Avi Rubin's Vita

Academic Degrees

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

Academic Appointments

- April, 2004 - present
  Professor, <u>Johns Hopkins University</u>

1.   -August, 2010 - July, 2011
  Visiting Research Professor, Fulbright Scholar, <u>Tel Aviv University</u>, Israel

- January, 2003 - April, 2004
  Associate Professor, <u>Johns Hopkins University</u>

- January, 2003 - present
  Technical Director, <u>Johns Hopkins University Information Security Institute</u>

- 2006 - 2010
  Director and Principal Investigator (PI), National Science Foundation's <u>ACCURATE Center</u>

- 1995 - 1999

Adjunct Professor, <u>New York University</u>

1. -*Internet and Web Security* Spring, 1999 (with Dave Kormann)
2. -*Privacy in Networks: Attacks and Defenses* Spring, 1998 (with Dave Kormann and Mike Reiter)
3. -*Design and Analysis of Cryptographic Protocols* Fall, 1996 & Spring, 1997 (with Matt Franklin)
4. -*Cryptography and Computer Security* Fall, 1995 & Spring, 1996

- Summer, 1999

Visiting Professor, <u>École Normale Supérieure</u>, Paris, France

- 1988 - 1993

Teaching Assistant, <u>University of Michigan</u>

1. -1993 *Intro. to Cryptography*
2. -1992 *Assembler Language Programming*
3. -1991 *Software Engineering*
4. -1990 *IVHS Seminar*
5. -1989-1990 **Head TA**, *Intro. to Computer Science*
6. -1988-1989 *Intro. to Computer Science*

- **Doctoral Committees**

1. -**Doctoral Thesis Advisor:** Gabe Kaptchuk, JHU
2. -**Doctoral Thesis Advisor:** Tushar Jois, JHU
3. -**Dissertation Committee:** Thomas Tantillo, JHU (September, 2018)
4. -**Doctoral Thesis Advisor:** Paul Martin, JHU (February, 2016)
5. -**Doctoral Thesis Advisor:** Michael Rushanan, JHU (May, 2016)
6. -**Doctoral Thesis Advisor:** Ayo Akinyele, JHU (December, 2013)
7. -**Doctoral Thesis Advisor:** Matthew Pagano, JHU (August, 2013)
8. -**Doctoral Thesis Advisor:** Ryan Gardner, JHU (August, 2009)
9. -**Doctoral Thesis Advisor:** Sam Small, JHU (May, 2009)
10. -**Doctoral Thesis Advisor:** Sujata Doshi, JHU (May, 2009)
11. -**Doctoral Thesis Advisor:** Joshua Mason, JHU (June, 2009).
12. -**Dissertation Committee:** J. Alex Halderman, Princeton University (May, 2009).
13. -**Dissertation Committee:** Sophie Qiu (May, 2007).
14. -**Doctoral Thesis Advisor:** Adam Stubblefield (April, 2005).
15. -**Dissertation Committee:** Kevin FU, MIT (February, 2005).
16. -**Dissertation Committee:** Robert Fischer, Harvard University (June, 2003).
17. -**Dissertation Committee:** Marc Waldman, New York University, (April, 2003).
18. -**Dissertation Committee:** Patrick McDaniel, University of Michigan (September, 2001).
19. -**Doctoral Thesis Advisor:** Fabian Monrose, New York University (April, 1999).

20.   -**Dissertation Committee:** Mike Just, Carleton University (November, 1998).
21.   -**Dissertation Committee:** Trent Jaeger, University of Michigan (October, 1996).

Industry Experience
- 2011 - present
    Harbor Labs, Managing Member
- 2005 - 2011
    Independent Security Evaulators, 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
1.   -Aviel D. Rubin, *Brave New Ballot*, Random House, (September, 2006).
2.   -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).
3.   -**Chapter 4**, *Communications Policy and Information Technology: Promises, Problems, Prospects*, MIT Press, Lorrie Faith Cranor and Shane Mitchell Greenstein, eds., (2002).
4.   -Aviel D. Rubin, *White-hat Security Arsenal*, Addison Wesley Publishing Company, Inc., (June, 2001).
5.   -**Chapter 8**, *Publius* and **Chapter 14**, *Trust in Distributed Systems*, Marc Waldman, Lorrie Faith Cranor, and Aviel D. Rubin, *Peer-to-Peer*, O'Reilly & Associates, Inc., (February, 2001).
6.   -Aviel D. Rubin, Daniel Geer, Marcus J. Ranum, *Web Security Sourcebook*, John Wiley & Sons, Inc , (June, 1997).
7.   -**Ph.D. dissertation:** *Nonmonotonic Cryptographic Protocols* (ps.gz, pdf), University of Michigan, Ann Arbor (April, 1994).

Refereed Journal Publications
1.   -David Kotz, Kevin Fu, Carl Gunter, Avi Rubin, *Security for Mobile and Cloud Frontiers in Healthcare,* Communications of the ACM (July, 2015).
2.   -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).

3. -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).

4. -Matt Blaze, John Ioannidis, Angelos D. Keromytis, Tal Malkin, Avi Rubin, *Anonymity in Wireless Broadcast Networks*, International Journal of Network Security (IJNS), (January, 2008).

5. -Stephen Bono, Aviel Rubin, Adam Stubblefield, and Matthew Green, *Security Through Legality*, Communications of the ACM (June, 2006).

6. -Adam Stubblefield, Dan S. Wallach, and Aviel D. Rubin, *Managing the Performance Impact of Web Security*, Electronic Commerce Research Journal, February, 2005.

7. -David Jefferson, Aviel D. Rubin, Barbara Simons, David Wagner, *Analyzing Internet Voting Security*, Communications of the ACM (October, 2004).

8. -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.

