

# Wenyuan Xu

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University of South Carolina  
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## Research Interests

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- Wireless Network Security and privacy
- Dependable Wireless Sensor Networks
- Smart Grid
- Jamming/Radio Interference
- Wireless Embedded Systems

## Education

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- Ph. D. in Electrical and Computer Engineering** Jun. 2007  
Rutgers, the State University of New Jersey, New Brunswick, NJ  
Advisor: Prof. Wade Trappe, Co-advisor: Prof. Yanyong Zhang  
Dissertation: Defending Wireless Networks from Radio Interference Attacks
- Ph. D. program in Computer Science (prior to transfer)** Jan. 2002 – Jun. 2002  
Rensselaer Polytechnic Institute, Troy, NY
- M. S. in Computer Science and Engineering** Mar. 2001  
Zhejiang University, Hangzhou, China  
Advisor: Prof. Zhu, Miaoliang  
Dissertation: A User-Friendly Graphic Interface for Monitoring Autonomous Vehicle Systems
- B. S. in Electrical Engineering** Jun. 1998  
Zhejiang University, Hangzhou, China  
Advisor: Prof. Zhao, Guangzhou  
Dissertation: Remote Detection of Fuse Status in Power Plants  
Graduated with the Highest Honor (top 5% students graduated in Zhejiang Province)

## Professional Experience

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- Assistant Professor**, University of South Carolina Aug. 2007- present  
Department of Computer Science and Engineering; Columbia, SC
- Visiting Professor**, University of Massachusetts Amherst May 2011 – Aug 2011  
Department of Computer Science; Amherst, MA
- Associate Faculty**, University of South Carolina Aug. 2011 – present  
Environment and Sustainability Program; Columbia, SC

## Professional Experience

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- Graduate Research Assistant**, Rutgers University Jun. 2002- Jun. 2007  
Department of Electrical and Computer Engineering  
Wireless Information Network Laboratory (WINLAB); New Brunswick, NJ
- Research Intern**, Hewlett-Packard Labs and Engineering; Princeton Junction, NJ Jun. 2005- Sept. 2005
- Graduate Teaching Assistant**, Rensselaer Polytechnic Institute Jan. 2002 – Jun. 2002  
Department of Computer Science; Troy, NY

## Awards and Honors

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- Career Awards** National Science Foundation of United States
- Student Travel Award** Sensys 2006
- First Prize Scholarship** Outstanding Undergraduate Scholarship of Zhejiang University (1994-1998)
- Liu Dan Scholarship** Top scholarship awarded to excellent students in Zhejiang University
- Contest Winner** Second Prize in China Mathematical Modeling Contest (1996)

## Research Grants

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- CDI-TYPE I:Biologically Relevant Sensor Networks for Climate Change Studies in Intertidal Ecosystems**  
Wenyuan Xu, Principal Investigator (PI), Brian Helmuth (Co-PI), National Science Foundation, \$447,666.00, 2011-2014
- CAREER: THAWS-Towards Highly Available Wireless Services**  
Wenyuan Xu (PI), National Science Foundation, \$400,000.00, 2009-2014
- REU: CAREER: THAWS--Towards Highly Available Wireless Services**  
Wenyuan Xu (PI), National Science Foundation, \$32,000.00, 2009-2014
- Integrate Smartphones With JTRS Radios Through WiFi**  
John Xu (PI), Wenyuan Xu (Contract), SPAWAR NISE Innovation project, \$49,999.00, 2012-2013
- ROP: Enhancing Data Privacy and Availability in Wireless Sensor Networks**  
Wenyuan Xu (PI), the Research Opportunity Program of USC, \$19,989.00, 2009
- Portable Devices to Monitor Electric and Gas Meters (PDM)**  
Wenyuan Xu (PI), Pinnacle Consulting LLC, \$20,467.00, 2011

## Publications

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### Book and Book Chapter Publications

1. Y. Chen, W. Xu, W. Trappe, Y. Zhang, "Securing Emerging Wireless Systems: Lower-layer Approaches," ISBN: 978-0-387-88490-5, Springer, 2009.
2. W. Xu, "Jamming Attack Defense," Encyclopedia of Cryptography and Security II, Springer, 2010.

