

Marc Liberatore

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140 Governors Drive
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RESEARCH INTERESTS

File and network forensics, anonymity systems, security, and peer-to-peer architectures.

ACADEMIC EXPERIENCE

University of Massachusetts Amherst, Amherst, MA 01003

Lecturer

September 2016 – Present

Associate Director, Digital Forensics Laboratory

Responsibilities include teaching four courses or course equivalents per academic year, supporting the CyberCorps Scholarship for Service (SFS) program, and advising and other service as required.

Research Scientist and Lecturer

January 2009 – August 2016

Associate Director, Center for Forensics and Society

Research and development digital forensic science and computer security; occasional teaching. Responsibilities include designing, implementing, and evaluating systems for digital investigations; planning and exploring new lines of research with the goal of advancing forensic science; coordination and writing of grant proposals; supervision of undergraduate and graduate students; and collaboration with local and remote academic and law enforcement colleagues. Courses taught include Programming with Data Structures (CMPSCI 187, Spring 2015, nominated for a Distinguished from Award), Artificial Intelligence (CMPSCI 383, Fall 2014), A Networked World (CMPSCI 290NW, Spring 2016 and Fall 2014), Computer Networking (CMPSCI 453, Spring 2014).

Wesleyan University, Middletown, CT 06459

Visiting Assistant Professor (Mellon Fellow)

August 2007 – December 2008

Developed and taught an upper-level undergraduate course *Introduction to Network and Computer Security* (COMP360, Fall 2007). Other responsibilities included teaching at Connecticut College (COM325, Spring 2008) and Trinity College (CPSC415, Fall 2008), conducting research, giving seminar talks, and involving undergraduates in research projects.

University of Massachusetts Amherst, Amherst, MA 01003

Research Assistant

January 2001 – August 2007

Performed Ph.D. research and Masters level coursework and research projects. Responsibilities included constructing and evaluating large software prototypes and implementations, occasional supervision of undergraduates, and collaboration with local and remote colleagues.

Instructor

June – August 2001

Instructor for the undergraduate course in *Computer Architecture and Assembly Language* (CMPSCI 201, Summer 2001). Responsibilities included lecture, discussion, lab supervision, grading, and development of labs, homework, and exams for a class of 35 students. Student feedback gave a 4.4 out of 5.0 for “Overall rating of the instructor’s teaching.”

EDUCATION

University of Massachusetts Amherst

Ph.D., Computer Science, February 2008

M.S., Computer Science, May 2003

B.S. *cum laude*, Computer Science, May 2000

Honors: Chancellor’s Scholarship for Academic Talent

PEER-REVIEWED
PUBLICATIONS

Characterization of Contact Offenders and Child Exploitation Material Trafficking on Five Peer-to-Peer Networks. George Bissias, Brian Neil Levine, Marc Liberatore, Brian Lynn, Juston Moore, Hanna Wallach, and Janis Wolak. *Elsevier Child Abuse & Neglect*, 52:185–199, 2016.

Forensic Identification of Anonymous Sources in OneSwarm. George Bissias, Brian Neil Levine, Marc Liberatore, and Swagatika Prusty. *IEEE Transactions on Dependable and Secure Computing*, to appear 2015.

Discovering Specification Violations in Networked Software Systems. Robert J. Walls, Yuriy Brun, Marc Liberatore, and Brian Neil Levine. *Proceedings of the IEEE International Symposium on Software Reliability Engineering*, November 2015.

Sybil-Resistant Mixing for Bitcoin. George Bissias, A. Pinar Ozisik, Brian N. Levine, and Marc Liberatore. In *Proceedings of the ACM Workshop on Privacy in the Electronic Society*, November 2014.

Efficient Tagging of Remote Peers During Child Pornography Investigations. Marc Liberatore, Brian Neil Levine, Clay Shields, and Brian Lynn. *IEEE Transactions on Dependable and Secure Computing*, 11(5):425–439, September 2014.

