

TYLER MOORE

Tandy Assistant Professor of Cyber Security and Information Assurance
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Experience

Tandy Assistant Professor of Cyber Security and Information Assurance

University of Tulsa, Tulsa, OK, 2015 – present

Assistant Professor of Computer Science and Engineering,

Southern Methodist University, Dallas, TX, 2012 – 2015

Director of the Economics and Social Sciences Program,

Darwin Deason Institute for Cyber Security, SMU, 2014 – 2015

Norma Wilentz Hess Visiting Assistant Professor of Computer Science,

Wellesley College, Wellesley, MA, 2011 – 2012

Visiting Scholar, Wellesley College, Wellesley, MA, 2010 – 2011

Postdoctoral Fellow, Center for Research on Computation and Society,

Harvard University, Cambridge, MA, 2008 – 2011

Education

Ph.D. (Computer Science), University of Cambridge, St. John's College, UK, 2008

Thesis: 'Cooperative attack and defense in distributed networks'

Supervisor: Prof. Ross Anderson FRS

B.S. (Computer Science), University of Tulsa, OK, USA, 2004 *Summa Cum Laude*

B.S. (Applied Mathematics), University of Tulsa, OK, USA, 2004 *Summa Cum Laude*

Research Specialties

Security Economics, Cybercrime Measurement, Critical Infrastructure Protection, Digital Currencies, Cybersecurity Policy, Wireless Network Security

Teaching Interests

All core undergraduate and graduate computer science courses, and advanced courses in my research specialties. Courses of special interest include Security Economics, Foundations of Cyber Security, Secure Electronic Commerce, Data Structures and Algorithms

Fellowships and Awards

Best Paper Award, International Workshop on Cyber Crime, 2014

Best Paper Award, 7th Anti-Phishing Working Group eCrime Researchers Summit, 2012

Inaugural Gordon Prize in Managing Cybersecurity Resources, 2009

Publication of the Year, University of Cambridge Computer Laboratory, 2008

Best Paper Award, 2nd Anti-Phishing Working Group eCrime Researchers Summit, 2007

Best Paper Award, 4th European Workshop on Security and Privacy in Ad-hoc and Sensor Networks, 2007

Ralph E. Powe Junior Faculty Enhancement Award, 2014

Marshall Scholarship, 2004–2007

US National Science Foundation Graduate Research Fellowship, 2004–2008
Goldwater Scholarship, 2003

Refereed Journal Publications

- [1] Mohammad Hanif Jhaveri, Orcun Cetin, Carlos Gañán, Tyler Moore, and Michel Van Eeten. Abuse reporting and the fight against cybercrime. *ACM Computing Surveys (CSUR)*, 49(4):68, 2017.
- [2] Marie Vasek, John Wadleigh, and Tyler Moore. Hacking is not random: a case-control study of webserver-compromise risk. *IEEE Transactions on Dependable and Secure Computing*, 13(2):206–219, 2016.
- [3] Markus Riek, Rainer Böhme, and Tyler Moore. Measuring the influence of perceived cybercrime risk on online service avoidance. *IEEE Transactions on Dependable and Secure Computing*, 13(2):261–273, 2016.
- [4] Orcun Cetin, Mohammad Hanif Jhaveri, Carlos Gañán, Michel van Eeten, and Tyler Moore. Understanding the role of sender reputation in abuse reporting and cleanup. *Journal of Cybersecurity*, 2(1):83–98, 2016.
- [5] Rainer Böhme and Tyler Moore. The “iterated weakest link” model of adaptive security investment. *Journal of Information Security*, 7(2):81–102, 2016.
- [6] Rainer Böhme, Nicolas Christin, Benjamin Edelman, and Tyler Moore. Bitcoin: Economics, technology, and governance. *Journal of Economic Perspectives*, 29(2):213–38, 2015.
- [7] Jake Drew and Tyler Moore. Optimized combined clustering methods for finding replicated criminal websites. *EURASIP Journal on Information Security*, 2014(14), 2014.
- [8] Steve Papa, William Casper, and Tyler Moore. Securing wastewater facilities from accidental and intentional harm: a cost-benefit analysis. *International Journal of Critical Infrastructure Protection*, 6(2):96–106, 2013.
- [9] Susan Landau and Tyler Moore. Economic tussles in federated identity management. *First Monday*, 17(10), 2012.
- [10] Tyler Moore and Richard Clayton. The impact of public information on phishing attack and defense. *Communications & Strategies*, 1(81):45–68, 1st quart 2011.
- [11] Tal Moran and Tyler Moore. The phish-market protocol: Secure sharing between competitors. *IEEE Security & Privacy*, 8(4):40–45, 2010.
- [12] Tyler Moore. The economics of cybersecurity: Principles and policy options. *International Journal of Critical Infrastructure Protection*, 3(3–4):103 – 117, 2010.
- [13] Rainer Böhme and Tyler Moore. The iterated weakest link. *IEEE Security & Privacy*, 8(1):53–55, 2010.
- [14] Tyler Moore, Richard Clayton, and Ross Anderson. The economics of online crime. *Journal of Economic Perspectives*, 23(3):3–20, Summer 2009.

