

Minho Shin

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Research Interests	Wireless Networks and Distributed Systems: <ul style="list-style-type: none">• WLAN, Ad-hoc, Wireless Mesh Networks, Vehicular Networks Pervasive Computing: <ul style="list-style-type: none">• People-centric Urban Sensing, Pervasive Health Monitoring Privacy and Security <ul style="list-style-type: none">• in Wireless Networks and Pervasive Computing	
Education	Ph.D., Computer Science University of Maryland, College Park, MD Advisor: William A. Arbaugh	2008
	M.S., Computer Science University of Maryland, College Park, MD Advisor: William A. Arbaugh	2003
	B.S., Computer Science and Statistics Seoul National University, Seoul, Korea	1998
Work Experience	Samsung Advanced Institute of Technology, Kiheung, Korea R&D Staff Member, Future IT Research Center I work on the project <i>Intelligent Mobile Platform (IMP)</i> with seven other research staffs. I designed the overall architecture of IMP, and developed <i>Sensor Abstraction Layer</i> , as well as a simulation framework. See <i>Research Projects</i> section for the detail.	Mar 2010–present
	Institute for Security, Technology, and Society at Dartmouth College Postdoctoral Research Fellow with Prof. David Kotz I worked on privacy and data integrity problems in people-centric sensing and pervasive health monitoring. I lead <i>Metrosec</i> project team of three Ph.D students and another post-doctor. I also lead <i>SenseMed</i> project mentoring a Master student. I worked on the privacy-preserving and secure health monitoring project, mentoring two Ph.D students.	Nov 2007–Feb 2010
	Motorola Networks & Systems Lab, Schaumburg, IL Internship with Dr. Judy Fu I worked on the Spontaneous Inter-Provider Roaming project to design a general framework for spontaneous roaming between providers. With the proposed framework, users can access visiting networks without a prior roaming contract between the home- and visiting-networks. We filed two patents.	Jun–Aug 2006
	Motorola Networks & Systems Lab, Schaumburg, IL Internship with Dr. Madjid Nakhjiri I implemented a prototype for broker-based inter-provider roaming scheme, which allows visiting users to authenticate through a broker service. I modified freeRadius server, open1x supplicant, and open1x authenticator.	Jun–Aug 2005

Samsung Advanced Institute of Technology, Kiheung, Korea

May–Jun 2003

Internship with Dr. Insun Lee and Dr. Kyunghoon Jang

I designed a QoS-aware hand-off technology using Neighbor Graphs. I co-worked with two Ph.D students and filed a patent.

Research Projects

IMP: Intelligent Mobile Platform

Mar 2010–Present

IMP provides a generic framework for context-aware computing on smart-phones. I designed the overall architecture of the platform, and also designed a special layer, called Sensor Abstraction Layer(SAL). SAL provides other middleware modules and application software with various context sources such as sensor values and other high-level context information. In addition, I developed a simulation framework for context-aware applications.

Metrosec: Security of People-centric Sensor Networks

Nov 2007–Jul 2010

This project aims to design secure and efficient people-centric sensing, which exploits mobile devices for environmental and human sensing. We developed a privacy-aware sensing architecture, ANONYSENSE, and an energy-efficient distributed sensing algorithm, DEAMON. We are developing a secure framework for sensor sharing between people.

SenseMed: Data Assurance in Pervasive Health Monitoring

Nov 2007–2009

This project aimed to provide the assurance and assessment of data quality in pervasive health-monitoring systems. We developed a physiology-based patient authentication framework with machine learning algorithms. Funded by Intel.

Thesis: Peer-to-Peer Lookup for Multi-Hop Wireless Networks

2006–2008

My thesis work presented a novel approach to building a scalable and efficient peer-to-peer lookup service in multi-hop wireless networks. I proposed a highly-structured lookup scheme, RIGS, and a loosely-structured lookup scheme, VALLEYWALK, both of which achieve near-shortest paths to the destination with reasonable assumptions.

Integrated Simulation Framework for Vehicular Ad-hoc Networks

2007–2008

Research on vehicular ad-hoc networks (VANET) needs a simulation method for evaluation. To present, no single simulator can simulate a VANET. We designed a VANET simulation framework by integrating two off-the-shelf simulators; *Paramics* for transportation simulation and *Qualnet* for network simulation.

Distributed Channel Assignment in Multi-hop Wireless Networks

2005–2007

Radio interference is a major obstacle for multi-hop wireless networks. Although the use of multiple radios can improve network throughput, it is difficult to assign an appropriate channel to each link. We proposed a distributed channel assignment algorithm SAFE and Semi-Definite Programming algorithms.