9. -Adam Stubblefield, John Ioannidis, and Aviel D. Rubin, *A Key Recovery Attack on the 802.11b Wired Equivalent Privacy Protocol (WEP)* (pdf), ACM Transactions on Information and System Security, May, 2004.

10. -Aviel D. Rubin, *Security Considerations for Remote Electronic Voting*, Communications of the ACM (December, 2002).

11. -Marc Waldman, Aviel D. Rubin, and Lorrie F. Cranor, *The Architecture of Robust Publishing Systems*, ACM Transactions on Internet Technology (TOIT), (November, 2001).

12. -David P. Kormann and Aviel D. Rubin, *Risks of the Passport Single Signon Protocol,* Computer Networks, (July, 2000).

13. -Christian Gilmore, David P. Kormann, and Aviel D. Rubin, *Secure Remote Access to an Internal Web Server*, IEEE Network, (November, 1999).

14. -Fabian Monrose and Aviel D. Rubin, *Keystroke Dynamics as a Biometric for Authentication*, (pdf) Future Generation Computer Systems, (March, 2000).

15. -Michael K. Reiter and Aviel D. Rubin, *Anonymity Loves Company: Anonymous Web Transactions with Crowds* (ps.gz, pdf) Communications of the ACM (February, 1999).

16. -Aviel D. Rubin and Daniel E. Geer, Jr., *Mobile Code Security* (ps.gz, pdf), IEEE Internet Computing (November/December, 1998).

17. -Aviel D. Rubin and Daniel E. Geer, Jr., *A Survey of Web Security*, IEEE Computer, (September, 1998).

18. -Michael K. Reiter and Aviel D. Rubin, *Crowds: Anonymity for Web Transactions* (ps.gz, pdf), ACM Transactions on Information and System Security, (June, 1998).

19. -Aviel D. Rubin, *An Experience Teaching a Graduate Course in Cryptography* (ps, pdf), Cryptologia (April, 1997).

20. -Aviel D. Rubin, *Extending NCP for public Key Protocols*, Mobile Networks and Applications (ACM/Balzer), 2(3) (April, 1997).

21. -Aviel D. Rubin, *Independent One-Time Passwords*, (ps.gz, pdf) USENIX Journal of Computer Systems (February, 1996).

22.　　-Aviel D. Rubin, *Secure Distribution of Documents in a Hostile Environment*, Computer Communications (June, 1995).

Refereed Conference Publications

1.　　　-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).
2.　　　-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).
3.　　　-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).
4.　　　-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 Confefence (IEEE CCWC 2020), (January, 2020).
5.　　　-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 Confefence (IEEE CCWC 2020), (January, 2020).
6.　　　-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).
7.　　　-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 Back-Doors 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).
8.　　　-Paul D. Martin, David Russel, Malek Ben Salem, Stephen Checkoway, Aviel D. Rubin, S*entinel: Secure Mode Profiling and Enforcement for Embedded Systems*, Proc. ACM/IEEE International Conference on Internet-of-Things Design and Implementation, (April, 2018).
9.　　　-Gabriel Kaptchuk, Matthew D. Green and Aviel D. Rubin, *Outsourcing Medical Dataset Analysis: A Possible Solution*, Financial Cryptography Conference, (April, 2017).
10.　　　-Michael Rushanan, David Russell and Aviel D. Rubin, *MalloryWorker: Stealthy Computation and Covert Channels using Web Workers,* Proceedings of the 12th International Workshop on Security and Trust Management, (September, 2016).
11.　　　-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).

12.   -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).

13.   -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).

14.   -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).

15.   -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).

16.   -Paul Martin, Avi 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).

17.   -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).

18.   -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).

19.   -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).

20.   -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).

21.   -Ryan Gardner, Sujata Garera, Aviel D. Rubin, *Designing for Audit: A Voting Machine with a Tiny TCB*, Financial Cryptography Conference, (January , 2010).

22.   -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).

23.   -Ryan Gardner, Sujata Garera, Aviel D. Rubin, *Coercion Resistant End-to-end Voting*, Financial Cryptography Conference, (February, 2009).

24.   -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).

25.   -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 2007), (November, 2007).

26.   -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).

27.   -Ryan Gardner, Sujata Garera, and Aviel D. Rubin, <u>On the Difficulty of Validating Voting Machine Software with Software</u>, In Proceedings of the 2nd USENIX/ACCURATE Electronic Voting Technology Workshop (EVT '07), (August, 2007).

28.   -Sujata Doshi, Fabian Monrose, and Aviel D. Rubin, *Efficient Memory Bound Puzzles using Pattern Databases*, <u>4th International Conference on Applied Cryptography and Network Security (ACNS'06)</u>, (June, 2006).

29.   -Sophie Qiu, Patrick McDaniel, Fabian Monrose, and Avi Rubin, *Characterizing Address Use Structure and Stability of Origin Advertisement in Interdomain Routing*, 11th IEEE Symposium on Computers and Communications, (June 2006).

30.   -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).

31.   -Stephen C. Bono, Matthew Green, Adam Stubblefield, Ari Juels, Aviel D. Rubin, Michael Szydlo, <u>Security Analysis of a Cryptographically-Enabled RFID Device</u> 14th USENIX Security Symposium, (August, 2005).

32.   -Tadayoshi Kohno, Adam Stubblefield, Aviel D. Rubin, and Dan S. Wallach, <u>Analysis of an Electronic Voting System</u>, Proc. IEEE Symposium on Security and Privacy (May, 2004).

33.   -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).

34.   -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).

35.   -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).

36.   -Simon Byers, Aviel D. Rubin, David Kormann, *Defending Against an Internet-based Attack on the Physical World* (<u>pdf</u>), ACM Workshop on Privacy in the Electronic Society (November, 2002).

37.   -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).

38.   -Aviel D. Rubin, <u>Security Considerations for Remote Electronic Voting</u>, <u>29th Research Conference on Communication, Information and Internet Policy (TPRC2001)</u>, (October, 2001).