- [15] Jolyon Clulow and Tyler Moore. Suicide for the common good: a new strategy for credential revocation in self-organizing systems. *Operating Systems Review*, 40(3):18–21, 2006.
- [16] Ross Anderson and Tyler Moore. The economics of information security. *Science*, 314(5799):610–613, 2006.

Refereed Conference Papers

- [1] Marie Vasek, Matthew Weeden, and Tyler Moore. Measuring the impact of sharing abuse data with web hosting providers. In *ACM Workshop on Information Sharing and Collaborative Security*, pages 71–80. ACM, 2016.
- [2] Marie Vasek, Joseph Bonneau, Ryan Castellucci, Cameron Keith, and Tyler Moore. The Bitcoin brain drain: Examining the use and abuse of Bitcoin brain wallets. In *Financial Cryptography and Data Security*, Lecture Notes in Computer Science. Springer, 2016.
- [3] Tyler Moore, Scott Dynes, and Frederick Chang. Identifying how firms manage cybersecurity investment. In *15th Workshop on the Economics of Information Security (WEIS)*, 2016.
- [4] Amir Feder, Neil Gandal, JT Hamrick, and Tyler Moore. The impact of DDoS and other security shocks on Bitcoin currency exchanges: Evidence from Mt. Gox. In *15th Workshop on the Economics of Information Security (WEIS)*, 2016.
- [5] Jake Drew, Michael Hahsler, and Tyler Moore. Polymorphic malware detection using sequence classification methods. In *Workshop on Bio-inspired Security, Trust, Assurance and Resilience (BioStar), IEEE Security and Privacy Workshops (SPW)*, pages 81–87. IEEE, May 2016.
- [6] John Wadleigh, Jake Drew, and Tyler Moore. The e-commerce market for “lemons”: Identification and analysis of websites selling counterfeit goods. In *International World Wide Web Conference (Security and Privacy Track)*, pages 1188–1197. ACM, May 2015.
- [7] Marie Vasek and Tyler Moore. There’s no free lunch, even using Bitcoin: Tracking the popularity and profits of virtual currency scams. In Rainer Böhme and Tatsuaki Okamoto, editors, *Financial Cryptography and Data Security*, volume 8975 of *Lecture Notes in Computer Science*, pages 44–61. Springer, January 2015.
- [8] Tyler Moore and Richard Clayton. Which malware lures work best? measurements from a large instant messaging worm. In *APWG Symposium on Electronic Crime Research (eCrime)*, pages 69–78. IEEE, 2015.
- [9] Richard Clayton, Tyler Moore, and Nicolas Christin. Concentrating correctly on cybercrime concentration. In *14th Workshop on the Economics of Information Security*, 2015.
- [10] Orcun Cetin, Mohammad Hanif Jhaveri, Carlos Ganan, Michel van Eeten, and Tyler Moore. Understanding the role of sender reputation in abuse reporting and cleanup. In *14th Workshop on the Economics of Information Security*, 2015.

- [11] Marie Vasek, Micah Thornton, and Tyler Moore. Empirical analysis of denial-of-service attacks in the Bitcoin ecosystem. In *1st Workshop on Bitcoin Research*, volume 8438 of *Lecture Notes in Computer Science*, pages 57–71. Springer, March 2014.
- [12] Marie Vasek and Tyler Moore. Identifying risk factors for webserver compromise. In *Financial Cryptography and Data Security*, volume 8437 of *Lecture Notes in Computer Science*, pages 326–345. Springer, March 2014.
- [13] Markus Riek, Rainer Böhme, and Tyler Moore. Understanding the influence of cybercrime risk on the e-service adoption of European Internet users. In *13th Workshop on the Economics of Information Security (WEIS)*, 2014.
- [14] Tyler Moore and Richard Clayton. The ghosts of banking past: Empirical analysis of closed bank websites. In *Financial Cryptography and Data Security*, volume 8437 of *Lecture Notes in Computer Science*, pages 33–48. Springer, March 2014.
- [15] Nektarios Leontiadis, Tyler Moore, and Nicolas Christin. A nearly four-year longitudinal study of search-engine poisoning. In *Proceedings of the 2014 ACM SIGSAC Conference on Computer and Communications Security, CCS '14*, pages 930–941, New York, NY, USA, 2014. ACM.
- [16] Benjamin Johnson, Aron Laszka, Jens Grossklags, Marie Vasek, and Tyler Moore. Game-theoretic analysis of DDoS attacks against Bitcoin mining pools. In *1st Workshop on Bitcoin Research*, volume 8438 of *Lecture Notes in Computer Science*, pages 72–86. Springer, March 2014.
- [17] Jake Drew and Tyler Moore. Automatic identification of replicated criminal websites using combined clustering. In *International Workshop on Cyber Crime (IWCC), IEEE Security and Privacy Workshops*. IEEE, 2014.
- [18] Marie Vasek and Tyler Moore. Empirical analysis of factors affecting malware URL detection. In *8th APWG eCrime Researchers Summit (eCrime)*, September 2013.
- [19] Tyler Moore and Nicolas Christin. Beware the middleman: Empirical analysis of Bitcoin-exchange risk. In *Financial Cryptography and Data Security*, volume 7859 of *Lecture Notes in Computer Science*, pages 25–33. Springer, April 2013.
- [20] Nektarios Leontiadis, Tyler Moore, and Nicolas Christin. Pick your poison: Pricing and inventories at unlicensed online pharmacies. In *ACM Conference on Electronic Commerce (EC)*, pages 621–638. ACM, June 2013.
- [21] Marie Vasek and Tyler Moore. Do malware reports expedite cleanup? An experimental study. In *Proceedings of the 5th USENIX Workshop on Cyber Security Experimentation and Test, CSET'12*, Berkeley, CA, USA, 2012. USENIX Association.
- [22] Tyler Moore, Jie Han, and Richard Clayton. The postmodern Ponzi scheme: Empirical analysis of high-yield investment programs. In Angelos D. Keromytis, editor, *Financial Cryptography and Data Security*, volume 7397 of *Lecture Notes in Computer Science*, pages 41–56. Springer, 2012.
- [23] Tyler Moore and Richard Clayton. Discovering phishing dropboxes using email metadata. In *7th APWG eCrime Researchers Summit (eCrime)*, October 2012.