WLAN Hand-off and 3G-WLAN Interworking

2002–2004

This project aimed to design an efficient and secure method for hand-offs within a WLAN and between a 3G and a WLAN. We empirically identified the hand-off latency as a major obstacle for seamless hand-off. Then we proposed Neighbor Graphs (NG) to the reduced hand-off latency below 31 *ms*. We also proposed a proactive key distribution scheme (centralized) and a proactive context caching scheme (distributed) to avoid security-induced hand-off latency. Our solution was included in the IEEE Standard 802.11f. We extended the notion of NG for inter-network roaming. Funded by Samsung Corporation.

**Journal
Publications**

AnonySense: A System for Anonymous Opportunistic Sensing
Minho Shin, C. Cornelius, D. Peebles, A. Kapadia, D. Kotz, N. Triandopoulos
Pervasive and Mobile Computing, April 2010

Multiple Query Scheduling for Distributed Semantic Caches
Beomseok Nam, Minho Shin, Henrique Andrade, and Alan Sussman
Journal of Parallel and Distributed Computing, 2010 (SCI: impact factor 1.168)

Efficient and Scalable Peer-to-Peer Lookup in Multi-hop Wireless Networks
Minho Shin, William Arbaugh
Transactions on Internet and Information Systems, Vol.3, No.1, Feb. 2009 (SCIE)

Wireless Network Security and Interworking
Minho Shin, Arunesh Mishra, Justin Ma, and William Arbaugh
The Proceedings of IEEE on Cryptography and Security, Vol.94, No.2, pp 455–466, Feb. 2006
(SCI: impact factor 4.613)

Pro-active Key Distribution using Neighbor Graphs
Arunesh Mishra, Minho Shin, N. L. Petroni, Jr., T. Charles Clancy, and William Arbaugh
IEEE Wireless Communications, Vol.11, No.1, pp 26–36, Feb., 2004 (SCI: impact factor 2.577)

An Empirical Analysis of the IEEE 802.11 MAC Layer Handoff Process
Arunesh Mishra, Minho Shin, and William Arbaugh
ACM SIGCOM Computer Communication Review (CCR), Apr. 2003 (SCI: impact factor 0.947)

**Conference/
Workshop
Publications**

Activity-aware ECG-based Patient Authentication for Remote Health Monitoring
Janani Sriram, Minho Shin, Tanzeem Choudhury, David Kotz
Proceedings of the Eleventh International Conference on Multimodal Interfaces and Workshop on Machine Learning for Multi-modal Interaction (ICMI-MLMI), November, 2009, MA, USA

MPCS: Mobile-Phone Based Patient Compliance System for Chronic Illness Care
Guanling Chen, Bo Yan, Minho Shin, David Kotz, Ethan Berke
Proceedings of the First International Workshop on Ubiquitous Mobile Healthcare Applications, July, 2009, Toronto, Canada

DEAMON: Energy-efficient Sensor Monitoring
Minho Shin, Patrick Tsang, David Kotz, Cory Cornelius
IEEE Communications Society Conference on Sensor, Mesh, and Ad Hoc Communications and Networks (SECON), June, 2009, Rome, Italy (acceptance ratio:18.8%)

Challenges in Data Quality Assurance in Pervasive Health Monitoring Systems
Janani Sriram, Minho Shin, David Kotz, Anand Rajan, Manoj Sastry, Mark Yarvis
Conference "Future of Trust in Computing", June, 2008, Berlin, Germany

AnonySense: Privacy-Aware People-Centric Sensing
C. Cornelius, A. Kapadia, D. Kotz, D. Peebles, Minho Shin, and N. Triandopoulos
The ACM International Conference on Mobile Systems, Applications, and Services (MOBISYS), June, 2008, Breckenridge, Colorado, USA (acceptance ratio:17.8%)

An Integrated Transportation and Communication Simulation Framework for Vehicular Ad Hoc Network Applications
Hyoungsoo Kim, Minho Shin, Beomseok Nam, David Lovell
Transportation Research Board 2008 Annual Meeting, Washington D.C., USA.

SDP-based Approach for Channel Assignment in Multi-radio Wireless Networks
Hieu Dinh, Yoo-Ah Kim, Seungjoon Lee, Minh Shin, Bing Wang
Dial M-POMC 2007, Portland, Oregon, USA. (acceptance ratio:35%)

Soft Edge Coloring

Chadi Kari, Yoo-Ah Kim, Seungjoon Lee, Alex Russell, and Minh Shin
APPROX 2007, Princeton University, New Jersey.