39.   -Aviel D. Rubin and Rebecca N. Wright, *Off-line generation of limited-use credit card numbers*, (ps.gz, pdf) <u>Financial Cryptography Conference</u>, (February, 2001).

40.   -Marc Waldman, Aviel D. Rubin, and Lorrie F. Cranor, *<u>Publius</u>, A robust, tamper-evident and censorship-resistant web publishing system*, 9th USENIX Security Symposium, (August, 2000).

41.   -David P. Kormann and Aviel D. Rubin, <u>*Risks of the Passport Single Signon Protocol*</u>, <u>9th International World Wide Web Conference</u>, (May, 2000).

42.   -Patrick McDaniel and Aviel D. Rubin, *A Response to "Can we Eliminate Certificate Revocation Lists?"*, (ps.gz, pdf), Financial Cryptography Conference, (February, 2000).

43.   -William A. Aiello, Aviel D. Rubin, and Martin J. Strauss, *Using smartcards to secure a personalized gambling device* (ps.gz, pdf), 6th ACM Conference on Computer and Communications Security, (November, 1999).

44.   -Ian Jermyn, Alain Mayer, Fabian Monrose, Michael K. Reiter, and Aviel D. Rubin, *The Design and Analysis of Graphical Passwords* (ps.gz, pdf) 8th USENIX Security Symposium, (August, 1999).

45.   -Christian Gilmore, David Kormann, and Aviel D. Rubin, *Secure Remote Access to an Internal Web Server*, (ps.gz, pdf), Proc. ISOC Symposium on Network and Distributed System Security (February, 1999).

46.   -Fabian Monrose, Peter Wykoff, and Aviel D. Rubin, *Distributed Execution with Remote Audit* (ps.gz, pdf), Proc. ISOC Symposium on Network and Distributed System Security (February, 1999).

47.   -Dahlia Malkhi, Michael K. Reiter and Aviel D. Rubin, *Secure Execution of Java Applets using a Remote Playground* (ps, pdf) Proc. IEEE Symposium on Security and Privacy (May, 1998).

48.   -Aviel D. Rubin, Dan Boneh, and Kevin Fu, *Revocation of Unread E-mail in an Untrusted Network* (ps.gz, pdf), Second Australasian Conference on Information Security and Privacy (July, 1997).

49.   -Fabian Monrose and Aviel D. Rubin, *Authentication via Keystroke Dynamics* (ps, pdf), 4th ACM Conference on Computer and Communications Security (April, 1997).

50.   -David M. Martin, Siviramakrishnan Rajagopalan, and Aviel D. Rubin, *Blocking Java Applets at the Firewall* (ps, pdf), Proc. ISOC Symposium on Network and Distributed System Security (February, 1997).

51.   -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).

52.   -Trent Jaeger, Aviel D. Rubin and Atul Prakash, *Building Systems that Flexibly Control Downloaded Executable Content*, Proc. 6th USENIX Security Symposium (July, 1996).

53.   -Victor Shoup and Aviel D. Rubin, *Session Key Distribution Using Smart Cards*, (ps, pdf), Proc. of Eurocrypt '96 (May, 1996).

54.   -Trent Jaeger & Aviel D. Rubin, *Preserving Integrity in Remote File Location and Retrieval*, Proc. ISOC Symposium on Network and Distributed System Security (February, 1996).

55. -Aviel D. Rubin, *Extending NCP for Public Key Protocols*, Proc. IEEE 4th International Conference on Computer Communications and Networks (September, 1995).
56. -Aviel D. Rubin, *Pseudo-Random Functions for One-Time Passwords*, Proc. 5th USENIX UNIX Security Symposium (June, 1995).
57. -Aviel D. Rubin, *Trusted Distribution of Software Over the Internet*, Proc. ISOC Symposium on Network and Distributed System Security (February, 1995).
58. -Aviel D. Rubin & Peter Honeyman, *Nonmonotonic Cryptographic Protocols*, Proc. IEEE Computer Security Foundations Workshop VII (June, 1994).
59. -Aviel D. Rubin & Peter Honeyman, *Long Running Jobs in an Authenticated Environment*, Proc. 4th USENIX UNIX Security Symposium (October, 1993).

Patents

1. -Aviel D. Rubin, "Broadband Certified Mail", **US Patent Numbers 6,990,581**, (January 24, 2006) and **9,876,769**, (January 23, 2018).
2. -Aviel D. Rubin, Utilization of multiple devices to secure online transactions, **US Patent Number 9,064,376**, (June 23, 2015).
3. -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).
4. -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).
5. -Aviel D. Rubin, "Method for secure remote backup", **US Patent Number 7,222,233**, (May 22, 2007).
6. -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).
7. -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).
8. -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).
9. -Aviel D. Rubin and Victor J. Shoup, "Session Key Distribution Using Smart Cards", **US Patent Number 5,809,140**, (September 15, 1998).
10. -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

1. **-Board of Directors**
2. -Director, Maryland Israel Development Center (MIDC), (2013 - 2018).
3. -Director, USENIX Organization, elected by popular vote (2000 - 2004).

4. **-Editorial and Committees**

5. -**Associate Editor:** IEEE Transactions on Information Forensics and Security (2009-2011).

6. -**Associate Editor**: Communications of the ACM (CACM), 2009 - 2017.

7. -**Guest Co-Editor:** IEEE Transactions on Information Forensics and Security: *Special Issue on Electronic Voting*, December 1, 2009.

8. -**Guest Co-Editor:** IEEE Security & Privacy Magazine, *Special Issue on Electronic Voting*, October/November, 2007.

9. -**Associate Editor:** IEEE Transactions on Software Engineering (2005-2006).

10. -**Editorial and Advisory Board:** International Journal of Information and Computer Security (IJICS) (2004-2006).