- [24] Benjamin Edwards, Tyler Moore, George Stelle, Steven A. Hofmeyr, and Stephanie Forrest. Beyond the blacklist: Modeling malware spread and the effect of interventions. In *Proceedings of the New Security Paradigms Workshop, Bertinoro, Italy, September 19-21, 2012*. ACM, 2012.
- [25] Rainer Böhme and Tyler Moore. How do consumers react to cybercrime? In *APWG eCrime Researchers Summit (eCrime)*, October 2012.
- [26] Ross Anderson, Chris Barton, Rainer Böhme, Richard Clayton, Michael van Eeten, Michael Levi, Tyler Moore, and Stefan Savage. Measuring the cost of cybercrime. In *11th Workshop on the Economics of Information Security (WEIS)*, 2012.
- [27] Tyler Moore, Nektarios Leontiadis, and Nicolas Christin. Fashion crimes: trending-term exploitation on the web. In Yan Chen, George Danezis, and Vitaly Shmatikov, editors, *ACM Conference on Computer and Communications Security (CCS)*, pages 455–466. ACM, 2011.
- [28] Tyler Moore and Richard Clayton. Ethical dilemmas in take-down research. In George Danezis, Sven Dietrich, and Kazue Sako, editors, *Workshop on the Ethics of Computer Security Research (Financial Cryptography Workshops)*, volume 7126 of *Lecture Notes in Computer Science*, pages 154–168. Springer, 2011.
- [29] Nektarios Leontiadis, Tyler Moore, and Nicolas Christin. Measuring and analyzing search-redirection attacks in the illicit online prescription drug trade. In *USENIX Security Symposium*. USENIX Association, 2011.
- [30] Susan Landau and Tyler Moore. Economic tussles in federated identity management. In *10th Workshop on the Economics of Information Security (WEIS)*, 2011.
- [31] Steven A. Hofmeyr, Tyler Moore, Stephanie Forrest, Benjamin Edwards, and George Stelle. Modeling internet-scale policies for cleaning up malware. In *10th Workshop on the Economics of Information Security (WEIS)*, 2011.
- [32] Tal Moran and Tyler Moore. The phish-market protocol: Securely sharing attack data between competitors. In Radu Sion, editor, *Financial Cryptography and Data Security*, volume 6052 of *Lecture Notes in Computer Science*, pages 222–237. Springer, 2010.
- [33] Tyler Moore, Allan Friedman, and Ariel D. Procaccia. Would a ‘cyber warrior’ protect us: exploring trade-offs between attack and defense of information systems. In Angelos D. Keromytis, Sean Peisert, Richard Ford, and Carrie Gates, editors, *New Security Paradigms Workshop (NSPW)*, pages 85–94. ACM, 2010.
- [34] Tyler Moore and Benjamin Edelman. Measuring the perpetrators and funders of typosquatting. In Radu Sion, editor, *Financial Cryptography and Data Security*, volume 6052 of *Lecture Notes in Computer Science*, pages 175–191. Springer, 2010.
- [35] Tyler Moore, Richard Clayton, and Henry Stern. Temporal correlations between spam and phishing websites. In *Proceedings of the 2nd USENIX conference on Large-scale exploits and emergent threats: botnets, spyware, worms, and more, LEET’09*, Berkeley, CA, USA, 2009. USENIX Association.

