

Hokeun Kim, Ph.D.

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<https://hokeun.github.io/>

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- EDUCATION** **University of California, Berkeley**, CA, United States
- Ph.D. in Electrical Engineering and Computer Sciences Aug 2012 – Aug 2017
 - Advisor: Professor Edward A. Lee
 - On “Securing the Internet of Things via Locally Centralized, Globally Distributed Authentication and Authorization”
- Seoul National University**, Republic of Korea
- M.S. in Electrical Engineering and Computer Science Mar 2010 – Feb 2012
 - Advisor: Professor Soonhoi Ha
 - On “An Analysis Method to Predict Performance Requirements for Components of a 4K Resolution Digital TV Platform”
 - B.S. in Computer Science and Engineering Mar 2003 – Feb 2010
 - Advisor: Professor Suk-In Yoo
 - On “A Method to Port OpenCores Ethernet IP Core on XUP Virtex II Board with ARM7 Processor”
- AREAS OF INTEREST** Internet of Things (IoT), Internet/network security, Edge computing, Real-time embedded systems, Computer architecture, Cyber-physical systems
- SKILLS** **Programming Languages and Tools** (Advanced || Experienced)
 Java, C/C++, C#, JavaScript (Adv.) || Python, Verilog, NI LabView, SQL, MATLAB, Scala (Exp.)
- Developing Environments and Platforms**
 OS X, Linux (Ubuntu and RedHat), Windows, Android OS, and TinyOS
- SOFTWARE PROJECTS** **SST: Secure Swarm Toolkit** – <https://github.com/iotaauth> Aug 2016 – Present
- An open-source software toolkit for authentication/authorization of the Internet of Things (IoT)
 - Initiated and currently managing the project as a main developer.
 - Implementing *Auth* (Java) and example programs (Node.js, C/C++, Android) for the IoT applications.
- The Ptolemy Project** – <http://ptolemy.org> Nov 2014 – Aug 2017
- **Cape Code** – A graphical environment for developing swarmlets (IoT applications)
 - Constructed security and network modules (Java, JavaScript) and designed software components, *accessors* (<http://accessors.org>), for IoT application developers.
 - URL: https://ptolemy.berkeley.edu/accessors/node_modules/@accessors-hosts/ptolemy/index.html
- ACADEMIC EXPERIENCE** **University of California, Berkeley**, CA, United States
- **Graduate Student Researcher (GSR)**, Ptolemy Project Team **Aug 2012 – Aug 2017**
 - *TerraSwarm Research Center* (<https://www.terraswarm.org/>) Feb 2014 – Aug 2017
 - Made major contributions to security and real-time aspects of a follow-up NSF project proposal for CPS small.
 - Carried out research on a scalable authorization infrastructure for the security of the IoT as a leading grad student.
 - Developed an open-source local authorization entity for the IoT (Java, available on <https://github.com/iotaauth>).
 - Designed software components, *accessors* (<http://accessors.org>), to help developers of secure IoT applications.
 - Worked on DRAM power and temperature modeling with Ptolemy II with Gem5 computer architecture simulator.
 - *Precision Timed (PRET) Machines* (<https://chess.eecs.berkeley.edu/pret/>) Jan 2013 – May 2015
 - Designed (Verilog) and evaluated (C/C++) a time-predictable memory controller for mixed-criticality systems.
 - Conducted research on time-predictable infrastructure from computer architecture to programming language.
 - *Industrial Cyber-Physical Systems (iCyPhy)*, (<https://www.icyphy.org/>) Aug 2012 – Jun 2013
 - Conducted study of a tool integration (Java) for architectural exploration of aircraft electric power systems (EPS).
 - Developed an Android application (Java) for semantic localization by sensing ultrasound signals.