11. -**Guest Co-Editor:** IEEE Computer Networks, *Special Issue on Web Security*, January, 2005.

12. -**Editorial Board:** Journal of Privacy Technology (2004-2006).

13. -**Guest Co-Editor:** IEEE Security & Privacy Magazine, *Special Issue on Electronic Voting Security*, January/February, 2004.

14. -**Member:** Security Peer Review Group (SPRG) of the Federal Voting Assistance Program's (FVAP) Secure Electronic Registration and Voting Experiment (SERVE) Project, 2003-2004.

15. -**Member:** DARPA Information Science And Technology Study Group (2003-2006).

16. -**Associate Editor:** IEEE Security & Privacy Magazine (2003-present).

17. -**Guest Editor:** Communications of the ACM, *Special Issue on Wireless Networking Security*, May, 2003.

18. -**Associate Editor:** ACM Transactions on Internet Technology (2002-2005).

19. -**Executive Committee Member:** DIMACS Workshop Series with Special Focus on Network Security (2002-2004).

20. -**Advisory Board Member:** Information Security and Cryptography Book Series, Springer, 2001-2006.

21. -**Member:** Steering Group, ISOC Symposium on Network and Distributed System Security, 2001-2004.

22. -**Member:** Government Infosec Science and Technology Study Group on malicious code, 1999 - 2000.

23. -**Member:** *AT&T Internet Intellectual Property Review Team*, 1999 - 2001.

24. -**Associate Editor:** *Electronic Commerce Research Journal*, Baltzer Science Publishers, 1999 - 2002.

25. -**Co-Editor:** Electronic Newsletter of the IEEE Technical Committee on Security & Privacy, with Paul Syverson, 1998.

26. -**Editorial Board:** Bellcore Security Update Newsletter, 1995-1996.

1. **-Conference Committees**

2. -Program Committee member: Financial Cryptography '15 Barbados, February, 2015.

3.   -Program Committee member: USENIX HealthTech Workshop on Health Information Technologies (HealthTech '15), August 11, 2015.

4.   **-Program Co-chair:** (w/Eugene Vasserman) USENIX HealthTech Workshop on Health Information Technologies (HealthTech '14), August 19, 2014.

5.   -Program Committee member: 2nd USENIX Workshop on Health Security and Privacy (HealthSec '11), August 9, 2011.

6.   **-Program Co-chair:** (w/Kevin Fu & Yoshi Kohno), 1st USENIX Workshop on Health Security and Privacy (HealthSec '10), August 10, 2010.

7.   -Program Committee member: First Security and Privacy in Medical and Home-Care Systems Workshop (SPIMACS), Chicago, IL, November 13, 2009.

8.   -Invited Talks Co-Coordinator: 17th USENIX Security Symposium, San Jose, CA, July 28 - August 1, 2008.

9.   **-Program Co-chair:** (w/Patrick McDaniel): IEEE Symposium on Security and Privacy, Oakland, California, May 18-22, 2008.

10.   **-Program Co-chair:** (w/Giovani Di Crescenzo): Financial Cryptography '06 Anguilla BWI, February, 2006.

11.   -Program Committee member: IEEE Symposium on Security and Privacy, Oakland, California, May 9-12, 2004.

12.   -Program Committee member: Financial Cryptography '04 Key West, Florida, February 9-12, 2004.

13.   -Program Committee member: 2nd ACM SIGSAC Workshop on Privacy in the Electronic Society Washington D.C., October 30, 2003.

14.   -Program Committee member: 10th ACM Conference on Computer and Communications Security, Washington D.C., October 27-30, 2003.

15.   -Program Committee member: 8th European Symposium on Research in Computer Science (ESORICS), Norway, October 13-15, 2002.

16.   **-Program Vice Chair:** Security and Privacy Track, The Twelfth International World Wide Web Conference, Budapest, Hungary, May 20-24, 2003.

17.   -Program Committee member: IEEE Symposium on Security and Privacy, Oakland, California, May 11-14, 2003.

18.   -Program Committee member: Workshop on Security and Assurance in Ad hoc Networks, Orlando, FL, January 28, 2003.

19.   -Program Committee member: 4th International Conference on Information and Communications Security (ICICS), Kent Ridge Digital Labs (KRDL), Singapore December 9-12, 2002.

20.   -Program Committee member: ACM SIGSAC Workshop on Privacy in the Electronic Society Washington D.C., November 21, 2002.

21.   -Program Committee member: 9th ACM Conference on Computer and Communications Security, Washington D.C., November 17-21, 2002.

22.   -Program Committee member: 5th International Conference on Electronic Commerce Research (ICECR-5), Montreal, Canada, October 23-27, 2002.

23.   -Program Committee member: 2nd Symposium on Requirements Engineering for Information Security (SREIS), Raleigh, North Carolina, Oct 14-15, 2002.

24.   -Program Committee member: 7th European Symposium on Research in Computer Science (ESORICS), Zurich, Switzerland, October 14-16, 2002.

25.   -Program Committee member: 11th USENIX Security Symposium, San Francisco, Ca, August 5-9, 2002.

26.   -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 21-24, 2002.

27.   -Program Committee member: 11th International World Wide Web Conference Honolulu, Hawaii, May 7-11, 2002.

28.   -Program Committee member: 2nd Workshop on Privacy Enhancing Technologies San Francisco, CA, April 14-15, 2002.

29.   -Program Committee member: The 1st International Workshop on Peer-to-Peer Systems (IPTPS'02) MIT Faculty Club, Cambridge, MA, March 7-8, 2002.

30.   -Program Committee member: The 4th International Conference on Telecommunications and Electronic Commerce Dallas, TX, November, 2001.

31.   -Program Committee member: 10th USENIX Security Symposium, Washington D.C., August 13-17, 2001.

32.   -Program Committee member: Financial Cryptography '01 Grand Cayman, Cayman Islands, BWI, February, 2001.

