

# JeongGil Ko

Department of Computer Science  
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## Education

- **Johns Hopkins University** Baltimore, MD  
*Ph.D. Student, Computer Science* Sep. 2007 - Present
- **Johns Hopkins University** Baltimore, MD  
*Master of Science in Engineering, Computer Science* Dec. 2009
- **Korea University** Seoul, Republic of Korea  
*Bachelor of Engineering, Computer Science and Engineering* Feb. 2007

## Research Experience

- **Hopkins interNetworking Research Group, Johns Hopkins University** Baltimore, MD  
*Research Assistant* Sep. 2007 - Present
  - Advisor: Dr. Andreas Terzis
  - Wireless Sensor Networks for Physiological Data Monitoring
    - \* Design and develop wireless sensor network system to monitor patients' vital signs
    - \* Deployment of MEDiSN system in clinical environments
      - Shock Trauma Center, University of Maryland Medical Center, Baltimore, MD
      - Emergency Department, Johns Hopkins Hospital, Baltimore, MD
      - Emergency Department, Washington Hospital Center, Washington, DC
  - CC2420 In-line Hardware Security Support for TinyOS 2.x
    - \* Implement interfaces in TinyOS 2.x for accessing in-line security functionalities offered by Chipcon/TI CC2420 RF Chip
    - \* Publicly released as part of TinyOS 2.1.1 release
  - ARM Cortex-M3 based Mote Platform (*Egs Platform*) Development
    - \* Provide software support for Atmel AT91SAM3U MCU in TinyOS 2.x
- **Stanford Information Networks Group, Stanford University** Stanford, CA  
*Visiting Researcher* Jan. 2010 - Apr. 2010
  - Supervisor: Dr. Philip Levis
  - RPL: IPv6 Routing Protocol for Low Power and Lossy Networks
    - \* Implementation of RPL (IPv6 Routing Protocol for Low Power and Lossy Networks – IETF ROLL WG draft) in TinyOS 2.x.
- **Array Signal Processing and Communications Lab, Hoseo University** Asan, Republic of Korea  
*Researcher* Mar. 2007 - Aug. 2007
  - Supervisor: Dr. Hak-Lim Ko
  - Performance Analysis of Directional Smart Antenna Based Ad-hoc Networks
  - Position Location System in Underwater Environments
  - Design and Implementation of Sector Antenna based MAC for Wireless Sensor Networks
- **Wireless Data Communication Lab, Korea University** Seoul, Republic of Korea  
*Undergraduate Research Student* Feb. 2005 - Feb. 2007
  - Advisor: Dr. Hyogon Kim
  - IEEE 802.15.4 MAC Layer Improvements
  - Security and Topology Control Issues in Wireless Sensor Networks
  - Power Saving Mode and Multimedia Transmissions in IEEE 802.11-based Wireless Networks
  - Characterizing in VoIP Traffic

## Teaching Experience

- **CS450: Networked Embedded Systems and Sensor Networks** Johns Hopkins University  
*Teaching Assistant* Fall 2009
  - Instructor: Dr. Andreas Terzis
  - Course Description: Upper level undergraduate and graduate level introductory course to the fundamental concepts of networked embedded systems and wireless sensor networks
  - Role: Designing and grading of homework and final project materials

## Research Interests

- Medical Applications for Wireless Embedded Network Systems
- Low Power Embedded Network Platforms and Protocols
- Effect of Human Mobility on Wireless Network System Performance
- Wireless Sensing Application Deployments in Real-life Environments
- IEEE 802-operated Medium Access Control (MAC) and Routing Protocol Design for Wireless Networks
- Wireless RF Characteristics and Security Issues in Mobile Networks

## Awards and Honors

- College Scholarship, *College of Information and Communications, Korea University*: 2005 - 2006
- Dean's Honor Roll, *College of Information and Communications, Korea University*: Spring 2006, Fall 2006
- Abel Wolman Fellowship, *Whiting School of Engineering, Johns Hopkins University*: 2007 - 2008