Seoul National University, Republic of Korea

- **Research Assistant**, Codesign and Parallel Processing Laboratory **Jan 2010 – May 2012**
 - *Research of Multimedia SoC Platform for Next Generation TV* Aug 2011 – May 2012
 - Conducted research on performance analysis of High-Efficiency Video Coding (HEVC) on given SoC platform based on profiling, using parameters related to execution time and required memory bandwidth.
 - Implemented H.264 video codec on GP-GPU using CUDA.
 - *Timed-functional Simulator for Embedded Software* Dec 2010 – Jul 2011
 - Improved efficiency of a timed-functional simulator for embedded software using new simulation method.
 - *Reliability-aware Multiprocessor System-on-Chip (MPSoC) Design* Mar 2010 – May 2010
 - Constructed and experimented fast dynamic programming algorithm and data structure to find solutions for optimal task re-mapping in case of processor failure.
 - *Location Tracking System Using Zigbee Communication* Jan 2010 – Dec 2010
 - Devised an algorithm for location tracking based on Received Signal Strength (RSS) of Zigbee signals.
 - Implemented the algorithm on various platforms such as computers, sensor nodes, and SoCs.
- **Undergraduate Research Assistant**, Dept. of Computer Sci. & Eng. **Mar 2009 – Jun 2009**
 - *Windows Kernel Profiler for Car Navigation System (Hyundai-Kia Motors)* Mar 2009 – Jun 2009
 - Conducted a study of profiling methods for embedded software on Windows to find performance bottleneck.
 - Designed and developed a profiler by modifying Windows kernel with Windows Research Kernel.

**INDUSTRY
EXPERIENCE****Google LLC**, Mountain View / Sunnyvale, CA, United States

- **Senior Software Engineer**, Safe Browsing, Security & Privacy **Sep 2018 – Present**
 - *Research on Internet security, data analysis and machine learning for defending phishing attacks*
 - Working on the Safe Browsing team (<https://safebrowsing.google.com/>) protecting more than 4 billion devices from harmful contents on the Internet.
 - Researching on detecting and preventing phishing attacks using data features extracted from host/domain information, network responses, and message feeds.
 - Designing and developing feature extraction and machine learning infrastructure for defense against phishing and social engineering attacks.

LinkedIn Corp., Sunnyvale, CA, United States

- **Software Engineer**, Trust Engineering Group **Sep 2017 – Sep 2018**
 - *Security infrastructure, big data analysis for cyber attack detection and anti-abuse incident response*
 - Undertook analysis of signals for abusive activity on LinkedIn and developed defense system infrastructure.
 - Monitored daily traffic on LinkedIn and responded to anomalies and potential attacks.

HP Labs, Palo Alto, CA, United States

- **Research Associate**, Print Adjacencies and 3D Lab (Pa3DL) **May 2015 – Dec 2016**
 - *Control and simulation of HP's MultiJet Fusion 3D Printing Technology*
 - Carried out cyber-physical system modeling for HP's Multi Jet Fusion 3D printing technology.
 - Designed and implemented a process-level 3D printer simulator using a tool, Ptolemy II. (<http://ptolemy.org>)

ESTsoft Corp., Seoul, Republic of Korea

- **Software Engineer**, Search Service Team **Feb 2008 – Aug 2009**
 - *Search Engine Project for Zum.com*
 - Designed and developed efficient file database (C++) to optimize response and refresh time of a search engine.
 - Implemented administrative tools (C#) and scripts (Python) for managing search engine file database.

YoungWoo CnI Inc., Seoul, Republic of Korea

- **Software Engineer, Project Manager**, Dept. of Research & Devel. **Apr 2006 – Feb 2008**
 - *Textile CAD Projects (TexKnit, TexPro, and TexWork)*
 - Developed and maintained textile-related CAD programs, TexKnit and TexPro CAD (C/C++).
 - Managed a project of TexWork for apparel design planning and description (C/C++) to develop new features.

**TEACHING
EXPERIENCE****University of California, Berkeley, CA, United States**

- **Guest Lecturer**, Dept. of EECS **Nov 2017**
 - *CS 294-144: Embedded Networked Systems for Internet of Things*
 - Gave a guest lecture on “Authentication and Authorization of the IoT: Issues, Challenges, and Architecture”.
- **Graduate Student Instructor (GSI)**, Dept. of EECS **Summer 2014 & Fall 2013**
 - *CS 61C: Great Ideas in Computer Architecture (Machine Structures)* Summer 2014
 - Led discussion sessions and lab sessions, teaching fundamental materials regarding computer architecture.
 - *EECS 149/249A: Introduction to Embedded Systems (Outstanding GSI Award)* Fall 2013
 - Taught lab sessions and mentored students’ final projects for embedded systems.
 - Made major contributions to the design of lab classes including manuals and lab exercises, and exams.