33.   -**Program Co-chair:** (w/Paul Van Oorschot): ISOC Symposium on Network and Distributed System Security, San Diego, CA, February 7-9, 2001.

34.   -Program Committee member: The 3rd International Conference on Telecommunications and Electronic Commerce Dallas, TX, November 16-19, 2000.

35.   -Program Committee member: 9th USENIX Security Symposium, Denver, Colorado, August 14-17, 2000.

36.   -Program Committee member: Workshop on Design Issues in Anonymity and Unobservability Berkeley, California, July 25-26, 2000.

37.   -Program Committee member: Performance and Architecture of Web Servers (PAWS), Santa Clara, CA, June 18, 2000.

38.   -**Program Co-chair:** (w/Gene Tsudik): ISOC Symposium on Network and Distributed System Security, San Diego, CA, February 2-4, 2000.

39.   -Program Committee member: 1999 International Information Security Workshop (ISW'99), Kuala Lumpur, Malaysia, November 6-7, 1999.

40.   -Program Committee member: 2nd Int'l. Conference on Telecommunications and Electronic Commerce, Nashville, TN, October 6-8, 1999.

41.   -Invited Talks coordinator: 8th USENIX Security Symposium, Washington D.C., August, 1999.

42.   -**Program Chair:** 24th USENIX Annual Technical Conference, Monterey, CA, June 7-11, 1999.

43.   -Program Committee member: 8th International World Wide Web Conference , Toronto, Canada, May 11-14, 1999.

44.   -Program Committee member: 3rd USENIX workshop on Electronic Commerce , Boston, MA, August 31 - September 3, 1998.

45.   -Program Committee member: 5th ACM Conference on Computer and Communications Security, San Francisco, CA, November 3-5, 1998.
46.   -**Program Chair:** <u>7th USENIX Security Symposium</u>, San Antonio, TX, Jan. 26-29, 1998.
47.   -Program Committee member: 4th ACM Conference on Computer and Communications Security, Zurich, Switzerland, April 2-4, 1997.
48.   -Program Committee member: 6th USENIX Security Symposium, San Jose, CA, July 22-25, 1996.
49.   -Program Committee member: ISOC Symposium on Network and Distributed System Security, San Diego, CA, February 22-23, 1996.

1.   **-Panels**
2.   -**Panelist:** Cardozo Society Associated panel: Cybersecurity and Privacy Law in the Digital Era, Baltimore, MD (February 19, 2020).
3.   -**Panelist:** Washington Post panel: Hacking Health, Washington DC (June 14, 2016).
4.   -**Panelist:** Financial Cryptography Conference, Security & Privacy, Barbados (February 24, 2016).
5.   -**Panelist:** RSA Conference, Social Networks Security Panel, San Francisco, CA (April 21, 2015).
6.   -**Panelist:** Expert Witness in Mock Trial: FTC Data Security, 63rd American Bar Association Section of Antitrust Law Spring Meeting Washington DC, (April 15, 2015).
7.   -**Panelist:** Security in Electronic Medical Records Databases, Medicine 2.0 Workshop, Haifa, Israel, (April 7, 2011).
8.   -**Panelist:** Security in the Cloud, Workshop on Cloud Security, Israeli Defense Ministry, Tel Aviv, Israel, (February 15, 2011).
9.   -**Panelist:** Securing Information Technology in Healthcare (SITH), Security and Usability of Electronic Health Records, Dartmouth College, NH, (May 17, 2010).
10.   -**Panelist:** First Security and Privacy in Medical and Home-Care Systems Workshop (SPIMACS), Authentication in iHealthcare, Chicago, IL, (November 13, 2009).
11.   -**Panelist:** Computers, Freedom, and Privacy Conference, Internet Voting for Overseas Americans, Washington DC, (June 4, 2009).
12.   -**Panelist:** Workshop on Electronic Voting, Electronic Voting: Future Aspirations, Tel Aviv, Israel (May 18, 2009).
13.   -**Panelist:** RSA Conference, Exploiting Online Games, San Francisco, CA (April 23, 2009).
14.   -**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).
15.   -**Panelist:** California Secretary of State's Voting System Testing Summit, *Security Panel*, Sacramento, CA, (November 28-29, 2005).
16.   -**Panelist:** NIST Symposium on Voting System Threats, *Configuration and Usability Threats*, Gaithersburg, MD, (October 7, 2005).

17.   **-Panelist:** Conference of State Supreme Court Chief Justices, *Voting Technologies*, Charleston, SC (August 1, 2005).

18.   **-Panelist:** *Workshop on observation of automated elections*, The Carter Center, Atlanta, GA (March 18, 2005).

19.   **-Panelist:** The Carter Center Venezuela Virtual Panel, (November, 2004).

20.   **-Panelist:** Workshop on Voting, *Vote Capture and Vote Counting*, Harvard Kennedy School of Government, The Technologies of Voting, Cambridge, MA (June 1, 2004).

21.   **-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).

22.   **-Panelist:** USENIX Security 2003, *Electronic Voting*, Washington D.C. (August 6, 2003).

23.   **-Panelist:** Democracy Now, 2003, *Voter-Verifiable Elections: How Do We Get There?*, Washington D.C. (November 23, 2003).

24.   **-Panelist:** USENIX Security 2003, *Electronic Voting*, Washington D.C. (August 6, 2003).

25.   **-Panelist:** IEEE Infocom 2002, *Securing Wireless and Mobile Networks - Is It Possible?*, New York City (June 25, 2002).

26.   **-Participant:** 2002 Security Visionary Roundtable: *A Roadmap for a Safer Wireless World*, Washington D.C., (May 5-7,2002).

27.   **-Panelist:** Computers Freedom and Privacy 2002, *Who Goes There? Privacy in Identity and Location Services*, San Francisco (April 18, 2002).

28.   **-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).

