **TecSec Inc** vs. International Business Machines Corporation, Case # 1:10-CV-115-LMB/TCB; Hunton & Williams, United States District Court, Eastern District of Virginia. (Patent Infringement)
    - Expert Testimony at deposition, Newark, NJ (November, 2010).
- **Echostar Satellite Corporation** vs. NDS Group, Case # SA-CV-03950-DOC(JTL); T. Wade Welch & Associates, United States District Court, Central District of California. (Copyright and DMCA)
    - Expert Testimony at trial, Santa Ana, CA (April, 2008).

    - Expert Testimony at deposition, Santa Ana, CA (April, 2008).
    - Expert Testimony at deposition, Baltimore, MD (October, 2007).
- **Web.com Inc** vs. The Go Daddy Group Inc., Case # CV-0701552-PHX-MHM; Graves Law Office, United States District Court, Arizona. (Patent Infringement)
    - Expert Testimony at Markman hearing, Phoenix, Az (July, 2008).
    - Expert Testimony at deposition, Baltimore, MD (May, 2008).
- z4 Technologies vs. **Microsoft & Autodesk**, Case # 2:04-CV-00335-LED; Fish & Richardson, United States District Court, Eastern District of Texas. (Patent Non-Infringement and Invalidity)
    - Expert Testimony at trial, Tyler, TX, (April, 2006).
    - Expert Testimony at deposition, Washington DC (January, 2006).
- **Linda Schade** vs. Linda Lamone et. al., Trial on the Legality of Paperless Voting Machines in Maryland. (Adequacy of Voting Equipment)
    - Expert Testimony at trial, Annapolis, MD (August 25, 2004).

Awards

- 2020, **Best Paper Award**, in the category of Mobile & Wireless Computing, 11th IEEE Annual Ubiquitous Computing, Electronics, and Mobile Communications Conference (UEMCON), October, 2020.
- 2020, **Best Paper Award**, in the category of Image Processing & Multimedia Technology, 11th IEEE Annual Ubiquitous Computing, Electronics, and Mobile Communications Conference (UEMCON), October, 2020.
- IEEE Computer Society Technical Committee on Security and Privacy, **Distinguished Service Award**, May, 2020.
- **Fulbright Scholar** in Israel at Tel Aviv University, academic year 2010-2011.
- 2009, **Google Research Award**, Securing Medical Records on Smartphones.
- Chosen as one of **54 favorite people, places and things in Jewish Baltimore**, Baltimore Jewish Times, February 22, 2008.
- 2007 **Award for Outstanding Research in Privacy Enhancing Technologies**, for Security Analysis of a Cryptographically Enabled RFID Device (with Stephen C. Bono, Matthew Green, Ari Juels, Adam Stubblefield, Michael Szydlo).
- 2005 **Best Student Paper Award** at the 14th USENIX Security Symposium, Security Analysis of a CryptographicallyEnabled RFID Device (with Stephen C. Bono, Matthew Green, Ari Juels, Adam Stubblefield, Michael Szydlo).
- 2004 Electronic Frontiers Foundation **Pioneer Award**.
- **Baltimorean of the Year**, Baltimore Magazine, January, 2004.
- 2001 Index on Censorship **Freedom of Expression Award** for the Best Circumvention of Censorship for the Publius project.
- 2000 **Best Paper Award** at the 9th USENIX Security Symposium, A robust, tamper-evident and censorship-resistant web publishing system (with Marc Waldman and Lorrie Cranor).
- 1999 **Best Paper Award & Best Student Paper Award** at the 8th USENIX Security Symposium, The Design and Analysis of Graphical Passwords (with Ian Jermyn, Alain Mayer, Fabian Monrose, and Michael K. Reiter).

- 1996 Coauthor of **Best Student Paper**, Building Systems that Flexibly Control Downloaded Executable Content, at the 6th USENIX UNIX Security Symposium. Student: Trent Jaeger.
- 1992 National Science Foundation **Fellowship Summer Institute in Japan**
- 1986 **Branstrom Prize**, University of Michigan

Technical Advisory Boards

Current Positions

Qualytics: Data Quality Assurance
RunSafe: Binary rewriting to protect software
MarinaLife: Online boat slip bookings

Past Technical Advisory Board Positions with Successful Exits

Arbor Networks: Acquired by Danaher, August, 2010.
Authentica: Acquired by EMC Corporation, March, 2006.
Fortify Software: Acquired by Hewlett Packard, September 2010.
Gilian Technologies: Acquired by Breach Security, Inc, July, 2004.
Hx Technologies: Acquired by MEDecision, May, 2009.
Indigo Security: Acquired by Tablus, February, 2005.
NeoPath Networks: Acquired by Cisco, April, 2007.
Netscaler: Acquired Citrix Systems, August, 2005.
SiteAdvisor: Acquired by McAfee, April, 2006.
Tablus: Acquired by EMC Corporation, August, 2007.
ZeroFox: Public Offering via SPAC, July, 2022.