

# HAO CHEN

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## Research interests

Computer security: mobile security, network security, Web security, privacy and anonymity. Mobile computing.

## Education

Ph.D. in Computer Science	University of California, Berkeley
M.E. in Biomedical Engineering	Southeast University, China
B.E. in Biomedical Engineering	Southeast University, China

## Professional experience

University of California, Davis. Department of Computer Science	July 2010 --- present	Associate Professor
University of California, Davis. Department of Computer Science	July 2004 --- June 2010	Assistant Professor
SRI International. Menlo Park, CA	May 2003 --- September 2003	Researcher
Microsoft Research. Redmond, WA	May 2002 --- August 2002 May 1999 --- August 1999	Researcher

## Teaching experience

- Graduate Courses
  - Computer Security
  - Software Security
- Undergraduate Courses
  - Data Structures and Programming
  - Introduction to Software Development
  - Computer Security

## Keynote lectures

- ACM AsiaCCS International Workshop on Security in Embedded Systems and Smartphones (SESP), 2013.

## Graduated students

- Doctoral students: Liang Cai, Jonathan Crussell, Benjamin Davis, Clint Gibler, Gabriel Maganis, Yuan Niu, Ryan Stevens, Matthew Van Gundy,
- Master students: Jeremy Erickson, Eric Gustafson, Kristen Kennedy, Denys Ma, Radmillo Racic.

## Services

### Chair of Program Committee

- IEEE Mobile Security Technologies (MoST) 2012 and 2013.

### Member of Program Committees

- IEEE INFOCOM 2016.
- International Conference on Mobile Systems, Applications, and Services (MobiSys) 2015.
- IEEE Symposium on Security and Privacy 2009, 2015.
- ACM Asia Conference on Computer and Communications Security (ASIACCS) 2006, 2015.
- IEEE Conference on Communications and Network Security (CNS) 2013, 2014, 2015.
- International Conference on Cryptology and Network Security (CANS) 2015.
- IEEE Mobile Security Technologies (MoST) 2014, 2015.
- Annual Computer Security Applications Conference (ACSAC) 2012, 2013.
- WWW conference 2012.
- ACM Conference on Wireless Network Security (WiSec) 2011.
- ISOC Network and Distributed System Security Symposium (NDSS) 2006, 2008, 2009, 2010, and 2011.
- International Conference on Security and Privacy in Communication Networks (SecureComm) 2007, 2008, 2009, 2010, 2011.
- IEEE Web 2.0 Security and Privacy 2009, 2010, 2011, 2013.
- International Conference on Distributed Computing Systems (ICDCS) 2008.
- Usenix security symposium 2007.

## Funding

- **DoE Verification and Validation of Energy Distribution Cyber-Infrastructure.** \$3,282,000. January 1, 2016 -- December 31, 2020. co-PI. Pending.
- **Intel Science and Technology Center for Secure Computing (ISTC-SC).** \$75,000. October 1, 2014 -- September 30, 2015. PI.
- **Intel Science and Technology Center for Secure Computing (ISTC-SC).** \$75,000. October 1, 2013 -- September 30, 2014. PI.
- **UC Davis Research Investments in the Sciences and Engineering (RISE) Cyber Security for Critical Infrastructures.** \$860,000. September 1, 2012 -- August 31, 2015. Co-PI.

- **NSF CNS-1018964** *Designing New Authentication Mechanisms using Hardware Capabilities in Advanced Mobile Devices*. \$500,000. August 1, 2010 -- July 31, 2014. PI.
- **University of California MICRO Program** *Leveraging Cellular Networks for Web Authentication*. \$11,250. August 2008 -- December 2009. PI.
- **NSF CNS-0831547** *Practical Privacy Preserving Technologies*. \$300,000. November 2008 -- October 2012. Co-PI.
- **Department of Defense** *Helix: A Self-Regenerative Architecture for the Incorruptible Enterprise*. \$1,646,000. May 2007 -- April 2012. PI.
- **NSF CNS-0644450 CAREER**: *Securing Broadband Cellular Data Networks*. \$400,000. July 2007 -- June 2013. PI.
- **I3P (Institute for Information Infrastructure Protection) Fellowship** \$150,000. September 2005 --- August 2007. PI.
- **NSF CNS-0520320 NeTS-NBD**: *Automatic Validation, Optimization, and Adaptation of Distributed Firewalls for Network Performance and Security*. \$400,000. September 2005 -- August 2008. Co-PI.
- **NSF CNS-0524826 CT-ISG**: *Reasoning about Composable Intrusion Detection Systems*. \$179,110. October 2005 -- September 2006. PI.
- **Sprint** \$30,000 in 2007 and \$30,000 in 2008. PI.
- **Microsoft** \$5,000 in 2007. PI.
- **Intel** \$150,000 in 2005. Co-PI.