29.   **-Panelist:** Financial Cryptography 2001, *The Business of Electronic Voting*, Grand Cayman (February, 2001).

30.   **-Panelist:** National Science Foundation *E-voting workshop*, Washington, D.C., (October, 2000).

31.   **-Panelist:** 5th ACM Conference on Computer and Communications Security, Anonymity on the Internet, San Francisco, CA, (November 1998).

32.   **-Panelist:** Open Systems Security and ISSA Annual Conference, *Securing the Web*, Orlando, FL (March, 1998).

33.   **-Panel organizer and moderator:** *Implementation Issues for Electronic Commerce: What Every Developer Should Know*. ISOC Symposium on Network and Distributed System Security, (March, 1998).

34.   **-Panel organizer and moderator:** *Downloadable Executable Content - Past, Present and Future*. ISOC Symposium on Network and Distributed System Security (February, 1997).

35.   **-Panelist:** DIMACS Workshop on Network Threats, Web/Java Security Issues, New Brunswick, NJ (December 5, 1996).

1.   **-Tutorials Taught**

2. -The Mathematics of Information Technology and Complex Systems Network (<u>MITACS</u>), *Network Security*, (May 8, 2003).
3. -IEEE Infocom 2002, *End to End Web Security and E-commerce*, (June 23, 2002).
4. -2002 USENIX Annual Technical Conference, *Introduction to Computer Security*, (June 10, 2002).
5. -LISA 2001, 15th Systems Administration Conference, *Introduction to Computer Security*, (December, 2001).
6. -8th & 9th USENIX Security Symposia, *Cryptography - From the Basics Through PKI in 23,400 Seconds*, (August, 2000) & (August 1999), with Dan Geer.
7. -9th International World Wide Web Conference, *Security on the World Wide Web*, (May, 2000).
8. -ISOC Symposium on Network and Distributed System Security, *Cryptography 101*, (February, 2000).
9.

Testimony

Before Government Bodies
1. -Maryland House, Expert Testimony, Hearing on HB 888, Consumer Protection - Security Features for Connected Devices, *Economic Matters Committee,* Annapolis, MD, (February 26, 2020).
2. -Maryland Senate, Expert Testimony, Hearing on SB 443 Security Features for Connected Devices, *Finance Committee,* Annapolis, MD, (February 19, 2020).
3. -Maryland Senate, Expert Testimony, Hearing on SB 553/HB 1276 Security Features for Connected Devices, *Finance Committee,* Annapolis, MD, (February 26, 2019).
4. -United States Pentagon, High Level Security Briefing on the Security of Embedded Devices (January 15, 2014).
5. -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).
6. -United Stated House Committee on Oversight and Government Reform, *hearing on electronic voting*, Washington, D.C., (April 18, 2007).
7. -United Stated House Committee on Appropriations, *hearing on ensuring the integrity of elections*, Washington, D.C., (March 7, 2007).
8. -Maryland Senate Committee on Education, Health, and Environmental Affairs, <u>Expert Testimony</u>, *Hearing on Senate Bill 392 for Voter-Verified Records in Voting Systems*, Annapolis, MD, (February 22, 2007).
9. -Maryland House Ways and Means Committee, Expert Testimony, *Hearing on House Bill 18 for improving voting systems in Maryland*, Annapolis, MD, (February 1, 2007).
10. -Maryland House Ways and Means Committee, <u>Expert Testimony</u>, *Hearing on House Bill 244 requiring a voter verified paper record for voting machines in Maryland*, Annapolis, MD, (February 1, 2006).

11.	-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).
12.	-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).
13.	-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).
14.	-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).
15.	-United States House Committee on House Administration, Expert Testimony, *Hearing on Security of Electronic Voting*, Washington, D.C. (July 7, 2004).
16.	-United States Federal Trade Commission, Written Expert Testimony, on a proposed Do Not Email Repository, (May 10, 2004).
17.	-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
1.	-**Blackberry Limited** vs. Facebook, Inc, Case #2:18-cv-01844 (KSx), Quinn Emanuel Urquhart & Sullivan, LLP, United States District Court, Central District of California.
2.	-Expert Testimony at Deposition, Baltimore, MD (December 20, 2019). (*patent infringement & patent validity*)
3.	-**Netfuel, Inc**. vs. Cisco Systems, Inc, Case # 5:18-cv-2352-EJD, Susman Godfrey, United States District Court, Northern District of California.
4.	-Expert Testimony at Deposition, Baltimore, MD (December 16 & 17, 2019). (*patent infringement & patent validity*)
5.	-Expert Testimony at Deposition, Baltimore, MD (June 11, 2019). (*patent infringement*)
6.	-Expert Testimony at Markman Hearing, San Jose, CA (February 28, 2019). (*courtroom tutorial*)
7.	-Expert Testimony at deposition, Baltimore, MD (December 20, 2018). (*claim construction*)
8.	-**Symantec Corporation** vs. Zscaler, Inc**.**, Case # 3:17-CV-04414-JST, Baker Botts, United States District Court, Northern District of California.
9.	-Expert Testimony at Deposition, Baltimore, MD (December 6, 2019). (*patent infringement*)
10.	-Expert Testimony at Deposition, Baltimore, MD (August 2, 2019). (*Assignor Estoppel*)

11. -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*)

12. -Expert Testimony at Deposition, Baltimore, MD (July 17, 2019).

13. -**Cypress Lake Software, Inc**. vs. Samsung Electronics & Dell Inc, Case # 6:18-cv-030-JKD and 6:18-cv-0138-JDK, Garteiser Honea, United States District Court, Eastern District of Texas. (*patent infringement and patent validity*)

14. -Expert Testimony at Deposition, Baltimore, MD (July 10-11, 2019).

15. -Finjan vs. **Juniper Networks**, Case # 3:17-cv-05659-WHA , Irell and Manella, United States District Court, Northern District of California.

