

Hao Chen

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RESEARCH INTERESTS

software security, machine learning security

EDUCATION

University of California, Berkeley
PhD in Computer Science

1998-08 – 2004-06
Berkeley, CA, USA

APPOINTMENTS

Department of Computer Science, University of California
Professor

2016-07 – present
Davis, CA, USA

Department of Computer Science, University of California
Associate Professor

2010-07 – 2016-06
Davis, CA, USA

Department of Computer Science, University of California
Assistant Professor

2004-07 – 2010-06
Davis, CA, USA

HONORS AND AWARDS

- Outstanding Engineering Faculty Award, UC Davis, 2010
- CAREER Award, NSF, 2007

STUDENTS

- *Doctoral*: Liang Cai, Haitian Chen, Jiyu Chen, Jonathan Crussell, Benjamin Davis, Clint Gibler, Francis Hsu, Gabriel Maganis, Yuan Niu, Yuyang Rong, Ryan Stevens, Matthew Van Gundy
- *Master*: Jeremy Erickson, Eric Gustafson, Kristen Kennedy, Denys Ma, Radmillo Racic, Jonathan Vronsky

SERVICES

Chair of program committee

- IEEE Mobile Security Technologies (MoST) 2012, 2013

Member of program committee

- ACM Conference on Foundations of Data Science (FODS) 2020
- ACM Conference on Computer and Communications Security (CCS) 2017–2019
- IEEE Conference on Communications and Network Security (CNS) 2013–2017
- ACM Asia Conference on Computer and Communications Security (ASIACCS) 2006, 2016–2017
- IEEE Mobile Security Technologies (MoST) 2012–2017
- IEEE International Conference on Computer Communications (INFOCOM) 2016
- IEEE Symposium on Security and Privacy (S&P) 2009, 2015
- International Conference on Mobile Systems, Applications, and Services (MobiSys) 2015

- International Conference on Cryptology and Network Security (CANS) 2015
- Annual Computer Security Applications Conference (ACSAC) 2012–2013
- World Wide Web Conference (WWW) 2012
- ACM Conference on Wireless Network Security (WiSec) 2011, 2016
- Network and Distributed System Security Symposium (NDSS) 2006, 2008–2011
- International Conference on Security and Privacy in Communication Networks (SecureComm) 2007–2012
- IEEE Web 2.0 Security and Privacy (W2SP) 2009–2011, 2013
- International Conference on Distributed Computing Systems (ICDCS) 2008
- Usenix Security Symposium 2007

FUNDING

- | | |
|--|-------------------|
| • NSF 1956364, PI | 2020-07 – 2023-06 |
| SaTC: CORE: Small: Collaborative: Understanding and Detecting Memory Bugs in Rust | \$199 997 |
| • ARL CRA, PI | 2018-09 – 2020-12 |
| MACRO: Models for Enabling Continuous Reconfigurability of Secure Missions | \$226 714 |
| • NSF 1801751, PI | 2018-08 – 2022-07 |
| SaTC: CORE: Medium: Collaborative: Towards Robust Machine Learning Systems | \$400 000 |
| • Intel, PI | 2013-10 – 2017-09 |
| Science and Technology Center for Secure Computing (ISTC-SC) | \$150 000 |
| • UC Davis, co-PI | 2012-09 – 2015-08 |
| Research Investments in the Sciences and Engineering (RISE) | \$860 000 |
| • NSF 1018964, PI | 2010-08 – 2014-07 |
| Designing New Authentication Mechanisms using Hardware Capabilities in Advanced Mobile Devices | \$500 000 |
| • NSF 0831547, co-PI | 2008-11 – 2012-10 |
| Practical Privacy Preserving Technologies | \$300 000 |
| • University of California MICRO, PI | 2008-08 – 2009-12 |
| Leveraging Cellular Networks for Web Authentication | \$11 250 |
| • NSF 0644450, PI | 2007-07 – 2013-06 |
| CAREER: Securing Broadband Cellular Data Networks | \$400 000 |
| • AFOSR, PI | 2007-05 – 2012-04 |
| Helix: A Self-Regenerative Architecture for the Incorruptible Enterprise | \$1 646 000 |
| • I3P, PI | 2005-09 – 2007-08 |
| Institute for Information Infrastructure Protection Fellowship | \$150 000 |
| • NSF 0524826, PI | 2005-10 – 2006-09 |
| CT-ISG: Reasoning about Composable Intrusion Detection Systems | \$179 110 |
| • NSF 0520320, co-PI | 2005-09 – 2008-08 |
| NeTS-NBD: Automatic Validation, Optimization, and Adaptation of Distributed Firewalls for Network Performance and Security | \$400 000 |