- [36] Tyler Moore and Richard Clayton. Evil searching: Compromise and recompromise of internet hosts for phishing. In Roger Dingledine and Philippe Golle, editors, *Financial Cryptography and Data Security*, volume 5628 of *Lecture Notes in Computer Science*, pages 256–272. Springer, 2009.
- [37] Rainer Böhme and Tyler Moore. The iterated weakest link - a model of adaptive security investment. In *8th Workshop on the Economics of Information Security (WEIS)*, 2009.
- [38] Tyler Moore, Maxim Raya, Jolyon Clulow, Panagiotis Papadimitratos, Ross Anderson, and Jean-Pierre Hubaux. Fast exclusion of errant devices from vehicular networks. In *Proceedings of the Fifth Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON)*, pages 135–143, 2008.
- [39] Tyler Moore and Richard Clayton. Evaluating the wisdom of crowds in assessing phishing websites. In Gene Tsudik, editor, *Financial Cryptography and Data Security*, volume 5143 of *Lecture Notes in Computer Science*, pages 16–30. Springer, 2008.
- [40] Tyler Moore and Richard Clayton. The consequence of non-cooperation in the fight against phishing. In *APWG eCrime Researchers Summit*, pages 1–14. IEEE, 2008.
- [41] Ross Anderson, Rainer Böhme, Richard Clayton, and Tyler Moore. Security economics and European policy. In Norbert Pohlmann, Helmut Reimer, and Wolfgang Schneider, editors, *Information Security Solutions Europe (ISSE)*, pages 57–76. Vieweg+Teubner, 2008.
- [42] Tyler Moore, Jolyon Clulow, Shishir Nagaraja, and Ross Anderson. New strategies for revocation in ad-hoc networks. In Frank Stajano, Catherine Meadows, Srdjan Capkun, and Tyler Moore, editors, *4th European Workshop on Security and Privacy in Ad-hoc and Sensor Networks (ESAS)*, volume 4572 of *Lecture Notes in Computer Science*, pages 232–246. Springer, 2007.
- [43] Tyler Moore and Jolyon Clulow. Secure path-key revocation for symmetric key pre-distribution schemes in sensor networks. In Hein S. Venter, Mariki M. Eloff, Les Labuschagne, Jan H. P. Eloff, and Rossouw von Solms, editors, *Proceedings of the IFIP TC-11 22nd International Information Security Conference (IFIP SEC)*, volume 232 of *IFIP*, pages 157–168. Springer, 2007.
- [44] Tyler Moore and Richard Clayton. Examining the impact of website take-down on phishing. In Lorrie Faith Cranor, editor, *APWG eCrime Researchers Summit*, volume 269 of *ACM International Conference Proceeding Series*, pages 1–13. ACM, 2007.
- [45] Tyler Moore and Richard Clayton. An empirical analysis of the current state of phishing attack and defence. In *6th Workshop on the Economics of Information Security (WEIS)*, 2007.
- [46] Tyler Moore. The economics of digital forensics. In *5th Workshop on the Economics of Information Security (WEIS)*, 2006.
- [47] Tyler Moore. A collusion attack on pairwise key predistribution schemes for distributed sensor networks. In *4th IEEE Conference on Pervasive Computing and Communications Security (PerSec)*, pages 251–255. IEEE Computer Society, 2006.

- [48] Jolyon Clulow, Gerhard P. Hancke, Markus G. Kuhn, and Tyler Moore. So near and yet so far: Distance-bounding attacks in wireless networks. In Levente Buttyán, Virgil D. Gligor, and Dirk Westhoff, editors, *3rd European Workshop on Security and Privacy in Ad-hoc and Sensor Networks (ESAS)*, volume 4357 of *Lecture Notes in Computer Science*, pages 83–97. Springer, 2006.
- [49] Tyler Moore. Countering hidden-action attacks on networked systems. In *4th Workshop on the Economics of Information Security (WEIS)*, 2005.
- [50] T. Kosloff, Tyler Moore, J. Keller, Gavin W. Manes, and Sujeet Sheno. Attacks on public telephone networks: technologies and challenges. In *SPIE 5071, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Defense and Law Enforcement II*, 72, pages 72–83, 2003.
- [51] Todd Kosloff, Tyler Moore, Jesse Keller, Gavin Manes, and Sujeet Sheno. SS7 messaging attacks on public telephone networks: Attack scenarios and detection. In *Workshop on the Scientific Aspects of Cyber Terrorism*. ACM, November 2002.
- [52] Gary Lorenz, Tyler Moore, Gavin Manes, John Hale, and Sujeet Sheno. Securing SS7 telecommunications networks. In *Second IEEE Systems, Man and Cybernetics Information Assurance Workshop*, June 2001.

Other Papers

- [1] Tyler Moore, Scott Dynes, and Frederick Chang. Identifying how firms manage cybersecurity investment. Technical Report DDI-TR-1001, Darwin Deason Institute for Cyber Security, Southern Methodist University, October 2015.
- [2] Fumiko Hayashi Tyler Moore and Richard J. Sullivan. The economics of retail payments security. In *Fifth International Payments Policy Conference: The Puzzle of Payments Security*, Federal Reserve Bank of Kansas City, 2015.
- [3] Tyler Moore. The promise and perils of digital currencies. *International Journal of Critical Infrastructure Protection*, 6(3–4):147–149, 2013.
- [4] Tyler Moore. Investigating the abuse of search engines to promote illicit online pharmacies. *Virus Bulletin*, November 2011.
- [5] Tyler Moore. How wise are crowds when assessing phishing websites? *Virus Bulletin*, April 2008.
- [6] Tyler Moore. Workshop report: DIMACS workshop on information security economics, January 2007.
- [7] Tyler Moore. Phishing and the economics of e-crime. *Elsevier Infosecurity Magazine*, 4(6):34–37, 2007.
- [8] Ross Anderson and Tyler Moore. Information security economics - and beyond. In Alfred Menezes, editor, *27th Annual International Cryptology Conference (CRYPTO)*, volume 4622 of *Lecture Notes in Computer Science*, pages 68–91. Springer, 2007.
- [9] Tyler Moore and Ross Anderson. Trends in security economics. *European Network and Information Security Agency Quarterly*, 1(3):6–7, 2005.