## Awards

- **NSF CAREER Award**, 2007.
- **UC Davis College of Engineering Faculty Award**, 2010.

## Publications

All the publications listed below are available at: <http://www.cs.ucdavis.edu/~hchen/paper/>

- [1] Fangda Cai, Hao Chen, Yuanyi Wu, and Yuan Zhang. "AppCracker: Widespread Vulnerabilities in User and Session Authentication in Mobile Apps". In: *IEEE Mobile Security Technologies (MoST)*. San Jose, CA, May 21, 2015.
- [2] Jonathan Crussell, Clint Gibler, and Hao Chen. "AnDarwin: Scalable Detection of Android Application Clones Based on Semantics". In: *IEEE Transactions on Mobile Computing* 14.10 (2015).
- [3] Ryan Stevens and Hao Chen. "Predictive Eviction: A Novel Policy for Optimizing TLS Session Cache Performance". In: *IEEE Global Communications Conference: Communications and Information System Security (GLOBECOM)*. San Diego, CA, Dec. 6–10, 2015.
- [4] Yuan Zhang, Min Yang, Guofei Gu, and Hao Chen. "FineDroid: Enforcing Permissions with System-wide Application". In: *International Conference on Security and Privacy in Communication Networks (SECURECOMM)*. Dallas, TX, Oct. 26–29, 2015.

- [5] Jonathan Crussell, Ryan Stevens, and Hao Chen. "MAdFraud: Investigating Ad Fraud in Android Applications". In: *12th International Conference on Mobile Systems, Applications and Services (MobiSys)*. Bretton Woods, NH, USA, June 16–19, 2014.
- [6] Daniel Defreez, Bhargava Shastry, Hao Chen, and Jean-Pierre Seifert. "A First Look at Firefox OS Security". In: *IEEE Mobile Security Technologies (MoST)*. San Jose, CA, May 17, 2014.
- [7] Jonathan Crussell, Clint Gibler, and Hao Chen. "Scalable Semantics-Based Detection of Similar Android Applications". In: *18th European Symposium on Research in Computer Security (ESORICS)*. Egham, U.K., Sept. 9–13, 2013.
- [8] Benjamin Davis and Hao Chen. "Retrofitting Android Apps". In: *11th International Conference on Mobile Systems, Applications and Services (MobiSys)*. Taipei, Taiwan, June 25–28, 2013.
- [9] Clint Gibler, Ryan Stevens, Jon Crussell, Hao Chen, Hui Zang, and Heesook Choi. "Characterizing Android Application Plagiarism and its Impact on Developers". In: *11th International Conference on Mobile Systems, Applications and Services (MobiSys)*. Taipei, Taiwan, June 25–28, 2013.
- [10] Eric Gustafson, Kristen Kennedy, and Hao Chen. "Quantifying the Effects of Removing Permissions from Android Applications". In: *IEEE Mobile Security Technologies (MoST)*. San Francisco, CA, May 23, 2013.
- [11] Daryl Posnett, David Kavalier, Clint Gibler, Hao Chen, Prem Devanbu, and Vladimir Filkov. "Using and Asking: APIs Used in the Android Market and Asked About in StackOverflow". In: *5th International Conference on Social Informatics (SocInfo)*. Kyoto, Japan, Nov. 25–27, 2013.
- [12] Ryan Stevens, Jonathan Ganz, Prem Devanbu, Hao Chen, and Vladimir Filkov. "Asking for (and About) Permissions Used by Android Apps". In: *10th Working Conference on Mining Software Repositories (MSR)*. San Francisco, CA, May 18–19, 2013.
- [13] Liang Cai and Hao Chen. "On the Practicality of Motion Based Keystroke Inference Attack". In: *5th International Conference on Trust & Trustworthy Computing (TRUST)*. Vienna, Austria, June 13–15, 2012.
- [14] Jonathan Crussell, Clint Gibler, and Hao Chen. "Attack of the Clones: Detecting Cloned Applications on Android Markets". In: *17th European Symposium on Research in Computer Security (ESORICS)*. Pisa, Italy, Sept. 10–12, 2012.
- [15] Benjamin Davis, Hao Chen, and Matthew Franklin. "Privacy-Preserving Alibi Systems". In: *7th ACM Symposium on Information, Computer and Communications Security (ASIACCS)*. Seoul, South Korea, May 1–3, 2012.
- [16] Benjamin Davis, Ben Sanders, Armen Khodaverdian, and Hao Chen. "I-ARM-Droid: A Rewriting Framework for In-App Reference Monitors for Android Applications". In: *IEEE Mobile Security Technologies (MoST)*. San Francisco, CA, May 24, 2012.
- [17] Clint Gibler, Jon Crussell, Jeremy Erickson, and Hao Chen. "AndroidLeaks: Automatically Detecting Potential Privacy Leaks In Android Applications on a Large Scale". In: *5th International Conference on Trust & Trustworthy Computing (TRUST)*. Vienna, Austria, June 13–15, 2012.
- [18] Matthew Van Gundy and Hao Chen. "Noncespaces: Using randomization to defeat cross-site scripting attacks". In: *Computers & Security* 31.4 (2012), pp. 612–628.