16. -Expert Testimony at deposition, Baltimore, MD (April 2, 2019). (*patent non-infringement)*

17. -Expert Testimony at deposition, San Francisco, CA (March 9, 2019). (*patent non-infringement)*

18. -Expert Testimony at trial, San Francisco, CA (December 13, 2018). (patent non-infringement and invalidity)

19. -Expert Testimony at deposition, Baltimore, MD (November 9, 2018). (patent non-infringement and invalidity)

20. -Expert Testimony at deposition, Baltimore, MD (July 6, 2018). (*patent non-infringement)*

21. -Expert Testimony at deposition, Baltimore, MD (June 12, 2018). (*patent non-infringement)*

22. -Grace et. al. vs. **Apple Inc.**, Case # 5:17-CV-00551-LHK (NC), Durie Tangri, United States District Court, Northern District of California. (*class action)*

23. -Expert Testimony at deposition, Towson, MD (September 26, 2018).

24. -**Rimini Street, Inc**. vs. Oracle International Corporation, et. al., Case # 2:14-CV-01699 LRH-CWH, Gibson Dunn, United States District Court, District of Nevada. (*Software security*)

25. -Expert Testimony at deposition, Baltimore, MD (August 30, 2018).

26. -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)*

27. -Expert Testimony at deposition, Pikesville, MD (July 3, 2018).

28. -**F5 Networks, Inc.** vs. Radware, LTD., IPR 2017-00124, Perkins Coie, US Patent Trial and Appeal Board. (*patent Invalidity)*

29. -Expert Testimony at deposition, Baltimore, MD (January 24, 2018).

30. -**Amazon.com Inc., Hulu, LLC, and Netflix, Inc,** vs. Uniloc Luxembourg S.A., IPR 2017-00948, Perkins Coie, US Patent Trial and Appeal Board. (*patent Invalidity)*

31. -Expert Testimony at deposition, Baltimore, MD (October 9, 2017).

32. -Phishme, Inc. vs. **Wombat Technologies, Inc**, Case # 16-403-LPS-CJB, K&L Gates, United States District Court, Delaware. (*patent claim construction)*

33. -Expert Testimony at deposition, Washington DC, (October 5, 2017).

34. -Finjan vs. **Symantec Corporation.**, Case # 14-cv-02998-HSG, Quinn Emanuel, United States District Court, Northern District of California. (*patent invalidity and non-infringement*)

35. -Expert Testimony at deposition, Baltimore, MD (September 14-15, 2017).

36. -**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*).

37. -Expert Testimony at deposition, Baltimore, MD (September 1, 2017).

38. -**F5 Networks, Inc.** vs. Radware, LTD., IPR 2017-00124, Perkins Coie, US Patent Trial and Appeal Board. (*patent Invalidity*)

39. -Expert Testimony at deposition, Baltimore, MD (August 10, 2017).

40. -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*).

41. -Expert Testimony at deposition, Baltimore, MD (June 1, 2017).

42. -Nader Asghari-Kamrani and Kamran Asghari-Kamrani 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*).

43. -Expert Testimony at trial, Norfolk, VA (April 21, 2017).

44. -Expert Testimony at deposition, Baltimore, MD (March 21, 2017).

45. -**Sabre GLBL Inc,** vs. HP Enterprise Services LLC. Case # 1310022761, JAMS Binding Arbitration Hearing, Dallas, TX (*Contract dispute*).

46. -Expert Testimony at arbitration hearing, Dallas, TX (April 5, 2017).

47. -**Al Cioffi et. al.** vs. Google, Case # 2:13-cv-103-JRG-RSP, Vasquez, Benisek & Lindgren, United States District Court, Eastern District of Texas. (*patent Infringement*).

48. -Expert Testimony at trial, Marshall, TX (February 7, 2016).

49. -Expert Testimony at deposition, Baltimore, MD (September 26, 2016).

50. -**Palo Alto Networks** vs. Finjan, IPR 2015-01979, Cooley, US Patent Trial and Appeal Board. (*patent Invalidity*)

51. -Expert Testimony at deposition, Baltimore, MD (November 14, 2016).

52. -**Palo Alto Networks** vs. Finjan, IPR 2016-00151, Morrison & Foerster, US Patent Trial and Appeal Board. (*patent Invalidity*)

53. -Expert Testimony at deposition, Baltimore, MD (August 19, 2016).

54. -**Palo Alto Networks** vs. Finjan, IPR 2015-01974, Cooley, US Patent Trial and Appeal Board. (*patent Invalidity*)

55. -Expert Testimony at deposition, Baltimore, MD (August 2, 2016).

56. -**Palo Alto Networks** vs. Finjan, IPR 2015-02001 & IPR 2016-00157, Cooley, US Patent Trial and Appeal Board. (*patent Invalidity*)

57. -Expert Testimony at deposition, Baltimore, MD (July 26 & 27, 2016).

58. -**Amazon.com, Inc** vs. Zitovault, LLC, IPR 2016-00021, Perkins Coie, US Patent Trial and Appeal Board. (*patent Invalidity*)

59. -Expert Testimony at deposition, Baltimore, MD (July 22, 2016).

