# Minho Shin


**Contact Information**

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**Research Interests**

**Privacy and Security in Mobile Systems**
- Smartphone Security and Privacy
- Location Privacy
- Smart Grid Security

**Wireless Networks and Distributed Systems**:
- WLAN, MANET, VANET, Mobile Sensing, Health Monitoring

**Power IT**:
- Smart Grid, Electric Vehicle Charging

**Education**

**Ph.D., Computer Science** 2008
University of Maryland, College Park, MD
Advisor: William A. Arbaugh

**M.S., Computer Science** 2003
University of Maryland, College Park, MD
Advisor: William A. Arbaugh

**B.S., Computer Science and Statistics** 1998
Seoul National University, Seoul, Korea

**Work Experience**

**Dept. of Computer Engineering, Myongji University, Korea** Mar 2015–present
Associate Professor

**Dept. of Computer Engineering, Myongji University, Korea** Mar 2011–Feb 2015
Assistant Professor

**Samsung Advanced Institute of Technology, Kiheung, Korea** Mar 2010–Feb 2011
R&D Staff Member, Future IT Research Center

**Institute for Security, Technology, and Society at Dartmouth College** Nov 2007–Feb 2010
Postdoctoral Research Fellow with Prof. David Kotz

**Motorola Networks & Systems Lab, Schaumburg, IL** Jun–Aug 2006
Internship with Dr. Judy Fu

**Motorola Networks & Systems Lab, Schaumburg, IL** Jun–Aug 2005
Internship with Dr. Madjid Nakhjiri

**Samsung Advanced Institute of Technology, Kiheung, Korea** May–Jun 2003
Internship with Dr. Insun Lee and Dr. Kyunghoon Jang

**Research Projects**

**Network traffic analysis for Network Forensic** Jun. 2019–present
Fund: Korea Sanhak Foundation
Joint work with Wins Co., Ltd.

**International standardization of IEC 63110** 2019–present
Fund: Korea Electrotechnology Research Institute (KERI)

**Developing International standards and patents for EV Wireless-charging communications** 2019–2020
Fund: Hyundai

**Developing EV Wireless-charging communication protocols based on international standards** 2018–2019
Fund: Hyundai

**Building user authorization and value-added service systems in EV charging system**
Mar. 2018–Jan. 2020
Design and build ISO 15118 Plug-aNd-Charge user authorization mechanism and develop an implementation guide-line. Develop KEPCO 3.0 protocol to support ISO 15118 PnC. Fund: KEPRI Joint work with Penta Security Inc., Dream Security Inc., and Funzin Inc.

**Energy Cluster: Dev. of Platform Design and Application Technologies for Alphagrid**
Mar. 2018–Feb. 2021
In this project, I develop Blockchain-based User Authentication & Authorization mechanisms in Electric Vehicle Charging Systems.
Fund: KEPTRI
Jointwork with Inha University, Postech University, Korea Polytechnic University, and Duksung University

**Dynamic formulation of VPPs and scheduling algorithm** 2017–present
Design and implement the formulation and scheduling algorithm for Dynamic Virtual Power Plants using Mosaik simulation framework.
Fund: KEPRI
Duration: from May 2017 to April 2020
Joint work with Professor Hyuksoo Jang, MJU

**The Promotion of Microdata De-identification** 2017
Advance the "Guideline of Microdata De-identification" by the Korean government, published in 2016. The project aims to report on the technical and policy limitations of the current guideline and propose the direction of the new guildeline.
Fund: Korea Internet & Security Agency
Duration: from Jun 2017 to Oct 2017

**A Dynamic Privacy Monitoring and Intervention System in Smartphones against Information Escalation Attacks** 2017–present
This project aims to developing a mobile security services in Android systems to detect and defend the information escalation attacks that can compromise the user privacy. Information escalation attack is an attempt to retrieve the users private information from information accessible through legitimate API calls from multiple Apps with different access rights.
Fund: National Research Foundation

**V2G Service-Oriented Development** 2015–2017
Build AC-based Bidirectional Power Transfer between EV and EV-Charger with flexible scheduling. My role is to develope the ISO/IEC 15118-compatible V2G communication protocol, and its domestic/international standardization
Fund: Korea Institute of Energy Technology Evaluation and Planning (KETEP)

Duration: from Jun 2015 to May 2017

**Smart Cloudlet** 2013–2018
High performance mobile cloudlet system for collaborative computation and sensing
Fund: Korea Communications Commission
Duration: from Mar 2013 to Feb 2018
Joint work with KAIST, Korea University, Gyeongsang National University, Hankyong National University, et al.