### Journal Publications

3. Z. Liu and W. Xu, "Determining Sink Location through Zeroing-In Attackers in Wireless Sensor Networks," to appear in *Wireless Networks*.
4. Z. Liu, H. Liu, W. Xu, and Y. Chen, "Exploiting Jamming-Caused Neighbor Changes for Jammer Localization," *accepted to IEEE Transaction on Parallel and Distributed Systems (TPDS)*.
5. M. Xia, Y. Dong, W. Xu, D. Lu, and X. Li. "Multi-mode user-centric design of wireless sensor networks for long-term monitoring," in *ACM SIGMOBILE Mobile Computing and Communications Review*, Volume 14, Number 1, 25-27, July 2010.
6. H. Liu, Z. Liu, Y. Chen and W. Xu, "Determining the Position of a Jammer Using Virtual-Force Iterative Approach," *Wireless Networks*, Volume 17, Number 2, 531-547, 2011
7. M. Xia, Y. Dong, W. Xu, D. Lu, and X. Li, "Multi-Mode User-Centric Design of Wireless Sensor Networks for Long-Term Monitoring," *Mobile Computing and Communication Review (MC2R)*, 2010.
8. P. Kamat, W. Xu, Y. Zhang and W. Trappe, "Temporal Privacy in Wireless Sensor Networks: Theory and Practice," *ACM Transactions on Sensor Networks (TOSN)*, Vol. 5(4), November, 2009.
9. W. Xu, W. Trappe, and Y. Zhang, "Defending Wireless Sensor Networks from Radio Interference through Channel Adaptation," *ACM Transactions on Sensor Networks (TOSN)*, Vol. 4(4), August. 2008.
10. W. Xu, K. Ma, W. Trappe, and Y. Zhang, "Jamming Sensor Networks: Attack and Defense Strategies," *IEEE Networks Special Issue on Sensor Networks*, Vol. 20, No. 3, pg. 41-47, May/June 2006. (Acceptance ratio: 10.3%)

### Peer-Reviewed Conference Publications & Conference Proceedings

11. M. Xu, W. Xu, and J. M. O'Kane, "Content-Aware Data Dissemination for Enhancing Privacy and Availability in Wireless Sensor Networks," in Proceedings of 8th IEEE International Conference on Mobile Ad-hoc and Sensor Systems (IEEE MASS), 2011
12. H. Mustafa, X. Zhang, Z. Liu, W. Xu, and A. Perrig, "Short Paper: Jamming-Resilient Multipath Routing Leveraging Availability-Based Correlation," in Proceedings of ACM Conference on Wireless Network Security (WiSec) 2011
13. H. Liu, Z. Liu, Y. Chen, and W. Xu, "Localizing Multiple Jamming Attackers in Wireless Networks," in Proceedings of Int'l Conference on Distributed Computing Systems (ICDCS), 2011