Seoul National University, Republic of Korea

- **Teaching Assistant**, Dept. of Computer Science and Engineering **Spring 2011**
 - *4190.416A: Basic Digital Signal Processing* Spring 2011
 - Taught lab sessions to practice theories delivered in lectures and graded students’ homework.

AWARDS

- **Honorable Mention** Jun 2017
In the IEEE Micro Top Picks from the 2016 Computer Architecture Conferences
- **Best Paper Award** Apr 2017
In the 2nd ACM/IEEE International Conference on Internet-of-Things Design and Implementation (IoTDI) 2017, Pittsburgh, PA
- **Outstanding Graduate Student Instructor (GSI) Award** May 2014
The Graduate Division and Graduate Council Advisory Committee, University of California, Berkeley
- **Scholarship for Doctoral Study Abroad** Aug 2012 – May 2017
Korea Foundation for Advanced Studies, Seoul, Republic of Korea
- **Excellence Award in Hardware IP Design Sector** Dec 2010
For “Proactive Camera Tracking System Using USN (Ubiquitous Sensor Node) with Zigbee Communication”, The 6th SoC Design Contest, Seoul Nat’l Univ. Center of SoC, and KAIST IDEC
- **Best Term Paper Award in Subject for Liberal Education Courses** Aug 2009
Faculty of Liberal Education, Seoul National University, Republic of Korea
- **Employee of the Month** Oct 2008
ESTsoft Corp., Seoul, Republic of Korea
- **Scholarship for Superior Academic Performance** Spring 2005, Spring 2006, Spring 2010
Seoul National University, Republic of Korea
- **3rd Place in Programming Contest** Aug 2004
ESCamp, Hosted by Seoul National University and Nexon Corp., Seoul, Republic of Korea
- **National Scholarship for Science and Engineering** Spring 2004, Fall 2004, Fall 2009
Korea Student Aid Foundation, Seoul, Republic of Korea

PUBLICATIONS**JOURNAL
ARTICLES**

- J1. H. Kim, E. Kang, D. Broman, and E. A. Lee, “Resilient Authentication and Authorization for the Internet of Things (IoT) Using Edge Computing,” *ACM Transactions on Internet of Things*, vol. 1, no. 1, pp. 4:1–4:27, Mar. 2020.
- J2. H. Kim, E. A. Lee, and S. Dustdar, “Creating a Resilient IoT With Edge Computing,” *Computer*, vol. 52, no. 8, pp. 43–53, Aug. 2019.
- J3. H. Kim, A. Wasicek, and E. A. Lee, “An Integrated Simulation Tool for Computer Architecture and Cyber-Physical Systems,” in *Cyber Physical Systems. Design, Modeling, and Evaluation*, ser. Lecture Notes in Computer Science (LNCS), Springer, Apr. 2019, pp. 83–93. (Note: Published as a journal version of CyPhy 2017 proceedings.)
- J4. M. Lohstroh, H. Kim, J. C. Eidson, C. Jerad, B. Osyk, and E. A. Lee, “On Enabling Technologies for the Internet of Important Things,” *IEEE Access*, vol. 7, pp. 27244–27256, Feb. 2019.

- J5. C. Brooks, C. Jerad, H. Kim, E. A. Lee, M. Lohstroh, V. Nouvellet, B. Osyk, and M. Weber, “A Component Architecture for the Internet of Things,” *Proceedings of the IEEE*, vol. 106, issue 9, Apr. 2018, pp. 1527–1542.
- J6. H. Kim and E. A. Lee, “Authentication and Authorization for the Internet of Things,” *IT Professional*, vol. 19, no. 5, pp. 27–33, Oct. 2017.

