# YoungMin Kwon


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## Research Interests

**Network Embedded Systems:** Building distributed computing environments for network embedded systems such as wireless sensor network.

**Hybrid Systems:** Developing logics and model checkers for evaluating performances of physical systems.

## Education

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| Ph.D. | Department of Computer Science, University of Illinois at Urbana-Champaign<br>Advisor: Professor Gul Agha<br>**research focus**: network embedded systems, distributed systems, temporal logics for physical systems |
| M.E. | Department of Mechatronics, Korea University, Seoul Korea<br>Advisor: Professor Tae-Woong Yoon<br>**research focus**: automatic control |
| B.E. | Department of Electrical Engineering, Korea University, Seoul Korea |

## Work Experience

**June 2006 - Present:** Software Design Engineer, Microsoft Coropration at Redmond, WA. Developing Windows Media Center

**Sep 2001 - May 2006:** Research Assistant, Department of Computer Science, University of Illinois at Urbana-Champaign under the guidance of Professor Gul Agha (DARPA NEST project). Developed:

- Middleware services for Wireless Sensor Networks
  - ActorNet: a mobile agent platform for WSNs
  - Localization service: outdoor middle scale localization with 100 nodes in 100×100 ($m^2$) area
  - Model based data aggregation: an energy efficient data collection algorithm
  - Tracking: RLS based target tracking in WSNs
- Probabilistic modeling and verification of large scale systems
  - LTLC: linear temporal logic for linear systems
  - iLTL: probabilistic temporal logic for Markov chains
  - iLTLChecker: a model checking tool for the iLTL logic
  - Performance evaluation of large scale systems

**Jan 2001 - July 2001:** System Engineer, Dadammicro Inc. (http://www.dadammicro.com). As a system engineer I developed embedded monitoring devices. These devices are used to check the status of large UPS systems.

**Aug 1999 - Dec 1999:** Lecturer, Department of Computer Science, Korea University.

**Aug 1998 - May 2000:** Research Assistant and Teaching Assistant, Department of Computer Science, Korea University.

- Object Modeling of Disk Array Systems (HP, Boise Idaho)
  - Fault tolerance: failure detection with dual controller system
  - Logging service: distributed snapshot algorithm
  - Web. based management

**Jan 1998 - May 1998:** System Engineer, Satellite divisionof Hyundai Electronics Inc. I was working on a satellite attitude control system.

**March 1996 - Feb 1998:** Research Assistant and Teaching Assistance, Department of Electrical Engineering, Korea University. I designed an adaptive predictive controller for a missile autopilot (Agency for Defense Development Korea).

## PhD Thesis

- YoungMin Kwon, "Probabilistic Modeling and Verification of Large Scale Systems," May 2006.
  URL: http://osl.cs.uiuc.edu/docs/PhDDissertationYoungMin/YoungMinKwonDissertation.pdf.

## Refereed Publications

- YoungMin Kwon and Gul Agha, "Passive Localization: Large Size Sensor Network Localization Based on Environmental Events," *International Conference on Information Processing in Sensor Networks (IPSN)*, 2008 (acceptance rate 23%).
  URL: http://osl.cs.uiuc.edu/docs/ipsn08/kwonipsn08.pdf.
- YoungMin Kwon and Gul Agha, "LTLC: Linear Temporal Logic for Control," *International Conference on Hybrid Systems: Computation and Control (HSCC)*, 2008.
  URL: http://osl.cs.uiuc.edu/docs/hscc08/kwonhscc08.pdf.
- YoungMin Kwon and Gul Agha, "A Markov Reward Model for Software Reliability," *NSF Next Generation Software (NGS) Workshop*, 2007.
  URL: http://osl.cs.uiuc.edu/docs/nfsngs07/main.pdf.
- YoungMin Kwon and Gul Agha, "Scalable Modeling and Performance Evaluation of Wireless Sensor Networks," *Real-Time and Embedded Technology and Applications Symposium*, IEEE Computer Society, pp. 49–58, 2006 (acceptance rate 29%).
  URL: http://osl.cs.uiuc.edu/docs/rtas06/main.pdf.
- YoungMin Kwon, Sameer Sundresh, Kirill Mechitov, and Gul Agha, "ActorNet: An Actor Platform for Wireless Sensor Networks," *International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, pp. 1297–1300, 2006.
  URL: http://osl.cs.uiuc.edu/docs/actornet/kwonActorNet.pdf.
- YoungMin Kwon, Kirill Mechitov, Sameer Sundresh, and Gul Agha, "Resilient Localization for Sensor Networks in Outdoor Environments," *International Conference on Distributed Computing Systems (ICDCS)*, IEEE Computer Society, pp. 643–652, 2005 (acceptance rate 13%).
  URL: http://osl.cs.uiuc.edu/docs/ICDCS2005/kwon_localization.pdf.
- YoungMin Kwon and Gul Agha, "iLTLChecker: A Probabilistic Model Checker for Multiple DTMCs," *International Conference on the Quantitative Evaluation of Systems (QEST)*, IEEE Computer Society, pp. 245–246, 2005.
  URL: http://osl.cs.uiuc.edu/docs/qesttool05/kwon_QEST_tool.pdf.