60.   -**Palo Alto Networks** vs. Finjan, IPR 2015-01979, Cooley, US Patent Trial and Appeal Board. (*patent Invalidity*)
61.   -Expert Testimony at deposition, Baltimore, MD (May 20, 2016).
62.   -Vir2us Inc. v. **Invincea, Inc. and Invincea Labs, LLC**, Case # 2:15cvl62; Cooley, United States District Court, Eastern District of Virginia. (*Patent Non-Infringement and Invalidity*)
63.   -Expert Testimony at deposition, Reston, VA (April 20, 2016).
64.   -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*)
65.   -Expert Testimony at trial, San Francisco, CA (July, 2015).
66.   -Expert Testimony at deposition, Baltimore, MD (February, 2015).
67.   -Intellectual Ventures vs. **Symantec**, Case # 1:10-cv-01067-LPS; Latham & Watkins, United States District Court, District of Delaware. (*Patent Invalidity*)
68.   -Expert Testimony at trial, Wilmington, DE (February, 2015).
69.   -Expert Testimony at deposition, Baltimore, MD (May, 2013).
70.   -Rovi Solutions & Veracode vs. Appthority, Case # 12-10487-DPW; Goodwin Procter, United States District Court, District of Massachusetts. (*Patent Infringement and Validity*)
71.   -Expert Testimony at trial, Boston, MA (August 11, 2014).
72.   -Expert Testimony at deposition, Baltimore, MD (April 4, 2014).
73.   -**Juniper** vs. Palo Alto Networks, Case # 1:11-CV-01258-SLR; Irell & Manella, United States District Court, District of Delaware. (*Patent Infringement*)
74.   -Expert Testimony at trial, Wilmington, DE (February, 2014).
75.   -Expert Testimony in court hearing, Wilmington, DE (November 14, 2013).
76.   -Expert Testimony at deposition, Baltimore, MD (June, 2013).
77.   -Prism Technologies. v. **Adobe Systems Inc**., Case # 8:10-cv-00220-LES-TDT; DLA Piper, United States District Court, District of Nebraska. (*Patent Invalidity*)
78.   -Expert Testimony at deposition, Baltimore, MD (August, 2012).
79.   -Finjan Inc. vs. **McAfee, Inc**., Case # 10-593 (GSM), Kirkland & Ellis, United States District Court, District of Delaware. (*Patent Non-Infringement*)
80.   -Expert Testimony at deposition, Washington, DC (June, 2012).
81.   -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*)
82.   - Expert Testimony at deposition, Newark, NJ (August, 2011).
83.   -**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*)
84.   - Expert Testimony at trial, Detroit, MI (February, 2011).
85.   - Expert Testimony at deposition, Baltimore, MD (December, 2005).
86.   -**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*)

87. -<u>Expert Testimony</u> at deposition, Newark, NJ (November, 2010).
88. -**Echostar Satellite Corporation** vs. NDS Group, Case # SA CV 03-950 DOC(JTL); T. Wade Welch & Associates, United States District Court, Central District of California. (*Copyright and DMCA*)
89. -<u>Expert Testimony</u> at trial, Santa Ana, CA (April, 2008).
90. -<u>Expert Testimony</u> at deposition, Santa Ana, CA (April, 2008).
91. -<u>Expert Testimony</u> at deposition, Baltimore, MD (October, 2007).
92. -<u>**Web.com Inc**</u> vs. The Go Daddy Group Inc., Case # CV07-01552-PHX-MHM; Graves Law Office, United States District Court, Arizona. (*Patent Infringement*)
93. -<u>Expert Testimony</u> at Markman hearing, Phoenix, Az (July, 2008).
94. -<u>Expert Testimony</u> at deposition, Baltimore, MD (May, 2008).
95. -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)*
96. -<u>Expert Testimony</u> at trial, Tyler, TX, (April, 2006).
97. -<u>Expert Testimony</u> at deposition, Washington DC (January, 2006).
98. -**Linda Schade** vs. Linda Lamone et. al., *Trial on the Legality of Paperless Voting Machines in Maryland*. (*Adequacy of Voting Equipment)*
99. -<u>Expert Testimony</u> at trial, Annapolis, MD (August 25, 2004).

Awards

1. -**Fulbright Scholar** in Israel at Tel Aviv University, academic year 2010-2011.
2. -2009, **Google Research Award**, *Securing Medical Records on Smartphones.*
3. -Chosen as one of **54 favorite people, places and things in Jewish Baltimore**, <u>Baltimore Jewish Times</u>, February 22, 2008.
4. -2007 <u>Award</u> 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).
5. -2005 **Best Student Paper Award** at the 14th USENIX Security Symposium, *Security Analysis of a Cryptographically-Enabled RFID Device* (with Stephen C. Bono, Matthew Green, Ari Juels, Adam Stubblefield, Michael Szydlo).
6. -2004 **Electronic Frontiers Foundation** *Pioneer Award.*
7. -**Baltimorean of the Year**, Baltimore Magazine, January, 2004.
8. -2001 **Index on Censorship** *Freedom of Expression Award* for the Best Circumvention of Censorship for the Publius project.
9. -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).
10. -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).

11. -1996 Co-author of **Best Student Paper**, *Building Systems that Flexibly Control Downloaded Executable Content*, at the 6th USENIX UNIX Security Symposium. Student: Trent Jaeger.
12. -1992 National Science Foundation Fellowship - Summer Institute in Japan
13. -1986 Branstrom Prize, University of Michigan

Technical Advisory Boards

Current Positions

1. -RunSafe
2. -Binary rewriting to protect software

3. -ZeroFox
4. -Provide security for social networking

5. -Snag-A-Slip
6. -Online boat slip bookings

Past Successful Technical Advisory Board Positions
1. -Arbor Networks
2. -Acquired by Danaher, August, 2010.
3. -Authentica
    - Acquired by EMC Corporation, March, 2006.
1. -Fortify Software
2. -Acquired by Hewlett Packard, September 2010.
3. -Gilian Technologies
    - Acquired by Breach Security, Inc, July, 2004.
1. -Hx Technologies
    - Acquired by MEDecision, May, 2009.
1. -Indigo Security
    - Acquired by Tablus, February, 2005.
1. -NeoPath Networks
    - Acquired by Cisco, April, 2007.
1. -Netscaler
2. -Acquired Citrix Systems, August, 2005.
3. -SiteAdvisor
    - Acquired by McAfee, April, 2006.
1. -Tablus
                    -Acquired by EMC Corporation, August, 2007.