Location privacy without carrier cooperation. Keen Sung, Brian Neil Levine, and Marc Liberatore. *Proceedings of the IEEE Workshop on Mobile System Technologies (MoST)*, May 2014.

Measuring a year of child pornography trafficking by U.S. computers on a peer-to-peer network. Janis Wolak, Marc Liberatore, and Brian Neil Levine. *Child Abuse & Neglect*, page 10, 2013.

Disabling GPS is Not Enough: Cellular location leaks over the Internet. Hamed Soroush, Keen Sung, Erik Learned-Miller, Brian Neil Levine, and Marc Liberatore. *Proceedings of the Privacy Enhancing Technologies Symposium (PETS)*, pages 103–122, July 2013.

Measurement and Analysis of Child Pornography Trafficking on P2P Networks. Ryan Hurley, Swagatika Prusty, Hamed Soroush, Robert J. Walls, Jeannie Albrecht, Emmanuel Cecchet, Brian Neil Levine, Marc Liberatore, and Brian Lynn. *Proceedings of the International World Wide Web Conference (WWW)*, May 2013. Runner-Up for Best Paper.

Effectiveness and Detection of Denial-of-Service Attacks in Tor. Norman Danner, Sam Defabbia-Kane, Danny Krizanc, and Marc Liberatore. *ACM Transactions on Information and System Security (TISSEC)*, 15(3):11:1–11:25, November 2012.

Forensic Investigation of the OneSwarm Anonymous Filesharing System. Swagatika Prusty, Brian Neil Levine, and Marc Liberatore. *Proceedings of the ACM Conference on Computer and Communications Security (CCS)*, 13 pages, October 2011.

Effective Digital Forensics Research is Investigator-Centric. Robert J. Walls, Brian Neil Levine, Marc Liberatore, and Clay Shields. *Proceedings of the USENIX Workshop on Hot Topics in Security*, 7 pages, August 2011.

Empirical Tests of Anonymous Voice Over IP. Marc Liberatore, Bikas Gurung, Brian Neil Levine, and Matthew Wright. *Elsevier Journal of Network and Computer Applications*, 34(1):341-350, January 2011.

Strengthening Forensic Investigations of Child Pornography on P2P Networks. Marc Liberatore, Brian Neil Levine, and Clay Shields. Proceedings of the ACM Conference on Future Networking Technologies (CoNEXT), 12 pages, November 2010.

Forensic Investigation of Peer-to-Peer File Sharing Networks. Marc Liberatore, Robert Erdely, Thomas Kerle, Brian Neil Levine, and Clay Shields. Proceedings of the DFRWS Annual Digital Forensics Research Conference, pages 95–103, August 2010.

DEX: Digital Evidence Provenance Supporting Reproducibility and Comparison. Brian Neil Levine and Marc Liberatore. Proceedings of the DFRWS Annual Digital Forensics Research Conference, pages 48–56, August 2009.

Detecting Denial of Service Attacks in Tor. Norman Danner, Danny Krizanc, and Marc Liberatore. Proceedings of the Thirteenth International Conference on Financial Cryptography and Data Security, pages 273–284, February 2009.

Cheat-Proof Payout for Centralized and Peer-to-Peer Gaming. Nathaniel E. Baughman, Marc Liberatore, and Brian Neil Levine. IEEE/ACM Transactions on Networking, 15(1):1–13, February 2007.

Maximizing Transfer Opportunities in Bluetooth DTNs. Marc Liberatore, Brian Neil Levine, and Chadi Barakat. Proceedings of the ACM Conference on Future Networking Technologies (CoNext), 11 pages, December 2006.

Inferring the Source of Encrypted HTTP Connections. Marc Liberatore and Brian Neil Levine. Proceedings of the ACM Conference on Computer and Communications Security (CCS), pages 255–263, October 2006.

