

David J. Malan

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education

Harvard University, School of Engineering and Applied Sciences 2002 – 2007

Doctor of Philosophy (Ph.D.), Computer Science. Research in cybersecurity and digital forensics with focus on detection of patterns in large datasets. Dissertation on *Rapid Detection of Botnets through Collaborative Networks of Peers*. Advised by Dean Michael D. Smith.

Harvard University, Graduate School of Arts and Sciences 2002 – 2004

Master of Science (S.M.), Computer Science. Research in sensor networks for emergency medical care.

Harvard College 1995 – 1999

Bachelor of Arts (A.B.), *cum laude*, Computer Science; 3.9 of 4.0 GPA in field. Studies in micro- and macro-economics, finance, statistics and probability theory, multivariate calculus, and linear algebra.

service

American Red Cross, Disaster Services 2003 –

Emergency Medical Technician (EMT). Provide emergency medical care at local events.

startups

Diskaster® 2005 – 2008

Founder. Started company that offered professional recovery of data from hard drives and memory cards as well as forensic investigations for civil matters.

Crimson Tutors 2005 – 2007

Founder. Started company that provided area students with academic tutors from Harvard and MIT. Managed all finances and oversaw 40 tutors.

experience

Harvard University, School of Engineering and Applied Sciences 2007 –

Senior Lecturer on Computer Science, Director of Educational Innovation. Voting member of the Faculty of Arts and Sciences with Principal Investigator privileges. Instructor for second-largest course at Harvard College, *Computer Science 50: Introduction to Computer Science I*. Grew enrollment from 132 students to 607 (+360%). Manage staff of 101 teaching fellows and course assistants. OpenCourseWare at <http://cs50.tv/>.

Mindset Media, LLC 2008 – 2011

Chief Information Officer (CIO). Responsible for advertising network's scalability, security, and capacity-planning. Designed infrastructure for collection of massive datasets capable of 500M HTTP hits per day with peaks of 10K per second. Acquired by Meebo, Inc.

Office of the Middlesex District Attorney, Special Investigations Division 2005

Forensic Investigator. Assisted police and prosecutors with criminal investigations. Conducted forensic analyses of seized hardware. Recovered deleted and damaged data as evidence for trials. Drafted subpoenas.

AirClic Inc. 2000 – 2001

Engineering Manager. First technical hire of wireless startup, chaired by American Express's Harvey Golub and backed by \$290M in class-B funding. Direct report to CTO. Built software-development and product-management teams. Drafted and managed all patents.

Harvard University, Division of Continuing Education 1998 –

Lecturer. Youngest instructor in Harvard Extension School's history; appointed while still an undergraduate. First instructor at university to podcast an entire course in audio and video formats, free to public. Podcast ranked "best educational podcast" by Wired Magazine and featured on iTunes, with over 10,000 subscribers at debut. OpenCourseWare at <http://computerscience1.tv/>.

languages

C, C++, C#, CSS, DTD, HTML, Java, JavaScript, LISP, NesC, Objective-C, Perl, PHP, SQL, SVG, VBScript, XHTML, XML Schema, XPath, XQuery, XSLT.

English, Spanish, Italian.

