

Vijay Raman

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Dept. of Electrical & Computer Engineering, and
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Urbana, IL 61801, USA.

Summary

Ph.D. student with systems & protocols development experience, and knowledge on 3GPP/2, IETF, & WiMAX.

Education

- **Ph.D. Program (Electrical & Computer Engineering) (Dec. 2008 - Expected Dec. 2011)**
University of Illinois at Urbana-Champaign **Adviser:** Prof. Nitin H. Vaidya
Developing protocols for spectrum management to optimize throughput and latency in wireless networks
Best Paper Award at WWIC '10 & Best Poster Award at MobiSys '11.
- **Master of Science (Electrical & Computer Engineering) (Aug. 2006 - Dec. 2008)**
University of Illinois at Urbana-Champaign **Adviser:** Prof. Nitin H. Vaidya
Thesis: Dealing with Adjacent Channel Interference Effects in Multichannel, Multi-Interface Wireless Networks
- **Bachelor of Technology (Electronics Engineering) (Aug. 2000 - Apr. 2004)**
Madras Institute of Technology, Anna University, Chennai
Thesis: Transmit Power Optimization in OFDM-MIMO Systems
Awarded the Anna University Gold Medal for academic excellence.

Skills

- Languages: C (familiar with kernel programming), Bash (Shell scripting); Familiar: Python, Perl
- Drivers: MadWiFi wireless 802.11 drivers
- Tools: ns-2, Matlab, Möbius, WinProp
- Platforms: Linux, Windows

Research Experience

Academic

- Research Assistant at **Coordinated Science Laboratory** (Aug 2006-Present), at *UIUC*.
 - Developing a suite of MAC and network layer protocols over **Linux kernel** for improving both throughput and delay performance of a multichannel, multi-radio (MCMR) mesh network.
 - Designed and simulated a scheme for **adapting spectrum widths** dynamically for providing QoS in MCMR networks.
 - Proposed a cross-channel **interference-aware channel allocation algorithm** for a MCMR network and measured its performance in a laboratory setting and in an anechoic chamber using a testbed implementation.
- Visiting Research Assistant at **Duke University** (Aug 2010-Dec 2010), with *Prof. Romit Roy Choudhury*.
 - Developed a virtual sensor using **smartphone accelerometers and gyroscopes** to detect if the phone user is currently driving a car or not.
 - Incorporated machine learning algorithms using **support vector machine (SVM)**.
 - Intend to use the virtual sensor for improving driver situational awareness.

Industry

- Interim Engineering Intern at **Qualcomm** (May 2011-Aug 2011), in the *Corp. R&D*.
 - Developed an **algorithm for scheduling femtocell beacons** to assist in **indoor positioning**.
 - Minimized the time to obtain a position fix by **scheduling beacons on frequency and time**.
 - **Modeled the pathloss** of both indoor and outdoor (dense urban) femtocell environments using WinProp.
- Software Engineer at **Motorola India** (Oct 2004-Jun 2006), in the *Network Advanced Technologies research group*.
 - Analyzed the performance of the dynamic location update mechanism in **CDMA 1x EVDO**.
 - Developed and implemented an algorithm for **estimating pathloss in 802.16e** over a cellular network simulator.
 - **Co-authored two IETF drafts on mobile IP** submitted to the NETLMM working group, and a contribution each on **3GPP LTE RAN2/3, WiMAX NWG, and IEEE 802.21 standards** documents.

Other Work Experience

- Teaching Assistant for **Distributed Systems (Spring 2011) & Communication Networks (Fall 2008)**.
 - Designed distributed system and UNIX network programming exercises.
 - Prepared homework and exam solutions.
 - Conducted office hours to provide homework and conceptual assistance.
- Programmer Analyst Trainee at **Cognizant Technology Solutions** (Jun 2004-Oct 2004).
 - Worked as a trainee for designing data model for data-marting customer feedback for Cendant Travel Link Group from an Oracle 9i database.

Selected Publications

• Journal Publications

- V. Raman and I. Gupta, “Performance Tradeoffs Among Percolation-based Broadcast Protocols in Wireless Sensor Networks”, in the International Journal of Parallel, Emergent, and Distributed Systems, Feb. 2010.

• Conference Publications

- **V. Raman** and N. H. Vaidya, “WiSP: A Protocol for Overcoming MAC Overheads Using Packet Size Dependent Channel Widths”, in the IEEE SECON, Jun. 2011.
- **V. Raman** and N. H. Vaidya, “SHORT: A Static-Hybrid Approach for Routing Real Time Applications over Multichannel, Multihop Wireless Networks”, in the WWIC, Jun. 2010. (**BEST PAPER AWARD**)
- **V. Raman** and M.C. Caesar, “A Practical Approach for Providing QoS in Multichannel Ad-Hoc Networks using Spectrum Width Adaptation”, in the IEEE Globecom, Dec. 2009.
- **V. Raman** and I. Gupta, “Performance Tradeoffs Among Percolation-based Broadcast Protocols in Wireless Sensor Networks”, in the WWASN Workshop (held with ICDCS), Jun. 2009.
- S. Kalyanasundaram, V. Ramachandran, and **V. Raman**, “Signaling Reduction in Idle Mode for Inter-Technology Mobility”, in the IEEE VTC, Spring 2007.
- M. Dillon, A. Diwan, C. Murphy, and **V. Raman**, “Evaluating the Opportunity for Optimization of Various RF Parameters in IEEE 802.16e Multi-Cell Network”, in the IEEE VTC, Fall 2006.
- **V. Raman** and S. Kalyanasundaram, “Performance Analysis of the Distance-Based Location Update Mechanism of CDMA 1x EV-DO,” in the IEEE Globecom Conference, Dec. 2005.

Patents (while at Motorola)

- (WO/2007/103619) METHOD AND SYSTEM FOR SELECTING BACKOFF WINDOW IN COMMUNICATION NETWORKS, Sep. 2007.
- (WO/2007/103600) METHOD AND SYSTEM FOR SELECTING POLLING STRATEGY IN COMMUNICATION NETWORKS, Sep. 2007.

Coursework at UIUC

Random Processes	Information Theory	Digital Communications	Wireless Communications
Wireless Networks	Advanced Wireless Networks	Internetworking	Communication Network Analysis
Algorithms	Distributed Algorithms	Computer Systems Analysis	Advanced Distributed Systems
Introduction to Optimization	Combinatorial Optimization	Computer Security	Logic Design

Awards and Honors

- **Best Poster Award** for the poster on ‘Driver detection’ at MobiSys, 2011.
- **Best Paper Award** for the paper published at WWIC, 2010.
- Awarded the **NSF Student Travel Grant** for attending SECON ’11, MobiSys ’10 and ICDCS conference ’09.
- Awarded **Level 1 Significant Participation standards award** in recognition of significant contributions to key standards programs in IETF, 3GPP RAN 2/RAN 3, WiMAX Network Working Group at Motorola, in 2006.
- Awarded the **Bravo Award** in recognition and appreciation of excellent contributions to projects undertaken, and two pursued patents at Motorola, in 2006.
- Awarded the **Anna University Gold Medal**, and several other endowments for academic excellence, in 2004.
- **Student Member**, IEEE and IEEE Communication Society.
- Chaired the **Electronics Engineers’ Association** at Anna University, and conducted a National level research symposium, in 2004.