• Sprint, PI Gift	2007, 2008 \$60 000
• Microsoft, PI Gift	2007 \$5000
• Intel, co-PI Gift	2005 \$150 000

PUBLICATIONS

- [1] Weili Han, Chang Cao, Hao Chen, Dong Li, Zheran Fang, Wenyuan Xu, and Xiaoyang Wang. “senDroid: Auditing Sensor Access in Android System-Wide”. In: *IEEE Transactions on Dependable and Secure Computing* 17.2 (2020), pp. 407–421.
- [2] Yiwen Guo, Qizhang Li, and Hao Chen. “Backpropagating Linearly Improves Transferability of Adversarial Examples”. In: *Neural Information Processing Systems (NeurIPS)*. Dec. 6–12, 2020.
- [3] Qizhang Li, Yiwen Guo, and Hao Chen. “Practical No-box Adversarial Attacks against DNNs”. In: *Neural Information Processing Systems (NeurIPS)*. Dec. 6–12, 2020.
- [4] Haitian Chen, Bai Jiang, and Hao Chen. “StyleCAPTCHA: CAPTCHA Based on Style-Transferred Images to Defend against Deep Convolutional Networks”. In: *ACM-IMS Foundations of Data Science Conference (FODS)*. Oct. 18–20, 2020.
- [5] Yuyang Rong, Peng Chen, and Hao Chen. “Integrity: Finding Integer Errors by Targeted Fuzzing”. In: *International Conference on Security and Privacy in Communication Networks (SecureComm)*. Oct. 21–23, 2020.
- [6] Qizhang Li, Yiwen Guo, and Hao Chen. “Yet Another Intermediate-Level Attack”. In: *European Conference on Computer Vision (ECCV)*. Aug. 23–28, 2020.
- [7] Yunhan Jia, Yantao Lu, Junjie Shen, Qi Alfred Chen, Hao Chen, Zhenyu Zhong, and Tao Wei. “Fooling Detection Alone Is Not Enough: Adversarial Attack Against Multiple Object Tracking”. In: *International Conference on Learning Representations (ICLR)*. Addis Ababa, Ethiopia, Apr. 26–30, 2020.
- [8] Jiyu Chen, David Wang, and Hao Chen. “Explore the Transformation Space for Adversarial Images”. In: *ACM Conference on Data and Application Security and Privacy (CODASPY)*. New Orleans, LA, USA, Mar. 16–18, 2020.
- [9] Jiyu Chen, Heqing Huang, and Hao Chen. “Informer: Irregular Traffic Detection for Containerized Microservices RPC in the Real World”. In: *ACM/IEEE Workshop on Security and Privacy in Edge Computing (Edge S&P)*. Washington DC, USA, Nov. 7–9, 2019.
- [10] Peng Chen, Jianzhong Liu, and Hao Chen. “Matryoshka: Fuzzing Deeply Nested Branches”. In: *ACM Conference on Computer and Communications Security (CCS)*. London, UK, Nov. 11–15, 2019.
- [11] Chia-Cheng Yen, Dipak Ghosal, Michael Zhang, Chen-Nee Chuah, and Hao Chen. “Falsified Data Attack on Backpressure-Based Traffic Signal Control Algorithms”. In: *IEEE Vehicular Networking Conference (VNC)*. Taipei, Taiwan, Dec. 5–7, 2018.
- [12] Yongshuai Liu, Jiyu Chen, and Hao Chen. “Less Is More: Culling the Training Set to Improve Robustness of Deep Neural Networks”. In: *Conference on Decision and Game Theory for Security (GameSec)*. Seattle, WA, USA, Oct. 29–31, 2018.
- [13] Peng Chen and Hao Chen. “Angora: Efficient Fuzzing by Principled Search”. In: *IEEE Symposium on Security & Privacy*. San Francisco, CA, USA, May 21–23, 2018.
- [14] Yuan Zhang, Jiarun Dai, Xiaohan Zhang, Sirong Huang, Zhemin Yang, Min Yang, and Hao Chen. “Detecting Third-Party Libraries in Android Applications with High Precision and Recall”. In: *IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER)*. Campobasso, Italy, Mar. 20–23, 2018.
- [15] Dongyu Meng and Hao Chen. “MagNet: a Two-Pronged Defense Against Adversarial Examples”. In: *ACM Conference on Computer and Communications Security (CCS)*. Dallas, TX, Oct. 30–Nov. 3, 2017.
- [16] Yuanyi Wu, Dongyu Meng, and Hao Chen. “Evaluating Private Modes in Desktop and Mobile Browsers and Their Resistance to Fingerprinting”. In: *IEEE Conference on Communications and Network Security (CNS)*. Las Vegas, NV, Oct. 9–11, 2017.