- articles* “Sensor Networks for Emergency Response: Challenges and Opportunities.” Konrad Lorincz, David J. Malan, Thaddeus R.F. Fulford-Jones, Alan Nawoj, Antony Clavel, Victor Shnayder, Geoff Mainland, Steve Moulton, and Matt Welsh. *IEEE Pervasive Computing*. October – December, 2004.
- conferences* *A Public-Key Infrastructure for Key Distribution in TinyOS Based on Elliptic Curve Cryptography*. David J. Malan, Matt Welsh, and Michael D. Smith. First IEEE International Conference on Sensor and Ad hoc Communications and Networks. Santa Clara, California. October 2004.
- Advanced Forensic Format: An Open, Extensible Format for Disk Imaging*. Simson L. Garfinkel, David J. Malan, Karl-Alexander Dubec, Christopher C. Stevens, and Cecile Pham. Second Annual IFIP WG 11.9 International Conference on Digital Forensics. Orlando, Florida. January 2006.
- Moving CS50 into the Cloud*. David J. Malan. 15th Annual Conference of the Northeast Region of the Consortium for Computing Sciences in Colleges. Hartford, Connecticut. April 2010.
- Podcasting Computer Science E-1*. David J. Malan. 38th Annual ACM Technical Symposium on Computer Science Education. Covington, Kentucky. March 2007.
- Reinventing CS50*. David J. Malan. 41st Annual ACM Technical Symposium on Computer Science Education. Milwaukee, Wisconsin. March 2010.
- Scratch for Budding Computer Scientists*. David J. Malan and Henry H. Leitner. 38th Annual ACM Technical Symposium on Computer Science Education. Covington, Kentucky. March 2007.
- Virtualizing Office Hours in CS 50*. David J. Malan. 14th Annual ACM Conference on Innovation and Technology in Computer Science Education. Paris, France. July 2009.
- dissertation* *Rapid Detection of Botnets through Collaborative Networks of Peers*. David J. Malan. Ph.D. Thesis. Harvard University, School of Engineering and Applied Sciences. Cambridge, Massachusetts. June 2007.
- journals* *Implementing Public-Key Infrastructure for Sensor Networks*. David J. Malan, Matt Welsh, and Michael D. Smith. *ACM Transactions on Sensor Networks*. Volume 4, Issue 4. November 2008.
- posters* *CodeBlue: An Ad Hoc Sensor Network Infrastructure for Emergency Medical Care*. David Malan, Thaddeus R.F. Fulford-Jones, Victor Shnayder, Breanne Duncan, Matt Welsh, Mark Gaynor, and Steve Moulton. Emerging Technology and Best Practices Seminar. Boston University. Boston, Massachusetts. May 2004.
- Quantitative Approaches to Software Security & Information Privacy*. Rachel Greenstadt, David J. Malan, Stuart E. Schechter, and Michael D. Smith. National Science Foundation Cyber Trust Annual Principal Investigator Meeting. Newport Beach, California. September 2005.
- Quantitative Approaches to Software Security & Information Privacy*. Rachel Greenstadt, David J. Malan, Stuart E. Schechter, and Michael D. Smith. National Science Foundation Cyber Trust Annual Principal Investigator Meeting. Atlanta, Georgia. January 2007.
- Vital Dust: Wireless sensors and a sensor network for real-time patient monitoring*. Dan Myung, Breanne Duncan, David Malan, Matt Welsh, Mark Gaynor, and Steve Moulton. 8th Annual New England Regional Trauma Conference. Burlington, Massachusetts. November 2003.
- reports* *Crypto for Tiny Objects*. David Malan. Harvard University Technical Report TR-04-04. January 2004.
- Low-Power, Secure Routing for MICA2 Mote*. Breanne Duncan and David Malan. Harvard University Technical Report TR-06-04. March 2004.
- Summary Structures for XML*. David Malan. Harvard University Technical Report TR-05-04. March 2004.