Books / Book Chapters

- [1] Frank Stajano, Catherine Meadows, Srdjan Capkun, and Tyler Moore, editors. *Security and Privacy in Ad-hoc and Sensor Networks, 4th European Workshop, ESAS 2007, Cambridge, UK, July 2-3, 2007, Proceedings*, volume 4572 of *Lecture Notes in Computer Science*. Springer, 2007.
- [2] Tyler Moore and Sujeet Sheno, editors. *Critical Infrastructure Protection IV - Fourth Annual IFIP WG 11.10 International Conference on Critical Infrastructure Protection, ICCIP 2010, Washington, DC, USA, March 15-17, 2010, Revised Selected Papers*, volume 342 of *IFIP Advances in Information and Communication Technology*. Springer, 2010.
- [3] Tyler Moore, David Pym, and Christos Ioannidis, editors. *Economics of Information Security and Privacy*. Springer, 2010.
- [4] Rainer Böhme, Michael Brenner, Tyler Moore, and Matthew Smith, editors. *Financial Cryptography and Data Security – 18th International Conference, FC 2014, Revised Selected Papers*, volume 8438 of *Lecture Notes in Computer Science*. Springer, 2014.
- [5] Tyler Moore and Ross Anderson. Internet security. In Martin Peitz and Joel Waldfogel, editors, *The Oxford Handbook of the Digital Economy*, pages 572–599. Oxford University Press, 2012.
- [6] Tyler Moore. The economics of cybersecurity: Principles and policy options. In *Proceedings of a Workshop on Deterring Cyberattacks: Informing Strategies and Developing Options for U.S. Policy*, pages 3–23. The National Academies Press, 2010.
- [7] Ross Anderson, Tyler Moore, Shishir Nagaraja, and Andy Ozment. Incentives and information security. In Noam Nisan, Tim Roughgarden, Eva Tardos, and Vijay V. Vazirani, editors, *Algorithmic Game Theory*, pages 633–649. Cambridge University Press, New York, NY, USA, 2007.
- [8] Christopher Swenson, Tyler Moore, and Sujeet Sheno. GSM cell site forensics. In Martin Olivier and Sujeet Sheno, editors, *Advances in Digital Forensics II*, volume 222 of *IFIP Advances in Information and Communication*, pages 259–272. Springer, 2006.
- [9] Tyler Moore, Anthony Meehan, Gavin Manes, and Sujeet Sheno. Using signaling information in telecom network forensics. In Mark Pollitt and Sujeet Sheno, editors, *Advances in Digital Forensics*, volume 194 of *IFIP – The International Federation for Information Processing*, pages 177–188. Springer, 2005.

Externally-Funded Research

- [1] Tyler Moore (PI) and Neil Gandal (PI): ‘Shocks to and Security in the Bitcoin Ecosystem: an Interdisciplinary Approach’. Tel Aviv University ICRC. Duration: October 2015 – September 2017. Award amount: \$67,726.
- [2] Tyler Moore (PI) and Frederick Chang (co-PI): ‘A Technical and Policy Evaluation of Mechanisms that Monitor Access to Company Documents’. Duration: January – December 2015. Award amount: \$100,000.

- [3] Tyler Moore (PI) and Frederick Chang (co-PI): ‘Structured Interviews and Field Studies to Identify How Firms Manage Cybersecurity Investment’. IBM. Duration: January – October 2015. Award amount: \$150,000.
- [4] Tyler Moore (PI) and Joshua Rovner (co-PI): ‘EAGER: Exploring Trade-offs in Cyber Offense and Defense Through the Lenses of Computer and Political Science’. National Science Foundation. Duration: September 2014 – September 2016. Award amount: \$210,505.
- [5] Tyler Moore (PI) and Michel van Eeten (PI): ‘Increasing the Impact of Voluntary Action Against Cybercrime’. US Department of Homeland Security–Dutch NWO. Duration: July 2014 – June 2017. Award amount: \$433,886 (SMU/TU portion) \$204,886.
- [6] Tyler Moore (PI): ‘Empirical Analysis of Security Threats Against Digital Currencies’. Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities. Duration: June 2014–May 2016. Award amount: \$10,000.
- [7] Nicolas Christin (PI), Alessandro Acquisti (co-PI), Ross Anderson (co-PI), and Tyler Moore (co-PI): ‘Understanding and Disrupting the Economics of Cybercrime’. Department of Homeland Security BAA 11-02. Duration: October 2012 – September 2016. Award amount: \$2,874,678 (SMU/TU portion \$371,843).

