

Wenhui Hu

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RESEARCH INTERESTS

My current research interest is Android application security. In particular, my dissertation is focusing on the security of third-party libraries used by Android applications. I am also interested in other topics in system security and network security.

EDUCATION

Pennsylvania State University
Ph. D. Candidate in Computer Science and Engineering
Advisors: Dr. Peng Liu and Dr. Patrick McDaniel
University Park, PA, USA
2007-

Helsinki University of Technology
M.Sc. (Tech) **with Distinction** in Computer Science and Engineering
Thesis: "Adopting Cellular IPv6 into Hybrid Ad Hoc Networks".
Espoo, Finland
Jan 2007

Southeast University
B.E. in Computer Science and Engineering
Thesis: "A New Back End of GNU Compiler Collection".
Nanjing, P.R. China
June 2002

ACADEMIC HONORS

- 1st Prize, Cisco Innovation Challenge (as group leader), Pennsylvania State University, Feb 2012.
- Travel Grant for Trusted Infrastructure Workshop, 2010.
- M.Sc. (Tech) with Distinction, Helsinki University of Technology, Jan 2007.
- Outstanding Graduate in Southeast University, 2002.
- Outstanding Graduation Project and Thesis in Southeast University, 2002.
- The first-class scholarship for outstanding students in Southeast University, 2001.
- The third-class scholarship for outstanding students in Southeast University, 1999, and 2000.

RESEARCH EXPERIENCE

- **Research Assistant, Pennsylvania State University, Aug 2007 - Present.**

Duet: Library Integrity Verification for Android Applications: There are two types of library-based attacks in the real world: *theft of service*, and *library forgery*. These attacks can be mitigated by library integrity tools. *Duet* is the first tool to achieve the library integrity for Android applications. In a dataset with 100,000 Android applications, I verify the integrity of 15 libraries. On average, 89.62% of libraries can pass the integrity checks. The evaluation results indicate that *Duet* is an effective tool to mitigate these attacks, as well as provide empirical insight into the library integrity situation in the wild. The result has been submitted to ASIACCS 2014.

Modification of Bluetooth Service in Android OS: Modification Bluetooth Service in the Android framework for a delay tolerant network research project. Tasks include: (1) Modify the Android framework source code to remove the time limitation of Bluetooth discoverable period. (2) Develop a RSS reader application in Android OS, which uses the modified Bluetooth service as the communication protocol.

Application Analysis on Symbian OS: Analysis the system calls by applications on Symbian OS. Tasks include: (1) Develop one notebook application in Symbian OS. (2) Monitor the system calls of applications in emulator by using proxy dynamic-link library.

Jamming and its Solutions in Sensor Networks (Programming on Mica2): In sensor networks, jamming is a critical attack. In this project, I modify TinyOS to enable jamming. I also design, implement, and evaluate the recovery protocols after jamming detected. The result has been published in ICICS.

Source Location Privacy in Sensor Networks: In sensor networks, source location of events can be the attack targets. We propose a cross-layer routing protocol as the solution to this problem. The result has been published in SECON.

- **Research Assistant, Helsinki University of Technology**, Jun 2005 - Jan 2007.

Adopting Cellular IPv6 into Hybrid Ad Hoc Networks: Work independently for a new routing protocol in hybrid ad hoc networks. My duties includes: protocol refinement, software design, implementation, and measurements. This work generates my Master's Thesis.

Special Assignment about Distributed Termination Algorithms: Design and Implementation of Distributed Termination Algorithms. This work is under the instruction of Professor Mordechai Ben-Ari, the holder of SIGCSE Award for Outstanding Contribution to Computer Science Education in 2004.

WORK EXPERIENCE

- **Software Designer, Canter Oy**, Helsinki, Finland, Oct. 2006 - Aug. 2007. Software design, ERP integration, and network administration.
- **Network Administrator, Changshu Information Center**, Changshu, China, Jan. 2004 - Aug. 2004. Network and system administration for a wide area network.
- **Software Engineer, MacroTech Co. Ltd**, Nanjing, China, May. 2003 - Dec. 2003. Software development for chip size estimation software.
- **Intern, Nanjing Micro Aurora Information Technology Co. Ltd**, Nanjing, China, Jul. 2001 - Mar. 2002. I mainly work on a compiler for embedded systems.