- talks*
- A Public-Key Infrastructure for Key Distribution in TinyOS Based on Elliptic Curve Cryptography.* First IEEE International Conference on Sensor and Ad hoc Communications and Networks. Santa Clara, California. October 2004.
- Active Learning.* Conversations@FAS, Harvard University. Cambridge, Massachusetts. February 2011.
- BMP Puzzles.* Nifty Assignments, 41st ACM Technical Symposium on Computer Science Education. Milwaukee, Wisconsin. March 2010.
- CodeBlue: An Ad Hoc Sensor Network Infrastructure for Emergency Medical Care.* International Workshop on Wearable and Implantable Body Sensor Networks. Imperial College. London, United Kingdom. April 2004.
- CSI: Computer Science Investigation.* Nifty Assignments, 41st ACM Technical Symposium on Computer Science Education. Milwaukee, Wisconsin. March 2010.
- Exploiting Temporal Consistency to Reduce False Positives in Host-Based, Collaborative Detection of Worms.* ACM Workshop on Recurring Malcode. Fairfax, Virginia. November 2006.
- The Geek Shall Inherit the Earth.* Harvard Thinks Big. Cambridge, Massachusetts. February 2010.
- Grading Qualitatively with Tablet PCs in CS 50.* David J. Malan. Workshop on the Impact of Pen-Based Technology on Education. Blacksburg, Virginia. October 2009.
- Host-Based Detection of Worms through Peer-to-Peer Cooperation.* ACM Workshop on Rapid Malcode. Fairfax, Virginia. November 2005.
- Moving CS50 into the Cloud.* 15th Annual Conference of the Northeast Region of the Consortium for Computing Sciences in Colleges. Hartford, Connecticut. April 2010.
- The New CS 50.* Colloquium on Computer Science Pedagogy, Carnegie Mellon. Pittsburgh, Pennsylvania. October 2009.
- One Big File Is Not Enough: A Critical Evaluation of the Dominant Free-Space Sanitization Technique.* 6th Workshop on Privacy Enhancing Technologies. Cambridge, United Kingdom. June 2006.
- Podcasting Computer Science E-1.* 38th ACM Technical Symposium on Computer Science Education. Covington, Kentucky. March 2007.
- Podcasting E-1: It's All About Access.* Podcast Academy at Boston University. Boston, Massachusetts. April 2006.
- Rapid Detection of Botnets through Collaborative Networks of Peers.* Final Oral Examination. Harvard University, School of Engineering and Applied Sciences. Cambridge, Massachusetts. May 2007.
- Reinventing CS50.* 41st ACM Technical Symposium on Computer Science Education. Milwaukee, Wisconsin. March 2010.
- Scratch @ Harvard.* Scratch@MIT Conference. Cambridge, Massachusetts. July 2008.
- Scratch for Budding Computer Scientists.* 38th ACM Technical Symposium on Computer Science Education. Covington, Kentucky. March 2007.
- Teaching Computer Science in the Cloud.* 2009 USENIX Annual Technical Conference. San Diego, California. June 2009.
- Toward a Public-Key Infrastructure for Key Distribution in TinyOS Based on Elliptic Curve Cryptography.* Qualifying Examination. Harvard University, School of Engineering and Applied Sciences. Cambridge, Massachusetts. November 2004.
- Toward PKI for Sensor Networks.* BBN Technologies. Cambridge, Massachusetts. November 2004.

Usando a tecnologia efetivamente para melhorar o ensino de graduação. Critical Issues and Strategies for Leaders of Modern Universities. Cambridge, Massachusetts. April 2011.

Virtualizing Office Hours in CS 50. 14th Annual ACM Conference on Innovation and Technology in Computer Science Education. Paris, France. July 2009.

tutorials

Moving Your Course into the Cloud. 41st Annual ACM Technical Symposium on Computer Science Education. Milwaukee, Wisconsin. March 2010.

Replacing Real Servers with Virtual Machines Using Amazon Elastic Compute Cloud (EC2). 23rd Large Installation System Administration Conference (LISA '09). Baltimore, Maryland. November 2009.

Replacing Real Servers with Virtual Machines Using Amazon Elastic Compute Cloud (EC2) and Simple Storage Service (S3). 2009 USENIX Annual Technical Conference. San Diego, California. June 2009.

Starting with Scratch (literally) in CS 1. 41st Annual ACM Technical Symposium on Computer Science Education. Milwaukee, Wisconsin. March 2010.

workshops

CodeBlue: An Ad Hoc Sensor Network Infrastructure for Emergency Medical Care. David Malan, Thaddeus Fulford-Jones, Matt Welsh, and Steve Moulton. ACM Workshop on Applications of Mobile Embedded Systems. Boston, Massachusetts. June 2004.

CodeBlue: An Ad Hoc Sensor Network Infrastructure for Emergency Medical Care. David Malan, Thaddeus Fulford-Jones, Matt Welsh, and Steve Moulton. International Workshop on Wearable and Implantable Body Sensor Networks. London, United Kingdom. April 2004.

Exploiting Temporal Consistency to Reduce False Positives in Host-Based, Collaborative Detection of Worms. David J. Malan and Michael D. Smith. ACM Workshop on Rapid Malcode. Fairfax, Virginia. November 2006.

Grading Qualitatively with Tablet PCs in CS 50. David J. Malan. Workshop on the Impact of Pen-Based Technology on Education. Blacksburg, Virginia. October 2009.

Host-Based Detection of Worms through Peer-to-Peer Cooperation. David J. Malan and Michael D. Smith. ACM Workshop on Recurring Malcode. Fairfax, Virginia. November 2005.