Privacy Vulnerabilities in Encrypted HTTP Streams. George Bissias, Marc Liberatore, David Jensen, and Brian Neil Levine. Proceedings of the Privacy Enhancing Technologies Workshop (PET), pages 1–11, May 2005.

FUNDING

PI: Brian Levine, Co-PIs: Wayne Bursleson, Marc Liberatore, Mila Sherman, Eric Sommers. “CyberCorps Scholarship for Service at the University of Massachusetts Amherst,” \$4.2M over five years, ending May 2021. National Science Foundation (DGE-1565521).

PI: Brian Levine, Co-PI: Marc Liberatore. “Research and Development for IINIU,” \$160k over one year, ending December 2013. Department of Justice.

PI: Marc Liberatore, Co-PIs: Brian Levine, Hanna Wallach. “RoundUp Predictive Tools,” \$475k over three years, ending September 2014. \$618k with partners Janis Wolak (UNH Crimes Against Children Research Center) and Brad Russ (Fox Valley). Office of Juvenile Justice and Delinquency Prevention (OJJDP).

PI: Marc Liberatore, Co-PI: Brian Levine. “Novel Investigative Techniques for Internet Crimes against Children Task Forces,” \$150k over eighteen months, ending March 2012. OJJDP, subcontract from MA Department of State Police (MSP).

PI: Thomas Kerle (MSP), Co-PIs: Marc Liberatore (PI for UMass), Brian Levine, Janis Wolak (UNH), Brad Russ (FV). “Needs Assessment and Developmental Activities for the National Internet Crimes Against Children Data System (NIDS),” OJJDP, October 2010.

PI: Brian Levine. Co-PI: Marc Liberatore, “Strengthening Forensic Science for Network Investigations,” \$380k over three years, ending July 2013. \$500k with partner Janis Wolak (UNH), National Science Foundation. (CNS-1018615)

PI: Brian Levine, Co-PI: Marc Liberatore. “RoundUp: A System for Identifying and Gathering Evidence of P2P Trafficking,” \$740k over four years, ending August 2012. National Institute of Justice. Sept. 2008. (2008-CE-CX-K005)

OUTREACH AND TALKS

Panel presentation, “Innovation with scale: turning large class sizes into opportunities for pedagogical innovation.” Consortium for Computing Sciences in Colleges — Northeastern Region. College of St. Rose, Albany, NY. April 2017.

Invited talks, “Internet Investigations and Anonymity: A Practical Overview” and “Understanding the BitTorrent File Sharing Network.” National Law Enforcement Training on Child Exploitation, Atlanta, GA. May 2012.

Invited talk, “Understanding Internet Anonymity Systems.” 6th Annual Provincial Strategy Multidisciplinary Training Conference, Ontario, Canada. November 2011.

Invited talks, “Internet Anonymity: A Practical Overview” and “Understanding BitTorrent.” National Strategy Conference on Combating Child Exploitation, San Jose, CA. May 2011.

Invited talk, “Internet Anonymity.” High Technology Crime Investigation Association (Northeast Chapter), Boston, MA. September 2010.

Invited talk (with Brian Levine), “Understanding BitTorrent.” Internet Crimes Against Children National Conference, Jacksonville, FL. May 2010.

SOFTWARE

RoundUp (<http://forensics.umass.edu>); a suite of tools for forensic investigation of contraband sharing on peer-to-peer networks. The tools are used by State Police in all 50 U.S. states, several federal agencies, in other countries, and is part of the standard curriculum of the Internet Crimes Against Children Task Force when training law enforcement in p2p investigations. Since the project's start in September 2008, over 9,000 investigators have completed multi-day trainings to become certified with our suite of software tools, and the tools have been the basis of at least 12,000 investigator-led criminal arrests. Collaborative work with Brian Levine, Brian Lynn, and Clay Shields.