**Mobile Privacy for Smartphones** 2012–2015
Preserving user privacy in smartphone.
Fund: National Research Foundation
Duration: from May 2012 to April 2015

**Smart Grid V2G Interoperability** 2011–14
Design & implement an interoperability testing system of EV charging system
Fund: Ministry of Knowledge Economy
Duration: from Dec 2011 to Nov 2014

**Intelligent Transportation Systems Simulator** 2011–2013
Design & implement a simulation framework for ITS by integrating transportation simulator (Paramics) and communication simulator (NS2), to emulate both the vehicle movements and vehicle communication with infrastructure (V2I) and other vehicles (V2V)
Fund: Korea Institute of Civil Engineering and Building Technology (KICT)
Duration: from June 2011 to Dec 2013

**IMP: Intelligent Mobile Platform** 2010
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 evalua-

tion. 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.

**Spontaneous Inter-Provider Roaming with AAA Architecture** 2006–2007
We designed a general framework for spontaneous user roaming between providers. With the proposed framework, users can access the visiting network without prior static roaming contract between home network and visiting network. It consists of AAA framework, policy engine, and negotiation algorithm. My contribution is on AAA framework using Diameter. This is a co-work with Dr. Judy Fu at Motorola Labs.

**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.

**Book Publications**

Korean interpretation of **Computer Security: Principles and Practice (2nd Edition)** by William Stallings and Lawrie Brown, Seoul, Korea: Kyobo 2013, ISBN 9788998886479

**Journal Publications**

**Building an Interoperability Test System for Electric Vehicle Chargers Based on ISO/IEC 15118 and IEC 61850 Standards**
Minho Shin, Hwimin Kim, Hyoseop Kim and Hyuksoo Jang
*Applied Sciences, Special Issue on "Smart Grid: Convergence and Interoperability" , Vol 6 Issue 6 (SCIE, IF 1.474), 2016*

**URALP: Unreachable Region Aware Location Privacy against Maximum Movement Boundary Attack**
Nha Nguyen, Seungchul Han, and Minho Shin
*International Journal of Distributed Sensor Networks, Vol 2015 (SCIE)*

**EM-KDE: A locality-aware job scheduling policy with distributed semantic caches**
Youngmoon Eom, Deukyeon Hwang, Junyong Lee, Jonghwan Moon, Minho Shin, Beomseok Nam
*Journal of Parallel and Distributed Computing, Volume 83, September 2015, Pages 119132 (SCI)*

**Location Privacy for Mobile Crowd Sensing through Population Mapping**
Minho Shin, Cory Cornelius, Apu Kapadia, Nikos Triandopoulos, and David Kotz
*Sensors, special issue Sensors and Smart Cities, June 2015 (SCIE)*

**CAN Based Conformance Testing Using TTCN-3**
Tayyab Wahab Awan, Ahmed Mahdi Abed, Intaek Kim, Hyuk Soo Jang, and Minho Shin
*International Journal of Computer and Communication Engineering, Nov. 2014*

**Hide-n-Sense: preserving privacy efficiently in wireless mHealth networks**
Shrirang Mare, Jacob Sorber, Minho Shin, Cory T Cornelius, David Kotz
*Mobile Networks and Applications, Vol. 19, No. 3, June 2014 (SCIE)*

**Virtual world control system using sensed information and adaptation engine**
Sang-Kyun Kim, Yong Soo Joo, Minho Shin, Seungju Han, Jae-Joon Hanin
*SIGNAL PROCESSING-IMAGE COMMUNICATION, Vol. 28, Feb 2013 (SCI)*

**Distributing Network Loads in Tree-based Content Distribution System**
Seung Chul Han, Sungwook Chung, Kwang-Sik Lee, Hyunmin Park and Minho Shin
*KSII Transactions on Internet and Information Systems, Vol. 7, No. 1, Jan. 2013 (SCIE)*