## Journal Publications

- **JeongGil Ko**, *Chenyang Lu, Mani B. Srivastava, John A. Stankovic, Andreas Terzis, Matt Welsh*. "Wireless Sensor Networks for Healthcare". *Proceedings of the IEEE, Special Issue on Sensor Network Applications, 2010 (Accepted)*.
- **JeongGil Ko**, *Jong Hyun Lim, Yin Chen, Razvan Musaloiu-E., Andreas Terzis, Gerald Masson, Tia Gao, Walt Destler, Leo Selavo, Richard Dutton*. "MEDiSN: Medical Emergency Detection in Sensor Networks". *ACM Transactions on Embedded Computing Systems (TECS), Special Issue on Wireless Health Systems, 2010 (In Press)*.
- **JeongGil Ko**, *Tia Gao, Richard Rothman, Andreas Terzis*. "Wireless Sensing Systems in Clinical Environments: Improving the Efficiency of the Patient Monitoring Process". *IEEE Engineering in Medicine and Biology (EMB) Magazine, Volume 29, Issue 2 (March/April), Pages 103-109, 2010*.
- *Soo Kim, JeongGil Ko, Jongwon Yoon, Heejo Lee, Hyogon Kim*. "Energy-Efficient and Fault-Tolerant Positioning of Multiple Base Stations". *Lecture Notes in Computer Science (LNCS) 5200, pages 584-593, Springer-Verlag, 2008. also, in Proc. of International Conference on Information Networking (ICOIN) 2007, Estoril, Portugal*.

## Conference Publications

- **JeongGil Ko**, *Andreas Terzis*. "Power Control for Mobile Sensor Networks: An Experimental Approach". *in Proc. of IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communication and Networks (SECON) 2010, Boston, MA*.
- **JeongGil Ko**, *Qiang Wang, Thomas Schmid, Wanja Hofer, Andreas Terzis*. "Egs: A Cortex M3-based Mote Platform". *Demo Abstract, IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communication and Networks (SECON) 2010, Boston, MA*.

- **JeongGil Ko**, Tia Gao, Andreas Terzis. “Empirical Study of a Medical Sensor Application in an Urban Emergency Department”. in *Proc. of International Conference on Body Area Networks (BodyNets) 2009, Los Angeles, CA*.
- **JeongGil Ko**, Razvan Musaloiu-E., Jong Hyun Lim, Yin Chen, Andreas Terzis, Tia Gao, Walt Destler, Leo Selavo. “Demo Abstract: MEDiSN: Medical Emergency Detection in Sensor Networks”. in *Proc. of ACM Conference on Embedded Networked Sensor Systems (SenSys) 2008, Raleigh, NC*.
- **JeongGil Ko**, Yin Chen, Razvan Musaloiu-E., Jong Hyun Lim, Andreas Terzis, Tia Gao, Walt Destler, Leo Selavo. “Wireless Sensor Networks for Patient Monitoring”. *Poster Abstract, ACM/USENIX International Conference on Mobile Systems, Applications, and Services (MobiSys) 2008, Breckenridge, CO*.
- Tia Gao, Christopher Pesto, Leo Selavo, Yin Chen, **JeongGil Ko**, Jong Hyun Lim, Andreas Terzis, Andrew Watt, James Jeng, Bor-rong Chen, Konrad Lorincz, Matt Welsh. “Wireless Medical Sensor Networks in Emergency Response: Implementation and Pilot Results”. in *Proc. of IEEE International Conference on Technologies for Homeland Security 2008, Waltham, MA*.
- Seung-Gu Lee, Bum-Sik Park, Deok-Hwan Lee, Dong-Hun Lee, Hak-Lim Ko, **JeongGil Ko**. “Performance Analysis of Beamforming Techniques in Ad-hoc Communication between Moving Vehicles”. in *Proc. of Asia-Pacific Conference on Communications (APCC) 2007, Bangkok, Thailand*.
- Jongwon Yoon, Hyogon Kim, **JeongGil Ko**. “Data Fragmentation In IEEE 802.15.4 Wireless Sensor Networks”. in *Proc. of IEEE Vehicular Technology Conference (VTC) Spring 2007, Dublin, Ireland*.
- Soo Kim, **JeongGil Ko**, Jongwon Yoon, Heejo Lee, Hyogon Kim. “Multiple-Objective Metric for Placing Multiple Base Stations in Wireless Sensor Networks”. in *Proc. of International Symposium on Wireless Pervasive Computing (ISWPC) 2007, San Juan, PR*.
- **JeongGil Ko**, Ji-Hun Ha, Bum-Sik Park, Seung-Gu Lee, Hak-Lim Ko. “Virtual Mobile Backbones for Wireless Ad-hoc Networks with the support of Directional Array Antennas”. in *Proc. of International Symposium on Wireless Pervasive Computing (ISWPC) 2007, San Juan, PR*.
- **JeongGil Ko**, Yong Hyun Cho, Hyogon Kim. “Performance evaluation of IEEE 802.15.4 MAC with Different Backoff Ranges in Wireless Sensor Networks”. in *Proc. of IEEE International Conference on Communications Systems (ICCS) 2006, Singapore*.
- Jongwon Yoon, Sangki Yun, Hyogon Kim, **JeongGil Ko**. “Maximizing Differentiated Throughput in IEEE 802.11e Wireless LANs”. in *Proc. of 33rd Korea Information Science Society (KISS) Fall Conference 2006, Seoul, Republic of Korea*.
- **JeongGil Ko**, Dongju Kim, Hyogon Kim. “Flexible extensions to the backoff range in IEEE 802.15.4 MAC”. in *Proc. of 33rd Korea Information Science Society (KISS) Fall Conference 2006, Seoul, Republic of Korea*.
- Deok-Hwan Lee, Min-Gu Jo, Seung-Gu Lee, Hak-Lim Ko, **JeongGil Ko**, Yong-Kon Lim. “Implementation of the Position Location System in an Underwater Water Channel Environment”. in *Proc. of WESPAC IX 2006, Seoul, Republic of Korea*.
- Deok-Hwan Lee, Jae-Min Shin, Hak-Lim Ko, **JeongGil Ko**, Hyun Seo Oh. “The Performance Analysis of Diversity Technologies for Mobile Ad Hoc Communications Between Moving Cars”. in *Proc. of IEEE Vehicular Technology Conference (VTC) Spring 2006, Melbourne, Australia*.