- [19] Gabriel Maganis, Elaine Shi, Hao Chen, and Dawn Song. "Opaak: Using Mobile Phones to Limit Anonymous Identities Online". In: *10th International Conference on Mobile Systems, Applications and Services (MobiSys)*. Low Wood Bay, Lake District, United Kingdom, June 26–28, 2012.
- [20] Ryan Stevens, Clint Gibler, Jon Crussell, Jeremy Erickson, and Hao Chen. "Investigating User Privacy in Android Ad Libraries". In: *IEEE Mobile Security Technologies (MoST)*. San Francisco, CA, May 24, 2012.
- [21] Liang Cai and Hao Chen. "TouchLogger: Inferring Keystrokes On Touch Screen From Smartphone Motion". In: *6th USENIX Workshop on Hot Topics in Security (HotSec 11)*. San Francisco, CA, Aug. 2011.
- [22] Liang Cai, Kai Zeng, Hao Chen, and Prasant Mohapatra. "Good Neighbor: Ad Hoc Pairing of Nearby Wireless Devices by Multiple Antennas". In: *Proceedings of the 18th Annual Network and Distributed System Security Symposium (NDSS)*. San Diego, CA, Feb. 2011.
- [23] Francis Hsu, Hao Chen, and Sridhar Machiraju. "WebCallerID: Leveraging Cellular Networks for Web Authentication". In: *Journal of Computer Security* 19.5 (2011).
- [24] Yuan Niu and Hao Chen. "Gesture Authentication with Touch Input for Mobile Devices". In: *3rd International Conference on Security and Privacy in Mobile Information and Communication Systems (MobiSec)*. Aalborg, Denmark, May 2011.
- [25] Liang Cai, Sridhar Machiraju, and Hao Chen. "CapAuth: A Capability-based Handover Scheme". In: *IEEE INFOCOM 2010: The 27th Conference on Computer Communications*. San Diego, CA, Mar. 2010.
- [26] Benjamin Davis and Hao Chen. "DBTaint: Cross-Application Information Flow Tracking via Databases". In: *USENIX Conference on Web Application*. Boston, MA, June 23–24, 2010.
- [27] Radmilo Racic, Denys Ma, Hao Chen, and Xin Liu. "Exploiting and Defending Opportunistic Scheduling in Cellular Data Networks". In: *IEEE Transactions on Mobile Computing* 9 (2010), pp. 609–620. ISSN: 1536-1233.
- [28] Justin Becker and Hao Chen. "Measuring Privacy Risk in Online Social Networks". In: *Web 2.0 Security and Privacy (W2SP)*. Oakland, CA, May 2009.
- [29] Liang Cai, Sridhar Machiraju, and Hao Chen. "Defending against Sensor-Sniffing Attacks on Mobile Phones". In: *The First ACM SIGCOMM Workshop on Networking, Systems, Applications on Mobile Handhelds (MobiHeld)*. Barcelona, Spain, Aug. 2009.
- [30] Liang Cai, Gabriel Maganis, Hui Zang, and Hao Chen. "Mitigating DoS attacks on the paging channel by efficient encoding in page messages". In: *Proceedings of the 5th International Conference on Security and Privacy in Communication Networks (SecureComm)*. Athens, Greece, Sept. 2009.
- [31] Ian Goldberg, Berkant Ustaoglu, Matthew Van Gundy, and Hao Chen. "Multi-party Off-the-Record Messaging". In: *Proceedings of the 16th ACM Conference on Computer and Communications Security (CCS)*. Chicago, IL, Nov. 2009.
- [32] Matthew Van Gundy and Hao Chen. "Noncespaces: Using Randomization to Enforce Information Flow Tracking and Thwart Cross-Site Scripting Attacks". In: *Proceedings of the 16th Annual Network and Distributed System Security Symposium (NDSS)*. San Diego, CA, Feb. 2009.
- [33] Francis Hsu and Hao Chen. "Secure File System Services for Web 2.0 Applications". In: *Proceedings of the The ACM Cloud Computing Security Workshop (CCSW 2009)*. Chicago, IL, Nov. 2009.

