

Nathanael Thompson

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Overview

My research focuses on the areas of mobile systems and wireless networking as well as distributed computing and the Internet. My objective is to apply my expertise in these areas to develop and deploy new software systems that improve end-user communication and expand it in new directions.

Education

PhD, Computer Science University of Illinois at Urbana-Champaign
expected May 2010 Urbana, IL

- Thesis title: "Planning for the Unplanned Future: Making User-Created Networks a Viable Communication Paradigm"
Thesis advisor: Prof. Robin Kravets
- GPA: 3.75/4.0

Bachelor of Science with Honors, Computer Science Brown University
2001 Providence, RI

- Concentration in Systems and Networking. GPA: 3.6/4.0

Professional Experience

Graduate Research Assistant MOBIUS Research Group, Prof. Robin Kravets
2008-present University of Illinois at Urbana-Champaign

- Designed and simulated a congestion control protocol for delay-tolerant networks that locally adjusts the per-encounter replication limit based on measured network conditions.
- Created a stochastic model of message delivery in delay-tolerant networks that inspired the design of our congestion detection mechanism.
- Evaluated in simulators OMNET++ and ONE (C++/Java) with bash and perl scripts.

Research Intern Deutsche Telekom Laboratories
Summer 2006 Berlin, Germany

- Co-created Authentication on the Edge (AGE) procedure for authentication in open Wi-Fi networks with millions of mobile clients which demand strict access control and traceability.
- Developed distributed protocol incorporating novel distribution of credentials and a social network overlay fall-back mechanism.
- Implemented AGE modules for FreeRADIUS and wpa_supplicant for Linux in C.

Graduate Research Assistant SWiNG Research Group, Prof. Haiyun Luo
2005-2007 University of Illinois at Urbana-Champaign

- Primary researcher on the Practical End-host Residential Multihoming (PERM) project for collaborative Internet access and bandwidth sharing over wireless networks.
- Designed predictive scheduling techniques for residential multihoming.
- Wrote PERM software framework in C for Linux and OpenWRT Linksys router firmware.

Graduate Research Programmer National Center for Supercomputing Applications
2004-2005 Urbana, IL

- Contributed to the design and implementation of an advanced tool for network monitoring and analysis that allows end-users to diagnose common Internet problems based on gathered metrics.
- Implemented new network tests and updated and maintained the large Java project (NLANR Network Performance Advisor).

Member Technical Staff Sun Microsystems
2001-2003 Santa Clara, CA

- Assessed and validated incoming customer bug reports regarding inconsistencies in the Java Development Kit including core Java, Java Web Start, JSSE, the Java compiler and JFC.
- Designed and implemented internal tools in JSP, Java, PERL, bash, sql, sed and awk.

Undergraduate Intern

Summer 2000

Robert Bosch GmbH FV/FLI (R&D/Systems Laboratory)

Stuttgart, Germany

- Implemented prototype steer-by-wire system in C based on CAN protocol.

Publications

1. **Nathanael Thompson**, Samuel C. Nelson, Mehedi Bakht, Tarek Abdelzaher and Robin Kravets. "Retiring Replicants: Congestion Control for Intermittently-Connected Networks", (*To Appear*) *Proceedings IEEE INFOCOM*, San Diego, USA, March, 2010.
2. **Nathanael Thompson**, Petros Zerfos, Robert Sombrutzki, Jens-Peter Redlich and Haiyun Luo. "100% Organic: Design and Implementation of Self-Sustaining Cellular Networks", *Proceedings ACM HotMobile*, Napa Valley, USA, February, 2008.
3. **Nathanael Thompson**, Haiyun Luo, Petros Zerfos, Jatinder Singh, Zuoning Yin. "Extended Abstract: Authentication on the Edge - Distributed Authentication for a Global Open Wi-Fi Network", *Proceedings ACM MobiCom*, Montréal, Canada, September, 2007.
4. Ercan Ucan, **Nathanael Thompson**, Indranil Gupta. "A PiggyBacking Approach to Reduce Overhead in Sensor Network Gossip", *Proceedings ACM MIDSSENS*, Newport Beach, USA, November, 2007.
5. **Nathanael Thompson**, Guanghui He, Haiyun Luo. "Flow Scheduling for End-host Multihoming," *Proceedings IEEE INFOCOM*, Barcelona, Spain, April, 2006.
6. Indranil Gupta, Steve Ko, **Nathanael Thompson**, Mehwish Nagda, Christo F. Devaraj, Ramss Morales, Jay A. Patel. "A Case for Methodology Research in Self-* Distributed Systems," LNCS 3460, *Self-Star Properties in Complex Information Systems (eds: O. Babaoglu et al)*, pages 260-272, 2005.

Patents (pending)

1. "Method and System for Distributed, Localized Authentication in the Framework of 802.11i", Petros Zerfos, Jatinder Singh, Marcin Solarski, Pablo Vidales, **Nathanael Thompson**, Haiyun Luo, US Provisional Patent No. 60970595, Filed in September 2007.

Posters

1. **Nathanael Thompson** and Robin Kravets. "Understanding and Controlling Congestion in Delay Tolerant Networks," *Poster, ACM MobiCom*, San Francisco, CA, September, 2008.
2. Guanghui He, **Nathanael Thompson**, Haiyun Luo. "Individual User WLAN Traffic Analysis," *Poster, ACM MobiHoc*, Champaign, Illinois, May, 2005.

Talks

1. "100% Organic: Design and Implementation of Self-Sustaining Cellular Networks", ACM Hot-Mobile, February 2008.
2. "Flow Scheduling for End-host Multihoming", IEEE INFOCOM, April 2006.

Media Coverage

- Brown, Bob. "Residential Wi-Fi sharing made easy." NetworkWorld.com. 27 April 2006 <<http://www.networkworld.com/news/2006/042706-sharing-wi-fi.html>>.

Awards and Activities

- Recipient 2008 ACM MobiCom travel grant.
- Recipient of 2006 Deutsche Telekom PAM (PhD - Advisor - Mentor) Fellowship.
- Member ACM SIGMOBILE and IEEE.

Teaching Experience

Graduate Teaching Assistant

University of Illinois at Urbana-Champaign

2006

Urbana, IL

- Assistant for large undergraduate programming course and graduate level networking class.
- Led weekly discussion sections and help office hours.
- Designed student homeworks, programming assignments and exams.

Technical Skills

Operating Platforms: Linux, Mac OS X, Xen hypervisor

Programming Languages: C, Java, PERL, sed, awk, bash, MATLAB

Web Technologies: PHP, JSP, HTML, CGI, SQL

Spoken Languages: English (native), German (excellent), French (conversational), Mandarin (basic spoken)