14. J. Hou, Z. Lin, W. Xu, G. Yan, "Distributed Transmit Beamforming with Autonomous and Self-organizing Mobile Antennas," in Proceedings of IEEE Global Communications Conference (IEEE Globecom), Miami, FL, 2010
15. J. O'Kane and W. Xu, "Network-assisted target tracking via smart local routing," in Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Taipei, Taiwan, October, 2010.
16. I. Rouf, R. Miller, H. Mustafa, T. Taylor, S. Oh, W. Xu, M. Gruteser, W. Trappe, and I. Seskar, "Security and Privacy Vulnerabilities of In-Car Wireless Networks: A Tire Pressure Monitoring System Case Study," in Proceedings of the 19th USENIX Security Symposium, Washington DC, August 11-13, 2010.
17. Z. Liu, H. Liu, W. Xu, and Y. Chen, "Wireless Jamming Localization by Exploiting Nodes' Hearing Ranges," in Proceedings of the International Conference on Distributed Computing in Sensor System(DCOSS), Santa Barbara, CA, June 2010.
18. I. Rouf, R. Miller, H. Mustafa, T. Taylor, S. Oh, W. Xu, M. Gruteser, W. Trappe, and I. Seskar, "Security and Privacy Vulnerabilities of In-Car Wireless Networks: A Tire Pressure Monitoring System Case Study," Poster Session, IEEE Symposium on Security and Privacy, Oakland, CA, May, 2010.
19. Z. Liu and W. Xu, "Zeroing-In on Network Metric Minima for Sink Location Determination," in Proceedings of ACM Conference on Wireless Network Security (WiSec), 2010. (Acceptance ratio: 21%)
20. M. Xia, Y. Dong, W. Xu, D. Lu, and X. Li, "Multi-Mode User-Centric Design of Wireless Sensor Networks for Long-Term Monitoring," Poster Session, the ACM International Conference on Mobile Computing and Networking, 2009
21. H. Liu, W. Xu, Y. Chen and Z. Liu, "Localizing Jammers in Wireless Networks," in Proceedings of IEEE PerCom International Workshop on Pervasive Wireless Networking (IEEE PWN) (Held in conjunction with IEEE PerCom), Texas, March 2009.
22. J. O'Kane and W. Xu, "Energy efficient target tracking with a sensorless robot and a network of unreliable one-bit proximity sensors," in Proceedings of IEEE International Conference of Robotics and Automation(ICRA), Kobe, Japan, May 2009.
23. W. Xu, W. Trappe, Y. Zhang, "Anti-Jamming Timing Channels for Wireless Networks," in proceedings of 1st ACM Conference on Wireless Security (WiSec2008), pg 203-213, 2008. (Acceptance ratio: 16.7%)
24. W. Xu, "On Adjusting Power to Defend Wireless Networks from Jamming," in proceedings of the First Workshop on the Security and Privacy of Emerging Ubiquitous Communication Systems (speucs), 2007.
25. R. Miller, W. Xu, P. Kamat, and W. Trappe, "Service Discovery and Device Identification in Cognitive Radio Networks," in Proceedings of the IEEE Workshop on Networking Technologies for Software Defined Radio (SDR) Networks (Held in Conjunction with IEEE SECON), 2007.
26. P. Kamat, W. Xu, Y. Zhang and W. Trappe, "Temporal Privacy in wireless sensor networks," in Proceedings of the 27th International Conference on Distributed Computing Systems (ICDCS2007), pg. 23, 2007. (Acceptance ratio: 13.5%)
27. W. Xu, W. Trappe, and Y. Zhang, "Channel Surfing: Defending Wireless Sensor Networks from Jamming and Interference," in Proceedings of the 6th International Conference on Information Processing in Sensor Networks (IPSN07), pg. 499-508, 2007. (Acceptance ratio: 22.3%)

28. W. Xu, W. Trappe, and Y. Zhang, "Poster Abstract: Channel Surfing: Defending Wireless Sensor Networks from Jamming and Interference," in Proceedings of the 4th ACM Conference on Embedded Networked Sensor Systems (SenSys), pg. 403-404, 2006.
29. Z. Li, W. Xu, R. Miller and W. Trappe, "Securing Wireless Systems via Lower Layer Enforcements," in Proceedings of the 2006 ACM Workshop on Wireless Security (WiSe), pg. 33-42, 2006. (Acceptance ratio: 19.6%)
30. W. Xu, P. Kamat and W. Trappe, "TRIESTE: A Trusted Radio Infrastructure for Enforcing SpecTrum Etiquettes," in Proceedings of the IEEE Workshop on Networking Technologies for Software Defined Radio (SDR) Networks (Held in Conjunction with IEEE SECON), 2006.
31. W. Xu, W. Trappe, Y. Zhang and T. Wood, "The Feasibility of Launching and Detecting Jamming Attacks in Wireless Networks," in Proceedings of ACM International Symposium on Mobile Ad Hoc Networking and Computing (Mobihoc), pg. 46-57, 2005. (Acceptance ratio: 14.2%)
32. W. Xu, T. Wood, W. Trappe, and Y. Zhang, "Channel surfing and spatial retreats: defenses against wireless denial of service," in Proceedings of the 2004 ACM workshop on Wireless security (WiSe), pg. 80-89, 2004. (Acceptance ratio: 20%)
33. W. Xu, W. Trappe, and S. Paul, "Key Management for 3G MBMS Security," in Proceeding of IEEE Global Telecommunications Conference (GLOBECOM), Vol. 4, pg. 2276-2280, 2004.

### **Design Document**

34. W. Trappe, W. Xu, "Requirements Document for Security of GENI Wireless Networks," GENI Design Document 06-16, Wireless Working Group, September 2006.

