Matthew J. Miller

Curriculum Vitae

Contact

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Employment

1/2007–present
Software Engineer
Cisco Systems
Research Triangle Park, NC

1/2003–9/2005
Research Assistant
Coordinated Science Laboratory, University of Illinois at Urbana-Champaign
Urbana, IL

Education

Ph.D., Computer Science, December 2006
University of Illinois at Urbana-Champaign
Urbana, IL

Thesis: *Energy Efficiency and Security for Multihop Wireless Networks*
Adviser: Prof. Nitin H. Vaidya
Committee: Prof. Klara Nahrstedt, Prof. Jennifer Hou, and Prof. Indranil Gupta
GPA: 3.94/4.0

M.S., Computer Science, December 2003
University of Illinois at Urbana-Champaign
Urbana, IL

Thesis: *Minimizing Energy Consumption in Sensor Networks Using a Wakeup Radio*
Adviser: Prof. Nitin H. Vaidya

B.S., Computer Engineering, May 2001
Clemson University
Clemson, SC

GPA: 4.0/4.0
Minors: *Computer Science* and *Mathematics*

Industry Experience

Cisco Systems

- IOS developer for 7600 router and SIP-400 linecard platforms.
- Helped implement core dump feature which was a finalist for a Reliability, Availability, and Serviceability (RAS) Award within business unit.
- Sustaining for 7600 IP routing platform code. Consistently resolved the most bugs in the group.
- Involved in troubleshooting several high profile customer cases.
- Reviewer for external proposals for Cisco Research.
- Served multiple times as a Cisco judge for Duke University's graduate networking project class.

Honors

US National Science Foundation Fellowship
Awarded in 2001
Acceptance Percentage: 16.2% (903/5560)

ASEE National Defense Science and Engineering Graduate Fellowship
Awarded in 2001
Acceptance Percentage: 21.3% (285/1339)

Publications

Journal Papers

Conference Papers

Submitted Papers

Technical Reports

Research Experience

Graduate Work

My work focuses on *security* and *energy efficiency* in wireless multihop networks, particularly sensor networks. In the security domain, I proposed a key distribution protocol to provide symmetric, pairwise keys that, with high probability, are unknown to eavesdroppers. This was the first work to use the underlying wireless channel diversity to address this problem. In the energy efficiency domain, most power save protocols use static sleeping and listening intervals regardless of the network environment. My work looks at adaptively adjusting these intervals in response to network traffic. Additionally, I have proposed methods of using carrier sensing to further improve the energy efficiency of power save protocols and a lightweight protocol to address the energy-latency tradeoff for broadcast dissemination in sensor networks.

Graduate Class Projects

- *Exploring the Energy-Latency Trade-off of Broadcasts in IEEE 802.11 Power Save Networks*
  Joint work with Cigdem Sengul in Fall 2003. Designed, analyzed, simulated, and evaluated (using *ns-2*) a protocol for power save networks and the impact of its parameters on energy and latency. Selected by the professor as one of the three best two-person projects in the class. Published in IEEE ICDCS 2005.
- *Improving Fault Tolerance in AODV*
  Joint work with Jungmin So in Fall 2002. Designed, simulated, and evaluated (using *ns-2*) techniques to maintain multiple routes in an ad-hoc routing protocol.
- *Improving Connectivity in a Scatternet Formation Algorithm*
  Joint work with Cristina L. Abad in Spring 2002. Designed, simulated, and evaluated (using a custom built simulator written in C) a protocol to provide greater connectivity in Bluetooth scatternet formation.
- *Log Correlation for Intrusion Detection*
  Group project in Spring 2003. Investigated how information from various system logs can be used to identify specific attacks. Subsequent work by some group members led to a publication based on the project:
- *Tools for Middle School Students to Create Vignettes*
  Joint work with Jeffrey Naisbitt and Naomi Caldwell in Spring 2003. Designed, implemented, and did user-testing on a tool (using Java Swing) to allow students to create life stories using an instant messenger-like interface.

Awards

- NSF Student Travel Grant (US $500) for IEEE BROADNETS 2004
- NSF Student Travel Grant (US $750) for ACM SenSys 2004
- DARPA/NSF Student Travel Grant (US $400–750) for IEEE MASS 2005

Undergraduate Work

- Participated in the NSF-funded Summer Undergraduate Research Experience (SURE) at Clemson University in 1999.
- Worked in Parallel Architecture Research Lab (PARL) at Clemson University for two years.
- Projects included designing user interfaces (using Java Swing) for scientific computing problem solving environments to allow message passing between modules and array partitioning.

External Reviewer

- *IEEE Transactions on Mobile Computing*, *IEEE Transactions on Dependable and Secure Computing*, *IEEE Transactions on Wireless Communications*, *IEEE Transactions on Information Forensics and Security*, and *IEEE Communications Magazine*.
- MobiQuitous 2004, IEEE WCNC 2004, IEEE ICC 2005, IEEE MASS 2006, and IEEE VTC 2006.
- Cisco Research funding proposals.
- Judge for Duke University Computer Science graduate class projects (2007).

Memberships

1997–present Member, Institute of Electrical and Electronics Engineers (IEEE)

Technical Skills

Proficient

C, Python, C++, Java, Perl, LaTeX, Matlab, *ns-2* Network Simulator (C++ based), TinyOS/TOSSIM

Familiar

Tcl/Tk, ML, Prolog, Lisp, PHP

Extracurricular

2004–2005 Large Group Coordinator
UIUC Graduate InterVarsity Christian Fellowship

- Responsible for contacting and scheduling about 20 speakers
- Responsible for arranging facility and equipment reservations
- Helped restructure the chapter budget

Miscellaneous

Citizenship: United States of America

Marital Status: Married

Erdös Number: ≤ 4

August 24, 2010