One Big File Is Not Enough: A Critical Evaluation of the Dominant Free-Space Sanitization Technique. Simson L. Garfinkel and David J. Malan. 6th Workshop on Privacy Enhancing Technologies. Cambridge, United Kingdom. June 2006.

courses

Computer Science 50: Introduction to Computer Science I **2007 –**
Harvard College

Introduction to the intellectual enterprises of computer science and the art of programming. This course teaches students how to think algorithmically and solve problems efficiently. Topics include abstraction, algorithms, encapsulation, data structures, databases, memory management, security, software development, virtualization, and websites. Languages include C, PHP, and JavaScript plus SQL, CSS, and HTML. Problem sets inspired by real-world domains of biology, cryptography, finance, forensics, and gaming. Designed for concentrators and non-concentrators alike, with or without prior programming experience.

Computer Science 164: Mobile Software Engineering **2012 –**
Harvard College

Introduction to principles of software engineering for mobile devices and best practices, including code reviews, source control, and unit tests. Topics include Ajax, encapsulation, event handling, HTTP, memory management, MVC, object-oriented design, and user experience. Languages include HTML5, JavaScript, Objective-C, and PHP. Projects include mobile web apps and native iOS apps.

Computer Science 15: Data Structures

2002 – 2005

Tufts University

A second course in computer science. Data structures and algorithms are studied through major programming projects in the C++ programming language. Topics include linked lists, trees, graphs, dynamic storage allocation, and recursion.

Computer Science E-1: Understanding Computers and the Internet

1999 –

Harvard Extension School

This course is all about understanding: understanding what's going on inside your computer when you flip on the switch, why tech support has you constantly rebooting your computer, how everything you do on the Internet can be watched by others, and how your computer can become infected with a worm just by being turned on. Designed for students who use computers and the Internet every day but don't fully understand how it all works, this course fills in the gaps. Through lectures on hardware, software, the Internet, multimedia, security, privacy, website development, programming, and more, this course "takes the hood off" of computers and the Internet so that students understand how it all works and why. Through discussions of current events, students are exposed also to the latest technologies.

Computer Science E-75: Building Dynamic Websites

2008 –

Harvard Extension School

Today's websites are increasingly dynamic. Pages are no longer static HTML files but instead generated by scripts and database calls. User interfaces are more seamless, with technologies like Ajax replacing traditional page reloads. This course teaches students how to build dynamic websites with Ajax and with Linux, Apache, MySQL, and PHP (LAMP), one of today's most popular frameworks. Students learn how to set up domain names with DNS, how to structure pages with XHTML and CSS, how to program in JavaScript and PHP, how to configure Apache and MySQL, how to design and query databases with SQL, how to use Ajax with both XML and JSON, and how to build mashups. The course explores issues of security, scalability, and cross-browser support and also discusses enterprise-level deployments of websites, including third-party hosting, virtualization, colocation in data centers, firewalling, and load-balancing.

Computer Science E-76: Building Mobile Applications

2011 –

Harvard Extension School

Today's applications are increasingly mobile. Computers are no longer confined to desks and laps but instead live in our pockets and hands. This course teaches students how to build mobile apps for Android and iOS, two of today's most popular platforms, and how to deploy them in Android Market and the App Store. Students learn to write native apps for Android using Eclipse and the Android SDK, to write native apps for iPhones, iPod touches, and iPads using Xcode and the iOS SDK, and to write web apps for both platforms.

Computer Science E-259: XML with Java, Java Servlet, and JSP

2004 – 2008

Harvard Extension School

This course introduces XML as a key enabling technology in Java-based applications. Students learn the fundamentals of XML and its derivatives, including DTD, SVG, XML Schema, XPath, XQuery, XSL-FO, and XSLT. Students also gain experience with programmatic interfaces to XML like SAX and DOM, standard APIs like JAXP and TrAX, and industry-standard software like Ant, Tomcat, Xerces, and Xalan. The course acquaints students with J2EE, including JavaServer Pages (JSP) and Java Servlet, and also explores HTTP, SOAP, web services, and WSDL. The course's projects focus on the implementation and deployment of these technologies.

Computer Science S-1: Great Ideas in Computer Science with Java

2003 – 2010

Harvard Summer School

This course is an introduction to the most important discoveries and intellectual paradigms in computer science, designed for students with little or no previous background. We explore problem-solving methods and algorithm development using such high-level programming languages as Java and JavaScript. Students learn how to design, code, debug, and document programs using techniques of good programming style in a Linux-based environment. This course presents an integrated view of computer systems, from switching circuits and machine language through compilers and GUI design. We examine theoretical and practical limitations related to unsolvable and intractable computational problems, and the social and ethical dilemmas presented by such issues as software unreliability and invasion of privacy.