**A Fault-tolerant Network Scheme for Large-scale Mission-critical Systems**
Minho Shin, R. A. Memon, Y.S. Ryu, J.M. Rhee, D.H. Lee
*Information Journal, Vol. 16, No. 3(B), pp. 3285-3290, Mar. 2013. (SCIE)*

**Development and Evaluation of Simulation-Based Training for Obstetrical Nursing Using Human Patient Simulators**
Miok Kim, Minho Shin *Computers, Informatics, Nursing (CIN), Feb 2013 (SSCI)*

**Secure Remote Health Monitoring with Unreliable Mobile Devices**
Minho Shin
*Journal of Biomedicine and Biotechnology, Jul. 2012 (SCIE)*

**High-throughput query scheduling with spatial clustering based on distributed exponential moving average**
Beomseok Nam, Deukyeon Hwang, Jinwoong Kim, Minho Shin
*Distributed and Parellel Databases, Vol 30, Aug 2012 (SCIE)*

**AnonySense: A System for Anonymous Opportunistic Sensing**
Minho Shin, C. Cornelius, D. Peebles, A. Kapadia, D. Kotz, N. Triandopoulos
*Pervasive and Mobile Computing, Feb 2011, Vol.7, Issue 1, pp 16-30 (SCIE)*

**Conference/ Workshop Publications**

**Fairness-aware Distributed Scheduling of Charging and Discharging Electric Vehicles in Dynamic Virtual Power Plants**
Zhong Zhang, Minho Shin, Hyuksoo Jang
*ITEC-2019: 2019 IEEE Transportation Electrification Conferenece, May. 08-10, 2019, Jeju, Korea*

**Outlook of Communication Standards for the Managements of Electric Vehicle Charging Stations and User Authentication**
Soojeong Lee, Minho Shin, Zhong Zhang
*ITEC-2019: 2019 IEEE Transportation Electrification Conferenece, May. 08-10, 2019, Jeju, Korea*

**Standard Developments of Electric Vehicle Charging Infrastructure**
Minho Shin, Sujeong Lee, Zhong Zhang
*THE 3RD INTERNATIONAL CONFERENCE ON ELECTRIC VEHICLE, SMART GRID AND INFORMATION TECHNOLOGY (ICESI 2018), May. 02-04, 2018, Jeju, Korea*

**A Crash Recovery Scheme for Log-based File System over Flash Memory using Shadow Paging**
Dileep Kumar, Yeonseung Ryu, Minho Shin
*International Conference on Platform Technology and Services (PlatCon'14), Feb. 11-13, 2014, Jeju, Korea*

**Protecting location privacy against maximum movement boundary attack in constrained movement scenarios**
Nha Nguyen, Minho Shin
*The FTRA 2013 International Symposium on Ubiquitous Computing and Embedded Systems (UCES-13), Dec. 18-21, 2013, Danang, Vietnam*

**Memory Efficient Parallelization for Aho-Corasick Algorithm on a GPU**
Nhat-Phuong Tran, Myungho Lee*, Sugwon Hong, Minho Shin
*2012 IEEE 14th International Conference on High Performance Computing and Communications*

**Plug-n-Trust: Practical Trusted Sensing for mHealth**
Jacob Sorber, Minho Shin, Ron Peterson, David Kotz
*MobiSys12, June 2529, 2012, Low Wood Bay, Lake District, UK*

**An Amulet for trustworthy wearable mHealth**
J. Sorber, M. Shin, R. Peterson, C. Cornelius, S. Mare, A. Prasad, Z. Marois, E. Smithayer, D. Kotz
*In the Workshop on Mobile Computing Systems and Applications (HotMobile), February, 2012*

**Patents**

**"PnC without Contract Certificate"** (US 62/837,919)
**"Using Cross-certification in ISO 15118"** (US 62/839,996)
**"Method and Apparatus for Dynamic and Spontaneous Roaming Agreement of Heterogeneous Networks"** (US 2008067877, 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 7,756,510 (July 13, 2010), KR 2006-41227, WO/2006/121307, EP 20060009984)
**"Method for performing handoff in wireless network"** (US 8,977,265 Mar 10, 2015)
**"Reconfiguration of Neighborhood Graph for QoS Support in Heterogeneous Network, and its use for seamless handoff"** (KR 2003)