Selected Presentations

- [1] ‘A Scientific Approach to Fighting Web-Based Cybercrime’. Keynote address to the 13th IFIP 11.9 International Conference on Digital Forensics, Orlando, FL, January 30, 2017.
- [2] ‘A Scientific Approach to Fighting Web-Based Cybercrime’. Invited talk to the Inaugural Cybercrime Conference, Cambridge Cybercrime Centre, University of Cambridge, United Kingdom, July 14, 2016.
- [3] ‘Identifying and Overcoming Barriers to Cybersecurity’. Invited talk to Cybersecurity and the Law, Continuing Legal Education, University of Tulsa, Tulsa, OK, April 22, 2016.
- [4] ‘Does the Internet Need a Hegemon?’. Invited talk to the Nye Cyber Seminar Series, Harvard Kennedy School of Government, Cambridge, Massachusetts, March 23, 2016.
- [5] ‘Introduction to Cybersecurity Economics’. Featured speaker in General Session of HIMSS Security and Privacy Forum, Boston, Massachusetts, December 1, 2015.
- [6] ‘A Scientific Approach to Fighting Web-Based Cybercrime’. Invited talk to the Asymmetric Resilient Cybersecurity Seminar Series, Pacific Northwest National Laboratory, Richland, Washington, October 27, 2015.
- [7] ‘Introduction to Cybersecurity Economics’. Presentation to the Stanford Congressional Cyber Bootcamp, Stanford, California, August 18, 2015.
- [8] ‘The Economics of Cybersecurity: Case Studies for Bank Regulators’. Invited talk to Senior Management Group Meeting, Office of the Comptroller of the Currency, Irving, Texas, February 12, 2015.

- [9] ‘Introduction to Cybersecurity Economics’. Guest lecture in *Case Studies in Cybersecurity*, Prof. Susan Landau, Worcester Polytechnic Institute, Worcester, Massachusetts, February 6, 2015.
- [10] ‘Introduction to Cybersecurity Economics’. Presentation to the Stanford Congressional Cyber Bootcamp, Stanford, California, August 19, 2014.
- [11] ‘Voluntary Action Against Cybercrime: Measuring and Increasing its Impact’. Keynote address to the 9th Annual London Action Plan Conference, Montreal, Canada, October 22, 2013.
- [12] ‘Foundational Security Economics’. Presentation to the National Academy of Sciences Committee on Future Research Goals and Directions for Foundational Science in Cybersecurity, Washington, DC, January 23, 2013.
- [13] ‘Introducing Cyberinsurance: Challenges and Opportunities’. Plenary presentation to the Cybersecurity Insurance Workshop: Defining Challenges to Today’s Cybersecurity Insurance Market, Department of Homeland Security, Arlington, VA, October 22, 2012.
- [14] ‘Economic Tussles in Federated Identity Management’. Presentation to the NIST IDTrust Workshop, Gaithersburg, MD, March 14, 2012.
- [15] ‘The Economics of Cybersecurity: Past, Present and Future’. International Conference on Challenges in Cybersecurity – Risks, Strategies and Confidence Building, German Federal Foreign Office, Berlin, Germany, December 13, 2011.
- [16] ‘Where Do We Go From Here?’. Panel presentation at the Fraud Symposium: Improving Security for Online and Card Not Present Transactions, Federal Reserve Bank, Chicago, IL, September 26, 2011.
- [17] ‘Exploring Attack and Defense Trade-offs in Cyber War’. Keynote address to the 4th IFIP 11.10 International Conference on Critical Infrastructure Protection, National Defense University, Washington, DC, March 24, 2011.
- [18] ‘Gathering Evidence of Large-Scale Internet Frauds’. Keynote address to the 7th IFIP 11.9 International Conference on Digital Forensics, Orlando, FL, February 1, 2011.
- [19] ‘Cyber War’. Invited talk to the Boston Committee on Foreign Relations, January 19, 2011.
- [20] ‘The Law and Economics of Cybersecurity’. Guest lecture, Law and Economics Seminar, Harvard Law School, Cambridge, MA, November 16, 2010.
- [21] ‘The Economics of Online Crime’. Guest lecture, Cybercrime Seminar, Harvard Law School, Cambridge, MA, March 11, 2010.
- [22] ‘The Economics of Identity Management’. Invited talk to the State Department Conference on Identity Management in an Open Society, Washington, DC, USA, November 20, 2009.
- [23] ‘The Economics of Information Security’. Invited talk to the Cyber International Relations Seminar, MIT, Cambridge, MA, USA, October 15, 2009.