AAA for Spontaneous Roaming Agreements In Heterogeneous Wireless Networks
Judy Fu, Minh Shin, J. C. Strassner, N. Jain, V. Ram, S. Upadhyaya, and W. Arbaugh
Autonomic and Trusted Computing 2007, Hong Kong, China.

Distributed Channel Assignment for Multi-radio Wireless Networks

Minh Shin, Seungjoon Lee, and Yooah Kim
The IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS),
Oct, 2006, Vancouver, Canada. (acceptance ratio:24.9%)

Improving the Latency of 802.11 Hand-offs using Neighbor Graphs

Minh Shin, Arunesh Mishra and William Arbaugh
The ACM International Conference on Mobile Systems, Applications, and Services (MOBISYS),
June, 2004, Boston, MA. (acceptance ratio: 13.4%)

Context Caching using Neighbor Graphs for Fast Handoffs in a Wireless Network

Arunesh Mishra, Minh Shin, and William Arbaugh
IEEE INFOCOM, March, 2003, Hong Kong, China, Mar., 2004 (acceptance ratio:20.8%)

The Robust Routing Protocol in Ad Hoc Networks

Seungjoon Lee, Bohyung Han, and Minh Shin
International Workshop on Ad Hoc Network(IWAHN) 2002, Vancouver, Canada.

Technical Reports

The Design of Efficient Internetwork Authentication for Ubiquitous Wireless Comm.
Minh Shin, Justin Ma, and William A. Arbaugh
Tech. Report of University of Maryland, 2004 (CS-TR-4617, UMIACS-TR-2004-59)

Posters

Reliable People-centric Sensing with Unreliable Participants
Minh Shin, C. Cornelius, D. Peebles, A. Kapadia, P. Tseng, and D. Kotz
The ACM International Conference on Mobile Systems, Applications, and Services (MOBISYS),
June, 2008, Breckenridge, Colorado, USA

Patents

"Dynamic Roaming Agreement of Heterogeneous Networks" (US 11/773122, IN/1410/DEL/ 2007)
"Probing Method for Fast Handoff in WLAN" (US 7,400,604, KR 2004-90573)
"Method for fast roaming in a wireless network" (US 7,421,268)
"Mobility Management Method using an Improved Neighbor Graph" (US 7,450,546)
"Authentication method for wireless distributed system" (US 11/433679, KR 2006-41227, WO/2006/121307, EP 20060009984)
"Method for performing handoff in wireless network" (US Appl. 20050083887)
"Reconfiguration of Neighborhood Graph for QoS Support in Heterogeneous Network, and its use for seamless handoff" (KR 2003)

Talks

Distributed Channel Assignment for Multi-radio Wireless Networks
Minh Shin, Seungjoon Lee, and Yooah Kim
MASS 2006, Vancouver, Canada.

Improving the Latency of 802.11 Hand-offs using Neighbor Graphs
Minho Shin, Arunesh Mishra and William Arbaugh
ACM MOBISYS 2004, Boston, MA.

Context Caching using Neighbor Graphs for Fast Handoffs in a Wireless Network
Arunesh Mishra, Minho Shin, and William Arbaugh
IEEE INFOCOM 2003, Hong Kong, China, Mar., 2004

Skills

Languages : C, C++, Object C, Java, Ruby, PHP, SQL, Object Pascal
System and Network Programming : TCP/IP Socket, Linux/BSD Kernel
Simulation Tools : Matlab, ns-2, Qualnet, Paramics

**Awards
& Honors**

National IT Fellowship Feb 2001–Jan 2005
Ministry of Information and Communication of Korea

SNUA Student Scholarship 2004–2007
Seoul National University Alumni Association

**Social
Activities**

President of Korean Graduate Student Association of CS in UMD 2003
Founder and president of KGSYS (KGCS System Research Group) in UMD 2002

**Professional
Services**

Program Committee: IEEE LCN Workshop on Network Security (WNS) 2008, IEEE LCN Workshop on Security in Communications Networks (SICK) 2010, Asia-Pacific Conference on Communications (APCC) 2010

Active Reviewer: IEEE Transactions on Mobile Computing, IEEE Transactions on Networking, IEEE ICC, IEEE Globecom, IEEE HPSR, IEEE Sarnoff, IEEE WCNC, IEEE ICCN, IEEE PIMRC, IEEE Communications Magazine, ACM IWCMC, European Wireless, European Transactions on Telecommunications, IEEE Communications Surveys and Tutorials (COMST), Springer Wireless Personal Communications

References

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Dartmouth College, Hanover, NH 03755, USA
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