- [17] Jonathan Vronsky, Ryan Stevens, and Hao Chen. "SurgeScan: Enforcing Security Policies on Untrusted Third-Party Android Libraries". In: *The 14th IEEE Conference on Advanced and Trusted Computing (ATC)*. San Francisco, CA, Aug. 4–8, 2017.
- [18] Yuan Zhang, Min Yang, Guofei Gu, and Hao Chen. "Rethinking Permission Enforcement Mechanism on Mobile Systems". In: *IEEE Transactions on Information Forensics & Security* 11.10 (2016), pp. 2227–2240.
- [19] Peng Chen and Hao Chen. "Security Analysis of Personal Unmanned Aerial Vehicles". In: *International Conference on Security and Privacy in Communication Networks (SECURECOMM)*. Guangzhou, China, Oct. 10–12, 2016.
- [20] Zhengyang Qu, Guanyu Guo, Zhengyue Shao, Vaibhav Rastogi, Yan Chen, Hao Chen, and Wangjun Hong. "AppShield: Enabling Multi-Entity Access Control Cross Platforms for Mobile App Management". In: *International Conference on Security and Privacy in Communication Networks (SECURECOMM)*. Guangzhou, China, Oct. 10–12, 2016.
- [21] Zheran Fang, Weili Han, Dong Li, Zeqing Guo, Danhao Guo, X. Sean Wang, Zhiyun Qian, and Hao Chen. "RevDroid: Code Analysis of the Side Effects After Dynamic Permission Revocation of Android Apps". In: *ACM Asia Conference on Computer and Communications Security (ASIACCS)*. Xi'an, China, May 30–June 3, 2016.
- [22] Ryan Stevens, Jonathan Crussell, and Hao Chen. "On the Origin of Mobile Apps: Network Provenance for Android Applications". In: *6th ACM Conference on Data and Application Security and Privacy (CODASPY)*. New Orleans, LA, Mar. 9–11, 2016.
- [23] 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), pp. 2007–2019.
- [24] 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.
- [25] 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.
- [26] 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.
- [27] 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.
- [28] 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.
- [29] Claire Le Goues, Anh Nguyen-Tuong, Hao Chen, Jack W. Davidson, Stephanie Forrest, Jason D. Hiser, John C. Knight, and Matthew Van Gundy. "Moving Target Defenses in the HELIX Self-Regenerative Architecture". In: *Moving Target Defense II: Application of Game Theory and Adversarial Modeling*. Ed. by Sushil Jajodia et al. Springer-Verlag New York, 2013, pp. 117–149.
- [30] 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.
- [31] 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.
- [32] 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.
- [33] 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.