## IETF Internet Drafts

- Philip Levis, Thomas Heide Clausen, Jonathan Hui, **JeongGil Ko**. “The Trickle Algorithm”. *Internet Draft (Active)*, April 2010, IETF ROLL Working Group.

## Misc. Publications and Tutorials

- **JeongGil Ko**. “CC2420 In-line Security Functions for TinyOS 2.x”. *TEP 128 (TinyOS Enhancement Proposal) 2010, TinyOS Alliance*.

- **JeongGil Ko.** “TinyOS 2.x CC2420 Security Tutorial”. 2009, Available On-line at the TinyOS 2.x Tutorial Website: [http://docs.tinyos.net/index.php/CC2420\\_Security\\_Tutorial](http://docs.tinyos.net/index.php/CC2420_Security_Tutorial)

## Patents

- **JeongGil Ko, Hak-Lim Ko.** “Topology Control and Server Selection Techniques in Mobile Ad-hoc Networks”. Korean Patent, Patent No. 10-0755095 (2007.08.28)

## Software Releases

- “TI/Chipcon CC2420 in-line hardware security support in TinyOS 2.x” (part of TinyOS 2.1.1 official release)
- “Atmel Sam3u microcontroller support in TinyOS 2.x” (in preperation, release planned for late 2010)
- “RPL (IPv6 Routing Protocol for Low Power and Lossy Networks – IETF ROLL WG draft) implementation in TinyOS 2.x” (in preperation, release planned for June 2010)

## Presentations and Talks

- “Empirical Study of a Medical Sensor Application in an Urban Emergency Department”. *Invited Seminar Talk, Micro Sensor Laboratory, Kyungbook National University, August 2009, Daegu, Republic of Korea.*
- “Introducing Network Technologies for Medical Sensing and Their Potentials for Underwater Sensor Networks”. *Invited Seminar Talk, Maritime & Ocean Engineering Research Institute (MOERI), August 2009, Daejeon, Republic of Korea.*
- “Empirical Study of a Medical Sensor Application in an Urban Emergency Department”. *Invited Seminar Talk, Wireless Data Communication Laboratory, Korea University, August 2009, Seoul, Republic of Korea.*
- “Empirical Study of a Medical Sensor Application in an Urban Emergency Department”. *Conference Presentation, International Conference on Body Area Networks (BodyNets) 2009, February 2009, Los Angeles, CA.*
- “MEDiSN: Medical Emergency Detection in Sensor Networks”. *Demo Presentation, ACM Conference on Embedded Networked Sensor Systems (SenSys) 2008, November 2008, Raleigh, NC.*
- “Wireless Sensor Networks for Physiological Monitoring”. *Poster Presentation, PACER Annual Meeting, September 2008, Baltimore, MD.*
- “Wireless Sensor Networks for Patient Monitoring”. *Poster and Demo Presentation, ACM/USENIX International Conference on Mobile Systems, Applications, and Services (MobiSys) 2008, June 2008, Breckenridge, CO.*
- “Emergency Medical Services with Wireless Sensor Networks”. *Invited Seminar Talk, Kyeongwon Inc., June 2008, Ansan, Republic of Korea.*
- “Wireless Sensor Networks for Patient Monitoring”. *Invited Seminar Talk, Wireless Data Communication Laboratory, Korea University, June 2008, Seoul, Republic of Korea.*
- “Wireless Sensor Networks for First Responders”. *Demo Presentation, PACER Scientific Assembly / All PI Meeting, May 2008, Baltimore, MD.*
- “Virtual Mobile Backbones for Wireless Ad-hoc Networks with the support of Directional Array Antennas”. *Conference Presentation, International Symposium on Wireless Pervasive Computing (ISWPC) 2007, February 2007, San Juan, PR.*
- “Performance evaluation of IEEE 802.15.4 MAC with Different Backoff Ranges in Wireless Sensor Networks”. *Conference Presentation, IEEE International Conference on Communications Systems (ICCS) 2006, October 2006, Singapore.*
- “Maximizing Differentiated Throughput in IEEE 802.11e Wireless LANs”. *Conference Presentation, 33rd Korea Information Science Society (KISS) Fall Conference, June 2006, Seoul, Republic of Korea.*