- [24] ‘The Economics of Information Security’. Invited talk to the Federal Reserve Bank, Kansas City, MO, USA, July 7, 2009.
- [25] ‘The Economics of Information Security – Key Insights and the Case of Phishing Metrics’. Keynote address to the ITWeb Security Summit, Midrand, South Africa, May 27, 2009.
- [26] ‘The Economics of Information Security – with Lessons for Critical Infrastructure Protection’. Invited talk to 3rd IFIP WG11.10 International Conference on Critical Infrastructure Protection, Hanover, NH, USA, March 23, 2009.
- [27] ‘An Empirical Analysis of Phishing Attack and Defense’. Invited talk to Harvard University, Center for Research on Computation and Society Seminar, Cambridge, MA, USA, October 1, 2008.
- [28] ‘An Empirical Analysis of Phishing Attack and Defense’. Invited talk to the University of Bath, Computer Science Departmental Seminar, Bath, United Kingdom, May 23, 2008.
- [29] ‘The Economics of Information Security’. Invited talk to the DeepSec In-Depth Security Conference, Vienna, Austria, November 22, 2007.
- [30] ‘Network Economics and Security Engineering’. Presented at the DIMACS Workshop on Information Security Economics, Rutgers University, Piscataway, NJ, USA, January 18–19, 2007.
- [31] ‘The Economics of Information Security’. Invited talk to the Institute for Security Technology Studies, Dartmouth College, Hanover, NH, USA, January 16, 2007.
- [32] ‘The Economics of Information Security’. Invited talk to the Laboratory for Computer Communications and Applications, EPFL, Lausanne, Switzerland, November 30, 2006.
- [33] ‘Economic Challenges to Improving Information Security’. Invited talk to the International Workshop on Cyber-security, Danish Board of Technology, Copenhagen, Denmark, September 14, 2006.
- [34] ‘A Survey of Recent Results in the Economics of Information Security’. Invited talk to the Conference on Network and Information Security in Cyprus—Policy and Implementation of Standards, Nicosia, Cyprus, April 28, 2006.
- [35] ‘On Economics and Information Security’. Keynote address to the Network of Networks (NVN) Workshop, Amsterdam, The Netherlands, January 26, 2006.
- [36] ‘A Research Agenda for Telecommunications Security’. Presented at the Infosec Research Council Meeting, DARPA, Arlington, VA, USA, September 11, 2003.
- [37] ‘Countering the Threats to America’s Public Telephone Networks’. Presented at the National Defense University, Fort Leslie McNair, Washington, DC, USA, September 11, 2003.
- [38] ‘Signaling System 7 (SS7) Network Security’. Presented at the National Security Information Exchange Meeting, Atlanta, GA, USA, September 18, 2002.

Teaching Experience

Tandy Assistant Professor of Cyber Security and Information Assurance

University of Tulsa, 2015–present

Taught CS2123 “Data Structures and Algorithms”. *Taught F16*

Taught graduate-level “Security Economics”. *Taught F15*

Taught CS7403 “Secure Electronic Commere”. *Taught S16*

Assistant Professor

Southern Methodist University, 2012–2015

Designed and taught “Security Economics”, introducing concepts from microeconomics and information security, covering security investment models, empirical analysis techniques for studying cybercrime, and game theoretic modeling. *Taught F12, F13, F14*

Taught undergraduate-level “Fundamentals of Algorithms”. *Taught S13, S14, F14*

Visiting Assistant Professor

Wellesley College, 2011-2012

Taught introductory course for non-majors covering HTML, CSS and JavaScript; designed and taught “Quantifying the World” course, introducing methods of data collection and analysis, teaching Python, R, and MongoDB.

Head Teaching Fellow

Harvard College, Spring 2009

Assisted teaching of introductory computer science and policy course for non-technical majors; managed 7 teaching fellows, co-wrote and graded problem sets, projects and exams.

Teaching Fellow

Harvard University Extension School, Autumn 2008 & Spring 2010

Assisted teaching of introductory computer science and policy course for non-technical majors

Supervisor, Computer Laboratory

University of Cambridge, Autumn 2004–Spring 2006

Courses taught: Security and Advanced Systems Topics

Mentor, Tulsa Undergraduate Research Challenge

University of Tulsa, Summer 2001–Summer 2004

Taught informal Java programming course and advised students on research projects and community service initiatives

Research Collaborators

Alessandro Acquisti (Carnegie Mellon), Ross Anderson (Cambridge), Chris Barton (Cloudmark), Rainer Böhme (Münster), William Casper (SMU), Nicolas Christin (Carnegie Mellon), Richard Clayton (Cambridge), Benjamin Edelman (Harvard), Benjamin Edwards (New Mexico), Stephanie Forrest (New Mexico), Allan Friedman (George Washington), Jens Grossklags (Penn State), Fumiko Hayashi (Federal Reserve Bank of Kansas City), Steven A. Hofmeyr (Berkeley Lab), Benjamin Johnson (UC Berkeley), Susan Landau (WPI), Aron Laszka (Budapest University of Technology and Economics), Nektarios Leontiadis (Carnegie Mellon), Michael Levi (Cardiff), Tal Moran (IDC Herzliya), Stephen Papa (SMU), Ariel D. Procaccia (Carnegie Mellon), George Stelle (New Mexico), Richard Sullivan (Federal Reserve Bank of Kansas City), Michael van Eeten (TU Delft)

Research Students

- **Postdoctoral Scholar:** David Benson (SMU, 2015–2016)