CONFERENCE PROCEEDINGS

- C1. H. Kim, E. Kang, D. Broman, and E. A. Lee, “An Architectural Mechanism for Resilient IoT Services,” in *Proceedings of the 1st ACM Workshop on Internet of Safe Things (SafeThings)*, Delft, The Netherlands, Nov. 2017, pp. 8–13.
- C2. H. Kim, A. Wasicek, and E. A. Lee, “An Integrated Simulation Tool for Computer Architecture and Cyber-Physical Systems,” in *Proceedings of the 7th Workshop on Design, Modeling and Evaluation of Cyber-Physical Systems (CyPhy)*, Seoul, South Korea, Oct. 2017.
- C3. M. Lohstroh, H. Kim, and E. A. Lee, “Contextual Callbacks for Resource Discovery and Trust Negotiation on the Internet of Things: Work-in-progress,” in *Proceedings of the 13th ACM International Conference on Embedded Software (EMSOFT)*, Seoul, South Korea, Oct. 2017, pp. 14:1–14:2.
- C4. H. Kim, E. Kang, E. A. Lee, and D. Broman, “A Toolkit for Construction of Authorization Service Infrastructure for the Internet of Things,” in *Proceedings of the 2nd ACM/IEEE International Conference on Internet-of-Things Design and Implementation (IoTDI)*, Pittsburgh, PA, Apr. 2017, pp. 147–158. **Best Paper Award**
- C5. H. Kim, A. Wasicek, B. Mehne, and E. A. Lee, “A Secure Network Architecture for the Internet of Things Based on Local Authorization Entities,” in *Proceedings of the 4th IEEE International Conference on Future Internet of Things and Cloud (FiCloud)*, Vienna, Austria, Aug. 2016, pp. 114–122.
- C6. D. Kim, A. Izraelevitz, C. Celio, H. Kim, B. Zimmer, Y. Lee, J. Bachrach, and K. Asanovic, “Strober: Fast and Accurate Sample-Based Energy Simulation for Arbitrary RTL,” in *Proceedings of the 43rd ACM/IEEE Annual International Symposium on Computer Architecture (ISCA)*, Seoul, South Korea, Jun. 2016, pp. 128–139. **Honorable Mention in the IEEE Micro Top Picks 2017**
- C7. H. Kim, Y. Zhao, and L. Zhao, “Process-level modeling and simulation for HP’s Multi Jet Fusion 3D printing technology,” in *Proceedings of the 1st International Workshop on Cyber-Physical Production Systems (CPPS)*, Vienna, Austria, Apr. 2016, pp. 1–4.
- C8. A. Wasicek, E. A. Lee, H. Kim, L. Greenberg, A. Iwai, and I. Akkaya, “System Simulation from Operational Data,” in *Proceedings of the 52nd Annual Design Automation Conference (DAC)*, San Francisco, CA, Jun. 2015, pp. 3:1–3:6.
- C9. H. Kim, D. Broman, E. A. Lee, M. Zimmer, A. Shrivastava, and J. Oh, “A predictable and command-level priority-based DRAM controller for mixed-criticality systems,” in *Proceedings of the 21st IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)*, Seattle, WA, Apr. 2015, pp. 317–326.
- C10. H. Kim, L. Guo, E. A. Lee, and A. Sangiovanni-Vincentelli, “A tool integration approach for architectural exploration of aircraft electric power systems,” in *Proceedings of the 1st IEEE International Conference on Cyber-Physical Systems, Networks, and Applications (CPSNA)*, Taipei, Taiwan, Aug. 2013, pp. 38–43.
- C11. D. Broman, M. Zimmer, Y. Kim, H. Kim, J. Cai, A. Shrivastava, S. A. Edwards, and E. A. Lee, “Precision timed infrastructure: Design challenges,” in *Proceedings of the Electronic System Level Synthesis Conference (ESLsyn)*, Austin, TX, May 2013, pp. 1–6.
- C12. C. Lee, H. Kim, H. w. Park, S. Kim, H. Oh, and S. Ha, “A task remapping technique for reliable multi-core embedded systems,” in *Proceedings of IEEE/ACM/IFIP International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS)*, Scottsdale, AZ, Oct. 2010, pp. 307–316.

PATENTS

1. Y. Zhao, H. Kim, L. Zhao, and J. Zeng, “Three-dimensional (3D) Object Printing Simulator”, United States Patent and Trademark Office (USPTO), Published in Sep 2018 (Publication No.: US20180275636A1)
2. S. Ha, H. Kim, and B. Lee, “Position Tracking System and Apparatus Using Signal Strength of Wireless Signal”, Korean Intellectual Property Office, Registered in Aug 2012 (Registration No.: 10-1176141)

POSTERS, DEMOS, ETC.