- [34] Shaozhi Ye, Felix Wu, Raju Pandey, and Hao Chen. "Noise Injection for Search Privacy Protection". In: *Proceedings of the 2009 IEEE International Conference on Privacy, Security, Risk and Trust (PASSAT)*. Vancouver, Canada, Aug. 2009.
- [35] Steven Crites, Francis Hsu, and Hao Chen. "OMash: Enabling Secure Web Mashups via Object Abstractions". In: *Proceedings of the 15th ACM Conference on Computer and Communications Security (CCS)*. Alexandria, VA, Oct. 2008, pp. 99–107.
- [36] Sridhar Machiraju, Hao Chen, and Jean Bolot. "Distributed Authentication for Low-Cost Wireless Networks". In: *Proceedings of the Ninth Workshop on Mobile Computing Systems and Applications (HotMobile)*. Napa Valley, CA, Feb. 2008, pp. 55–59.
- [37] G Mishserghi, Lihua Yuan, Zhendong Su, Chen-Nee Chuah, and Hao Chen. "A general framework for benchmarking firewall optimization techniques". In: *IEEE Transactions on Network and Service Management* 5.4 (Dec. 2008), pp. 227–238.
- [38] Yuan Niu, Francis Hsu, and Hao Chen. "iPhish: Phishing Vulnerabilities on Consumer Electronics". In: *Proceedings of Usability, Psychology, and Security 2008*. San Francisco, CA, Apr. 2008.
- [39] Radmilo Racic, Denys Ma, Hao Chen, and Xin Liu. "Exploiting Opportunistic Scheduling in Cellular Data Networks". In: *Proceedings of the 15th Annual Network and Distributed System Security Symposium (NDSS)*. San Diego, CA, Feb. 2008, pp. 333–345.
- [40] Matthew Van Gundy, Hao Chen, Zhendong Su, and Giovanni Vigna. "Feature Omission Vulnerabilities: Thwarting Signature Generation for Polymorphic Worms". In: *Proceedings of the 23rd Annual Computer Security Applications Conference (ACSAC)*. Miami Beach, FL, Dec. 2007, pp. 74–83.
- [41] Yuan Niu, Yi-Ming Wang, Hao Chen, Ming Ma, and Francis Hsu. "A Quantitative Study of Forum Spamming Using Context-based Analysis". In: *Proceedings of the 14th Annual Network and Distributed System Security Symposium (NDSS)*. San Diego, CA, Feb. 2007, pp. 79–92.
- [42] Yi-Min Wang, Ming Ma, Yuan Niu, and Hao Chen. "Spam Double-Funnel: Connecting Web Spammers with Advertisers". In: *Proceedings of the 16th International World Wide Web Conference (WWW)*. Banff, Canada, May 2007.
- [43] Francis Hsu, Hao Chen, Thomas Ristenpart, Jason Li, and Zhendong Su. "Back to the Future: A Framework for Automatic Malware Removal and System Repair". In: *Proceedings of 22nd Annual Computer Security Applications Conference (ACSAC)*. Miami Beach, FL, Dec. 2006.
- [44] Radmilo Racic, Denys Ma, and Hao Chen. "Exploiting MMS Vulnerabilities to Stealthily Exhaust Mobile Phone's Battery". In: *Proceedings of the Second IEEE Communications Society / CreateNet International Conference on Security and Privacy in Communication Network (SecureComm)*. Baltimore, MD, Aug. 2006.
- [45] Lihua Yuan, Jianning Mai, Zhendong Su, Hao Chen, Chen-Nee Chuah, and Prasant Mohapatra. "FIREMAN: A Toolkit for FIREwall Modeling and ANalysis". In: *Proceedings of 2006 IEEE Symposium on Security and Privacy*. Berkeley, CA, May 2006, pp. 199–213.
- [46] Benjamin Schwarz, Hao Chen, David Wagner, Geoff Morrison, Jacob West, Jeremy Lin, and Wei Tu. "Model Checking An Entire Linux Distribution for Security Violations". In: *Proceedings of the 2005 Annual Computer Security Applications Conference (ACSAC)*. Tucson, Arizona, Dec. 2005.