- YoungMin Kwon and Gul Agha, "Linear Inequality LTL (iLTL): A Model Checker for Discrete Time Markov Chains," *International Conference on Formal Engineering Methods (ICFEM)* Lecture Notes in Computer Science, vol. 3308, pp. 194–208, 2004 (acceptance rate 27%).
  URL: http://osl.cs.uiuc.edu/docs/ICFEM04/kwonICFEM04.pdf.

- Sundresh, Sameer, Gul Agha, Kirill Mechitov, WooYoung Kim, and YoungMin Kwon, "Coordination Services for Wireless Sensor Networks," *International Workshop on Advanced Sensors, Structural Health Monitoring and Smart Structures*, 2003.
  URL: http://osl.cs.uiuc.edu/docs/shm2003/shm03.pdf.

- Mechitov, Kirill, Sameer Sundresh, YoungMin Kwon, and Gul Agha, "Cooperative Tracking with Binary-Detection Sensor Networks," *International Conference on Embedded Networked Sensor Systems (SenSys'03)*, ACM Press, pp. 332-333, 2003.
  URL: http://osl.cs.uiuc.edu/docs/sensys03/sensys03.pdf.

## Technical Reports

- YoungMin Kwon, Sameer Sundresh, Kirill Mechitov, and Gul Agha, "ActorNet: An Actor Platform for Wireless Sensor Networks," UIUCDCS-R-2005-2595, 2005.
  URL: http://osl.cs.uiuc.edu/docs/UIUCTechReport062005/ActorNet.pdf.

- Sundresh, Sameer, YoungMin Kwon, Kirill Mechitov, WooYoung Kim, and Gul Agha, "Localization of Sparse Sensor Networks Using Layout Information," UIUCDCS-R-2005-2525, 2005.
  URL: http://osl.cs.uiuc.edu/docs/ktloc04/loc-layout.pdf.

- YoungMin Kwon, Kirill Mechitov, Sameer Sundresh, WooYoung Kim, and Gul Agha, "Resilient Localization for Sensor Networks in Outdoor Environments," UIUCDCS-R-2004-2449, 2004.
  URL: http://osl.cs.uiuc.edu/docs/tr2449/tr2449.pdf.

- Mechitov, Kirill, Sameer Sundresh, YoungMin Kwon, and Gul Agha, "Cooperative Tracking with Binary-Detection Sensor Networks," UIUCDCS-R-2003-2379, 2003.
  URL: http://osl.cs.uiuc.edu/docs/mechitov03uiuc/tracking.pdf.

## Presentations

- "Resilient Localization for Sensor Networks in Outdoor Environments," *International Conference on Distributed Computing Systems (ICDCS),* Columbus, Ohio, USA, June, 2005. URL: http://osl.cs.uiuc.edu/~ykwon4/ICDCS.pdf.
- "iLTLChecker: A Probabilistic Model Checker for Multiple DTMCs," *International Conference on the Quantitative Evaluation of Systems (QEST),* Torino, Italy, September, 2005. URL: http://osl.cs.uiuc.edu/~ykwon4/QEST.pdf.
- "Modeling and Performance Evaluationof Large Scale Systems," *CONTESA Workshop*, University of Illinois at Urbana-Champaign, Urbana, Illinois, USA, October, 2005.
- "Linear Inequality LTL (iLTL): A Model Checker for Discrete Time Markov Chains," *International Conference on Formal Engineering Methods (ICFEM)* , Seattle, Washington, USA, November, 2004. URL: http://osl.cs.uiuc.edu/~ykwon4/ICFEM.pdf.
- "An LTL Model Checker for Discrete Time Markov Chains," *CONTESSA Workshop*, University of California Irvine, Irvine, California, USA, March, 2004.

## Software

- **LTLC Checker:** LTLC is a temporal logic to specify state stransitions of linear systems from all input sequences in a highly abstract manner. Also, it can be used to compute a control input sequence to satisfy the specification.
  Available at http://osl.cs.uiuc.edu/~ykwon4.
- **iLTL Checker:** iLTLChecker is a probabilistic model checking tool for concurrent runs of multiple Markov Processes. Because, iLTL specifies expected rewards on transitions of probability mass functions, it is a suitable logic for evaluating performances of large scale systems.
  Available at http://osl.cs.uiuc.edu/~ykwon4.
- **ActorNet-1.0:** ActorNet is a mobile agent platform for Wireless Sensor Networks (WSNs). It provides a scheme-like simple syntax, coordination services, and many useful library of modules so that application applications for WSNs can be easily developed.
  Available at http://osl.cs.uiuc.edu/~ykwon4.

## Professional Activities

Reviewer for

- ACM Conference on Embedded Networked Sensor Systems (SenSys) 2004
- ACM International Conference on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA) 2004
- ACM/IFIP/USENIX International Middleware Conference 2004
- IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS) 2005
- ACM Conference on Programming Language Design and Implementation (PLDI) 2005

## References


- Professor Gul Agha
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  University of Illinois at Urbana Champaign
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  University of Illinois at Urbana Champaign
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- Professor Mahesh Viswanathan
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