1. H. Kim, A. Wasicek, B. Mehne, and E. A. Lee, “Key Management System for the Internet of Things Using Local Authorization Entities”, Talk and Poster at *SRC TECHCON 2016* hosted by Semiconductor Research Corporation, Austin, TX, Sep 2016

2. H. Kim, A. Wasicek, B. Mehne, and E. A. Lee, "A Secure Network Architecture for the Internet of Things Based on Local Authorization Entities", Work-in-Progress Poster Session at *the 53rd Annual Design Automation Conference (DAC)*, Austin, TX, Jun 2016
3. H. Kim, L. Guo, and A. Sangiovanni-Vincentelli, "A Preliminary Integration Framework Providing Co-simulation for Electrical Safety-critical Systems", Demo & Exhibition, University Booth at *Design, Automation, & Test in Europe (DATE)*, Grenoble, France, Mar 2013

INVITED TALKS

- **Dept. of Mechanical Engineering, Hanyang Univ. ERICA**, Ansan, Korea Oct 2019
"Authentication & Authorization for the IoT: Issues, Challenges, and Architecture"
- **Anti-Abuse Seminar, LinkedIn**, Sunnyvale, CA Dec 2017
"Authentication & Authorization for the IoT: Issues, Challenges, and Architecture"
- **Toyota InfoTechnology Center (ITC) USA**, Mountain View, CA Nov 2017
"Authentication and Authorization for the IoT: An Edge Computing-Based Approach"
- **Dept. of Information System, Hanyang University**, Seoul, Korea Oct 2017
"Authentication and Authorization for the Internet of Things"
- **SNU CSE BK21 Plus Seminar, Seoul National University**, Korea Oct 2017
"Authentication and Authorization for the Internet of Things"
- **Palo Alto Research Center (PARC), A Xerox Company**, Palo Alto, CA Aug 2017
"Locally Centralized, Globally Distributed Authentication and Authorization for the Internet of Things"
- **ECE Special Seminar, UNIST**, Republic of Korea Jan 2017
"A Toolkit for Construction of Authorization Service Infrastructure for the Internet of Things"
- **Dept. of ECE, Ajou University**, Republic of Korea Jan 2017
"A Toolkit for Construction of Authorization Service Infrastructure for the Internet of Things"
- **Dept. of CSE, Seoul National University**, Republic of Korea Dec 2016
"A Toolkit for Construction of Authorization Service Infrastructure for the Internet of Things"
- **HP Internet of Things (IoT) Virtual Community Monthly Call**, Palo Alto, CA Dec 2016
"A Toolkit for Construction of Authorization Service Infrastructure for the Internet of Things"
- **Swarm – TerraSwarm Seminar, EECS, University of California, Berkeley** Dec 2016
"Authorization Service Infrastructure for the Internet of Things"

ACADEMIC SERVICES

- **Program Committee**
 - ACM SIGBED International Conference on Embedded Software (EMSOFT 2021)
- **Reviewer of Journals/Transactions**
 - IEEE Access (2021)
 - Computers & Security (Elsevier Journal, 2018 - 2021)
 - IEEE Transactions on Cloud Computing (2020)
 - IEEE Internet of Things Journal (2019)
 - Elsevier Future Generation Computer Systems (2019)
 - Additive Manufacturing (Elsevier Journal, 2018 - 2019)
 - USENIX Annual Technical Conference (USENIX ATC, 2018)
 - IEEE Software (2017)
 - IEEE Transactions on Computers (2015 - 2016)
- **Secondary Reviewer of Journals/Transactions**
 - IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS, 2017 - 2018)
 - ACM SIGBED International Conference on Embedded Software (EMSOFT 2013, 2015 and 2018)
 - ACM Transactions on Embedded Computing Systems (TECS, 2014 and 2016)

- REFERENCES**
- **Prof. Edward A. Lee** (Ph.D. research advisor) eal (at) eeecs.berkeley.edu
Department of EECS, University of California, Berkeley
 - **Prof. Alberto L. Sangiovanni-Vincentelli** (Research advisor) alberto (at) berkeley.edu
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KTH Royal Institute of Technology, Sweden
 - **Prof. Schahram Dustdar** (Collaborative research advisor) dustdar (at) dsg.tuwien.ac.at
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[Last updated on May 4, 2021]