- [47] Hao Chen, Drew Dean, and David Wagner. "Model Checking One Million Lines of C Code". In: *Proceedings of the 11th Annual Network and Distributed System Security Symposium (NDSS)*. San Diego, CA, Feb. 2004, pp. 171–185.
- [48] Hao Chen and Jonathan Shapiro. "Using Build-Integrated Static Checking to Preserve Correctness Invariants". In: *Proceedings of the 11th ACM Conference on Computer and Communications Security (CCS)*. Washington, DC, Nov. 2004, pp. 288–297.
- [49] Hao Chen and David Wagner. "MOPS: an Infrastructure for Examining Security Properties of Software". In: *Proceedings of the 9th ACM Conference on Computer and Communications Security (CCS)*. Washington, DC, Nov. 2002, pp. 235–244.
- [50] Hao Chen, David Wagner, and Drew Dean. "Setuid Demystified". In: *Proceedings of the 11th USENIX Security Symposium*. San Francisco, CA, Aug. 2002, pp. 171–190.
- [51] Susan Dumais, Edward Cutrell, and Hao Chen. "Optimizing Search by Showing Results in Context". In: *Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI)*. Seattle, WA, Apr. 2001, pp. 277–284.
- [52] Hao Chen and Susan Dumais. "Bringing Order to the Web: Automatically Categorizing Search Results". In: *Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI)*. The Hague, The Netherlands, Apr. 2000, pp. 145–152.
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- [54] Susan Dumais and Hao Chen. "Hierarchical Classification of Web Content". In: *Proceedings of the 23rd ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*. Athens, Greece, July 2000, pp. 256–263.
- [55] Susan Dumais, Edward Cutrell, and Hao Chen. "Classified displays of web search results". In: *Proceedings of the 11th ASIST SIG/CR Classification Research Workshop*. Nov. 2000, pp. 87–90.
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- [58] Richard Sproat, Jianying Hu, and Hao Chen. "Emu: An E-mail Preprocessor for Text-to-Speech". In: *1998 Workshop on Multimedia Signal Processing*. IEEE Signal Processing Society. Redondo Beach, CA, Dec. 1998, pp. 239–244.
- [59] Hao Chen, Oscar E. Agazzi, and Ching Y. Suen. "Piecewise Linear Modulation Model of Handwriting". In: *Proceedings of the 4th International Conference on Document Analysis and Recognition (ICDAR)*. Ulm, Germany, Aug. 1997, pp. 363–367.