- [34] 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.
- [35] 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.
- [36] Matthew Van Gundy and Hao Chen. "Noncespaces: Using Randomization to Defeat Cross-Site Scripting Attacks". In: *Computers & Security* 31.4 (2012), pp. 612–628.
- [37] 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.
- [38] Liang Cai and Hao Chen. "On the Practicality of Motion Based Keystroke Infernce Attack". In: *5th International Conference on Trust & Trustworthy Computing (TRUST)*. Vienna, Austria, June 13–15, 2012.
- [39] 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.
- [40] 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.
- [41] 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.
- [42] 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.
- [43] 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.
- [44] Francis Hsu, Hao Chen, and Sridhar Machiraju. "WebCallerID: Leveraging Cellular Networks for Web Authentication". In: *Journal of Computer Security* 19.5 (2011).
- [45] Liang Cai and Hao Chen. "TouchLogger: Inferring Keystrokes on Touch Screen from Smartph One Motion". In: *6th USENIX Workshop on Hot Topics in Security (HotSec 11)*. San Francisco, CA, Aug. 9–9, 2011.
- [46] 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 17–19, 2011.
- [47] Liang Cai, Kai Zeng, Hao Chen, and Prasant Mohapatra. "Good Neighbor: Ad Hoc Pairing of Nearby Wireless Devices by Multiple Antennas". In: *Annual Network and Distributed System Security Symposium (NDSS)*. San Diego, CA, Feb. 6–9, 2011.
- [48] 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.
- [49] 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.
- [50] 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. 15–19, 2010.
- [51] 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. 9–13, 2009.
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- [53] 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. 14–18, 2009.
- [54] 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. 17–17, 2009.
- [55] 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. 29–31, 2009.
- [56] Justin Becker and Hao Chen. "Measuring Privacy Risk in Online Social Networks". In: *Web 2.0 Security and Privacy (W2SP)*. Oakland, CA, May 21–21, 2009.
- [57] 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. 8–11, 2009.
- [58] G Misherghi, 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.
- [59] 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. 27–31, 2008, pp. 99–107.
- [60] 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. 14–14, 2008.
- [61] 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. 25–26, 2008, pp. 55–59.
- [62] 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. 10–13, 2008, pp. 333–345.
- [63] 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. 10–14, 2007, pp. 74–83.
- [64] 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 8–12, 2007.
- [65] 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. 28–Mar. 2, 2007, pp. 79–92.
- [66] 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 22rd Annual Computer Security Applications Conference (ACSAC)*. Miami Beach, FL, Dec. 11–15, 2006.
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PATENTS

- [1] Sridhar Machiraju, Jean Bolot, and Hao Chen. "Distributed Wireless Device Association with Bases-tations". US 9 503 895. Nov. 22, 2016.
- [2] Sridhar Machiraju, Jean Bolot, and Hao Chen. "Distributed Wireless Device Association with Bases-tations". US 8 873 752. Oct. 28, 2014.
- [3] Hui Zang, Liang Cai, Hao Chen, and Gabriel Maganis. "Method for Increasing the Number of Concurrent Page Records Sent to Mobile Stations". US 8 639 275. Jan. 28, 2014.
- [4] Hui Zang, Liang Cai, Hao Chen, and Gabriel Maganis. "Method for Increasing the Number of Concurrent Page Records Sent to Mobile Stations". US 8 509 821. Aug. 13, 2013.
- [5] Sridhar Machiraju, Francis Hsu, and Hao Chen. "Cellular Authentication for Authentication to a Service". US 8 442 527. May 14, 2013.
- [6] Jianying Hu, Richard Sproeat, and Hao Chen. "E-mail Signature Block Analysis". US 6 373 985. Apr. 16, 2002.

- [7] Jianying Hu, Richard Sproeat, and Hao Chen. "E-mail Signature Block Segmentation". US 6 360 010. Mar. 19, 2002.