- “Flexible extensions to the backoff range in IEEE 802.15.4 MAC”. *Conference Presentation, 33rd Korea Information Science Society (KISS) Fall Conference, June 2006, Seoul, Republic of Korea.*

## Media Coverage

- “Emergency Rooms Go Wireless”. *Discovery Channel Technology Video, April 10 2009*  
– <http://dsc.discovery.com/videos/tech-emergency-rooms-go-wireless.html>

## Academic Working Group Activities

- *Member*, TinyOS Core Working Group: 2008 - Present
- *Member*, TinyOS 802.15.4 Working Group: 2008 - Present
- *Member*, TinyOS Zigbee Working Group: 2008 - Present
- *Contributer*, IETF Routing Over Low-power and Lossy Links (ROLL) Working Group: 2010 - Present

## Academic Services

- *Web Chair*, International ICST Conference on Sensor Systems and Software (S-Cube): 2010
- *Reviewer*, ACM Conference on Computer and Communications Security (CCS): 2010
- *Reviewer*, International Conference on Body Area Networks (BodyNets): 2010
- *Reviewer*, IEEE Transactions on Mobile Computing (TMC): 2010
- *Reviewer*, International Conference on Distributed Computing in Sensor Networks (DCOSS): 2010
- *Reviewer*, IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communication and Networks (SECON): 2009, 2010
- *Reviewer*, IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing (SUTC): 2010
- *Reviewer*, Wiley International Journal of Communication Systems (IJCS): 2010
- *Reviewer*, ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN): 2010
- *Reviewer*, European Conference on Wireless Sensor Networks (EWSN): 2009, 2010
- *Reviewer*, IEEE International Conference on Network Protocols (ICNP): 2009
- *Reviewer*, ACM Conference on Embedded Networked Sensor Systems (SenSys): 2009
- *Reviewer*, IEEE Real-Time Systems Symposium (RTSS): 2009
- *Reviewer*, IEEE Military Communications Conference (MILCOM) 2008
- *Reviewer*, ACM SIGMOBILE Mobile Computing and Communications Review ( $MC^2R$ ): 2008
- *Reviewer*, KICS/IEEE Journal of Communication and Networks (JCN): 2007

## Non-Academic Activities and Services

- |                                                                          |                              |
|--------------------------------------------------------------------------|------------------------------|
| • <b>Korean Graduate Students' Association</b>                           | Johns Hopkins University     |
| • <i>President</i>                                                       | <i>Nov. 2008 - Present</i>   |
| • <b>College of Information and Communication Students' Association</b>  | Korea University             |
| • <i>Board Officer</i>                                                   | <i>Jul. 2004 - Feb. 2006</i> |
| • <b>Dept. of Computer Science and Engineering Planning Team</b>         | Korea University             |
| • <i>Head Leader</i>                                                     | <i>Jul. 2004 - Jun. 2005</i> |
| • <b>Dept. of Computer Science and Engineering Students' Association</b> | Korea University             |
| • <i>Acting President</i>                                                | <i>Jul. 2004 - Jun. 2005</i> |

## Professional Memberships

- *Member*, KIISE (Korea Institute of Information Scientists and Engineers): 2006 - Present
- *Member*, IEEE: 2006 - Present
- *Member*, IEEE Communications Society: 2008 - Present
- *Member*, KOCSEAA (Korean Computer Scientists and Engineers Association in America): 2008 - Present

## Contacts

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## References

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*Assistant Professor* *terzis@cs.jhu.edu*
- **Dr. Amitabh Mishra** Department of Computer Science, Johns Hopkins University  
*Assistant Research Professor* *amitabh@cs.jhu.edu*
- **Dr. Philip Levis** Department of Computer Science, Stanford University  
*Assistant Professor* *pal@cs.stanford.edu*
- **Dr. Hyogon Kim** Division of Computer and Communications Engineering, Korea University  
*Professor* *hyogon@korea.ac.kr*
- **Dr. Heejo Lee** Division of Computer and Communications Engineering, Korea University  
*Associate Professor* *heejo@korea.ac.kr*