**INDUSTRY
EXPERIENCE**

Intel Research Cambridge, England

Research Intern

May – October 2004

Performed various research duties relating to disruption tolerant networking, including design of prototype Delay Tolerant Network (DTN) protocols, implementation of DTN software for deployment on embedded Java platforms, and measurement studies of several Bluetooth implementations.

**PROFESSIONAL
SERVICE**

Served on the technical program committee for the 2011–15 DFRWS Digital Forensics Conference, 2013–15 Privacy Enhancing Technologies Symposium (PETS), the ACM CCS Workshop on Insider Threats (WITs 2010) and the Workshop on Network and Systems Support for Games (NetGames 2008).

Ad hoc reviewing for various journals and conferences, including IEEE Transactions on Parallel and Distributed Systems (TPDS), IEEE/ACM Transactions on Networking (TON), Springer Journal of Multimedia Tools and Applications, ACM Computer Communication Review (CCR), Springer/ACM Multimedia Systems Journal, ACM Transactions on Modeling and Performance Evaluation of Computer Systems, Network and Distributed System Security Symposium (NDSS), ACM Conference on Computer and Communications Security (CCS), USENIX Security Symposium, IEEE Conference on Computer Communications (INFOCOM), Conference on Privacy Enhancing Technologies (PET), Northeast Digital Forensics Exchange (NeFX), and the ACM Conference on Network and Operating System Support for Digital Audio and Video (NOSSDAV).

TEACHING

Using Data Structures (CMPSCI190D). Fall 2016 at UMass Amherst.

Computer Crime Law (CMPSCI391L/591L). Fall 2016 at UMass Amherst.

Programming with Data Structures (CMPSCI187). Spring 2015 at UMass Amherst. 112 students; students gave 4.6 out of 5.0 for “Overall rating of the instructor’s teaching.” Nominated for a Distinguished Teaching Award.

Artificial Intelligence (CMPSCI383). Fall 2014 at UMass Amherst. 44 students; students gave 4.5 out of 5.0 for “Overall rating of the instructor’s teaching.”

A Networked World (CMPSCI290NW). Fall 2014 at UMass Amherst. 37 students; students gave 4.8 out of 5.0 for “Overall rating of the instructor’s teaching.”

Computer Networks (CMPSCI453). Spring 2014 at UMass Amherst. 46 students; students gave 4.8 out of 5.0 for “Overall rating of the instructor’s teaching.”

Computer Crime Law (CMPSCI391LI), with Brian Levine. Fall 2011 at UMass Amherst. 25 students. (Quantitative evaluations for Prof. Levine only.)

Introduction to Network and Computer Security (CPSC415). Fall 2008 at Trinity College (Hartford, CT).

Introduction to Network and Computer Security (COM325). Spring 2008 at Connecticut College (New London, CT).

Introduction to Network and Computer Security (COMP360). Fall 2007 at Wesleyan University (Middletown, CT).

Architecture and Assembly Language (CMPSCI201). Summer 2001 at UMass Amherst. 35 students; students gave 4.4 out of 5.0 for “Overall rating of the instructor’s teaching.”

ADVISING

Ryan Hurley, M.S. May 2013, took a position at TripAdvisor. Co-advisor.

Swagatika Prusty, M.S. May 2012, took a position in the kernel group at Oracle. Co-advisor.

Sharon Santana, Research Experience for Undergraduates (visiting from Greenfield Community College, MA; matriculated at Smith College in 2012), Summer 2011. Advisor.

LaTia Jefferson, Research Experience for Undergraduates (visiting from McKendree University, IL), Summer 2011. Advisor.

Craig Darmetko, B.S. May 2010. Reader for honors thesis.

OTHER SERVICE

Amherst Fire Department, Amherst, MA 01002

Call Fire Lieutenant

July 2001 – August 2007

Served as an officer for Engine Company 4, which staffs the ladder truck, an engine, and an ambulance for the Town of Amherst. Responsibilities included leadership and supervision, fire suppression, emergency medical care, developing and overseeing training exercises, and various administrative tasks.