### **Patents**

35. W. Trappe, Y. Zhang, W. Xu, K. Ma, "Repairing and Protecting Wireless and Sensor Networks from Interference through Spectral and Spatial Adaptation," Rutgers Invention Disclosure, submitted April 17, 2006.

### **Professional Activities**

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#### **Journal Editorship**

International Journal of Autonomous and Adaptive Communications Systems (IJAAACS)

#### **Program Chair**

The 8th IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS '12)  
The First IEEE International Workshop on Generation C Wireless Networks (GenCWiNets 2008)

#### **Technical Program Committees**

Usenix Security Symposium (2011)  
The ACM Conference on Wireless Network Security (WiSec 2009, WiSec 2010, Wisec 2012);  
The International Conference on Computer Communications and Networks (ICCCN 2007, ICCCN 2009, ICCCN2010, ICCCN2011);  
IEEE International Conference on Communications 2010, System Security Symposium (ICC'10 CISS, ICC'11 CISS)  
IEEE Global Telecommunications Conference (GlobeCom 2011);  
The International Wireless Communications and Mobile Computing Conference (IWCMC 2009);  
The First International Workshop on Security for Mobile Wireless Communications SeMIC 2008,

(held in conjunction with COMSWARE 2008);  
The 1st IEEE Workshop on Security, Privacy and Authentication in Wireless Networks (SPAWN 2008);  
ChinaCom2008-Network and Information Security Symposium (ChinaCom2008-NIS);  
The IEEE Workshop on Networking Technologies for Software Defined Radio (SDR) Networks (2009, 2008, 2007);

### **Proposal Reviewing**

Panelist/Reviewer, National Science Foundation of the United States (NSF)  
Army Research Office (ARO)

### **Journal/Conference Reviewing**

ACM Transactions on Sensor Networks (TOSN);  
IEEE Transactions on Mobile Computing (TMC);  
Wireless Communications and Mobile Computing (WILEY WCMC);  
IEEE Communications Surveys and Tutorials (ComST);  
The EURASIP Journal on Information Security;  
Wireless Networks;  
Pervasive and Mobile Computing; the Journal of Mobile Communication, Computation and Information;  
IEEE Global Telecommunications Conference (GlobeCom);  
IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS);  
ACM SIGMOBILE Mobile Computing and Communications Review (MC2R);  
IEEE InfoCom 2007.

### **Invited Talks**

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#### **Key Note Speaker at 9<sup>th</sup> escar Embedded Security in Cars Conference**, Germany, November 2011

Security and Privacy Vulnerabilities of In-Car Wireless Networks: A Tire Pressure Monitoring System Case Study

#### **Guest Speaker at SWING: Bertinoro PhD School on Security for Wireless Networking**, Italy, November 2011

Security and Privacy Vulnerabilities of Embedded Wireless Networks

#### **Technische Universität Darmstadt, System Security Lab at the Center for Advance Security Research**, Germany, November 2011

Do You Trust Your Car: On Ethical Car Hacking to Mitigate Security and Privacy Vulnerabilities of In-Car Wireless Sensor Networks

#### **University of Massachusetts Amherst**, October 2010

Analyzing the Security and Privacy Vulnerability of Emerging Wireless Networks via Software Defined Radio: A Tire Pressure Monitoring System Case Study

#### **Zhejiang University**, Jan. 2009

Jamming Wireless Networks: Attack and Defense Strategies

#### **Industrial Advisory Board (IAB) Research Review, WINLAB**, Fall 2007

Anti-Jamming Timing Channels for Wireless Networks

**Intel Inc. 2007**

Jamming Wireless Networks: Attack and Defense Strategies

**NSF-funded network security workshop for underrepresented researchers, Lehigh University, May 2006**

Jamming Wireless Networks: Attack and Defense Strategies

**Teaching Experience**

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**Assistant Professor**, University of South Carolina 2007-present

- CSCE 416 Introduction to Computer Networks
- CSCE 515 Computer Network Programming
- CSCE 719 Security and Privacy of Wireless Systems
- CSCE 790 Security and Privacy for Emerging Ubiquitous Communication Systems

**Guest Lecturer**, USFalcon, Inc (Military Training Support for DoD) 2010-2011

- FA24 Program –Data Communication

**Teaching Assistant**, Rensselaer Polytechnic Institute 2002

- Computer Architecture