- **Dissertation/Thesis Advisor:** Marie Vasek (Ph.D., TU, anticipated 2017), JT Hamrick (Ph.D., TU, anticipated 2020), Matthew Weeden (M.S., TU, anticipated 2017), Jake Drew (Ph.D., SMU, 2015), Lewis Sykalski (D.Eng., SMU, 2015), John Wadleigh (M.S., SMU, 2015), Era Vuksani (B.S. honors thesis, Wellesley, 2012)
- **Committee Member:** Aaron Hansen (Ph.D., TU, anticipated 2016), Jason Staggs (Ph.D., TU, anticipated 2016), Chad Johnson (Ph.D., TU, anticipated 2016), Osman Yucel (Ph.D., TU, anticipated 2016), Jason Britt (Ph.D., University of Alabama at Birmingham, anticipated 2016), Benjamin Edwards (Ph.D., University of New Mexico, 2016), Subil Abraham (Ph.D., SMU, 2016), Aaron Estes (D.Eng., SMU, 2016), Bilal Al-qudah (Ph.D., SMU, 2015), Ali Eshmawi (Ph.D., SMU, 2014), Nektarios Leontiadis (Ph.D., Carnegie Mellon University, 2014), Richard Goodrum (Ph.D., SMU, 2013), Stephen Papa (Ph.D., SMU, 2013), Andy Nagar (Ph.D., SMU, 2013)
- **Undergraduate Research Students:** Joseph Brett (TU), Steven Diaz (TU), Andrew Fulsom (SMU), Jie Han (Wellesley), Cameron Keith (SMU), Justin Konersmann (SMU), Viral Kotecha (SMU), Noah Mendoza (SMU), Jarret Shook (SMU), Joe St. Angelo (SMU), Micah Thornton (SMU), Elena Villamil (SMU), John Wadleigh (SMU), Marie Vasek (Wellesley), Era Vuksani (Wellesley)
- **Visiting Scholar:** Markus Riek, University of Münster

Professional Activities

Director

StopBadware, (2015–present)

Editor in Chief

Journal of Cybersecurity, Oxford University Press, (2014–present)

Vice President and Director

International Financial Cryptography Association, (2011–2014)

Vice Chair

IFIP Working Group 11.10 on Critical Infrastructure Protection, (2008–present)

Workshop Organizer

“Assessing ICT Security Risks in Socio-Technical Systems”, Schloss Dagstuhl, Germany, November 2016

Program Chair

9th Workshop on the Economics of Information Security, Harvard University, Cambridge, MA, USA (2010)

Program Co-Chair

1st Workshop on Bitcoin Research, Barbados (2014)

8th APWG eCrime Researchers Summit, San Francisco, CA (2013)

7th APWG eCrime Researchers Summit, Las Croabas, PR (2012)

4th IFIP WG 11.10 International Conference on Critical Infrastructure Protection, National Defense University, Washington, DC, USA (2010)

8th Workshop on the Economics of Information Security, University College London, UK (2009)

General Chair

18th International Conference on Financial Cryptography and Data Security, Barbados (2014)

13th International Conference on Financial Cryptography and Data Security, Barbados (2009)

5th Workshop on the Economics of Information Security, University of Cambridge, UK (2006)

Local Arrangements Chair

4th European Workshop on Security and Privacy in Ad-hoc and Sensor Networks, University of Cambridge, UK (2007)

Program Committee Member

USENIX Security Symposium (2015, 2016)

WWW: International World Wide Web Conference (Security & Privacy Track) (2014, 2015, 2016, 2017)

FC: International Conference on Financial Cryptography and Data Security (2011, 2015, 2016)

WEIS: Workshop on the Economics of Information Security (2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017)

eCrime: Anti-Phishing Working Group eCrime Researchers Summit, (2009, 2010, 2011, 2012, 2013, 2016, 2017)

CCS: ACM Conference on Computer and Communications Security (2012)

BITCOIN: Workshop on Bitcoin and Blockchain Research (2014, 2015, 2016)

WTMC: International Workshop on Traffic Measurements for Cybersecurity (2016, 2017)

IFIP WG 11.10 International Conference on Critical Infrastructure Protection (2007–2016)

STAST: Workshop on Socio-Technical Aspects in Security and Trust (2011, 2012, 2013, 2014)

W-PIN+NetEcon 2014: Workshop on Pricing and Incentives in Networks and Systems (2014)

NetEcon: Workshop on the Economics of Networks, Systems and Computation (2017) *CSET:*

USENIX Workshop on Cybersecurity Experimentation and Test (2013)

GameSec: Conference on Decision and Game Theory for Security (2013)

QASA: International Workshop on Quantitative Aspects of Security Assurance (2013)

NSPW: New Security Paradigms Workshop (2011)

TRUST: International Conference on Trust and Trustworthy Computing (2009, 2010, 2011, 2016)

DIMVA: International Conference on Detection of Intrusions and Malware & Vulnerability Assessment (2010)

Ad Auctions Workshop (2010)

WiSec: ACM Conference on Wireless Network Security (2010)

PerSec: IEEE Workshop on Pervasive Computing and Communications Security (2007)

IFIP WG 11.9 International Conference on Digital Forensics (2006–2010)

Journal Reviews

Science, IEEE Transactions on Dependable and Secure Computing, IEEE Security and Privacy Magazine, ACM Mobile Computing and Communications Review, ACM Computing Surveys, Information Systems Research, The Computer Journal (British Computer Society, Elsevier International Journal of Critical Infrastructure Protection, Management Science, Journal of Policy Analysis and Management, Proceedings on Privacy Enhancing Technologies

References

Available upon request.