TEACHING EXPERIENCE

- **Instructor.** CMPSC 203: Introduction to Spreadsheets and Databases, Pennsylvania State University, Summer 2013.
- **Teaching Assistant.** CMPSC 473: Operating Systems Design and Construction, Pennsylvania State University, Fall 2011.
- **Teaching Assistant.** CMPSC 203: Introduction to Spreadsheets and Databases, Pennsylvania State University, Summer 2011, and Summer 2012.
- **Teaching Assistant.** CMPSC 311: Introduction to Systems Programming, Fall 2008, Spring 2009, Spring 2012, Spring 2013, and Spring 2015.
- **Teaching Assistant.** CSE 513: Distributed System, Pennsylvania State University, Spring 2008.
- **Teaching Assistant.** CSE 465: Data Structures and Algorithms, Pennsylvania State University, Fall 2007.
- **Tutor.** T-110.5290: Seminar on Network Security - Security and Privacy in Pervasive Computing, Helsinki University of Technology, Fall 2006.
- **Teaching Assistant.** T-106.1200: Basics of Programming T (Java), Helsinki University of Technology, Fall 2006.
- **Instructor.** Instructor of two undergraduate students on their Graduation Project and Thesis, Southeast University, Spring 2002.
- **Instructor.** Principles of Compiler, Nanjing Forestry University, Fall 2001.

PUBLICATIONS

1. **W. Hu**, D. Oceau, P. McDaniel, and P. Liu, "Duet: Library Integrity Verification for Android Applications", *Proceedings of The ACM Conference on Wireless Network Security (WiSec)*, July 2014. Oxford, United Kingdom.
2. X. Jiang, **W. Hu**, S. Zhu, and G. Cao, "Compromise-Resilient Anti-Jamming Communication in Wireless Sensor Networks", *ACM/Springer Wireless Networks*, August 2011.
3. X. Jiang, **W. Hu**, G. Cao, and S. Zhu, "Compromise-Resilient Anti-Jamming for Wireless Sensor Networks", *Proceedings of Twelfth International Conference on Information and Communications Security (ICICS)*, 2010.

4. M. Shao, **W. Hu**, S. Zhu, G. Cao, S. Krishnamurthy, and T. La Porta, “Cross-layer Enhanced Source Location Privacy in Sensor Networks”, *IEEE Conference on Sensor, Mesh, and Ad Hoc Communications and Networks (SECON)*, 2009.
5. **W. Hu**, and D. Forsberg, “Fast Solutions for AP-to-AP Handoffs”, *In Proceedings of The 11th Nordic Workshop on Secure IT-systems (NordSec 2006)*, Linköping, Sweden, October 2006.

Technical Report

6. **W. Hu**, D. Oceau, P. McDaniel, and P. Liu, “Duet: Library Integrity Verification for Android Applications”, Technical Report NAS-TR-0172-2014, Network and Security Research Center, Department of Computer Science and Engineering, Pennsylvania State University, University Park, PA, USA. February 2014. (*Updated March 2014*)

SERVICE

- Reviewer (Journals) - *Transactions on Computers (TC)*, *Transactions on Dependable and Secure Computing (TDSC)*, *Security and Communication Networks (SDN)*, *International Journal of Distributed Sensor Networks (IJDSN)*, *Journal of Biomedical Informatics (JBI)*, *International Journal of Sensor Networks (IJS-NET)*, *International Journal on Advances in Information Sciences and Service Sciences (AISS)*.
- Reviewer (Conferences) - *RAID 2014*, *IEEE CNS 2014*, *ASIACCS 2015*, *SECURITY 2015*, *IEEE CNS 2015*, *ESORICS 2015*, *QRS 2015*.
- Reviewer (Workshops) - *CCS SafeConfig 2015*.

REFERENCES

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Prof. Patrick McDaniel
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 Computer Science and Engineering
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 Phone: (814) 863-3599
 Email: mcdaniel@cse.psu.edu