

# Dheeraj Reddy

School of Electrical and Computer Engg.  
Georgia Institute of Technology  
Atlanta GA 30332  
404-894-9041  
gtg645e@prism.gatech.edu

1036, Curran Street,  
Apt B,  
Atlanta, GA 30318  
404-734-7615 (M)  
dheeraj@ece.gatech.edu

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## Objective

A full-time position that exploits my excellent understanding of TCP/IP networks, their implementation, computer network simulation expertise and leverages my BSD as well as Linux Operating Systems programming/debugging skills.

## Education

PhD. Student, School of Electrical and Computer Engineering. Georgia Institute of Technology, Atlanta GA	Jan 2002 - Current GPA: - 3.7/4.0
Master of Technology, Electrical Engineering. Indian Institute of Technology, Madras	June 1997 - Feb 1999 CGPA: 9.0/10.0
Bachelor of Technology ,Electrical and Electronics Engg Sri Venkateswara University, Tirupati.	Aug 1993 - May 1997 CGPA: 3.95/4.0

## Work Experience

### **Georgia Institute of Technology, Atlanta GA**

Graduate Research/Teaching Assistant Jan 2002 - present  
Responsibilities include research into network simulators and building a simulator for large scale simulations of sensor networks. Relevant coursework includes Sensor enabled embedded systems, ATM networks, Object oriented design for scientists and engineers, Computer graphics, Performance evaluation of computer networks, CAD for computer networks, Network measurements, Multimedia communications. Activities include ::

- Design and coding of network and data-link layer (including 802.11 MAC) of the Georgia Tech Network Simulator (GTNetS).
- Study and design a simulation framework for simulating the communication between compute nodes in a distributed compute cluster.
- Study of BSD protocol stack so that our network simulator behaves closely to the actual network.
- Wireless transmit power control support for Cisco aironet drivers on NetBSD and Linux.
- Hacking the linux and the BSD kernels for power control in wifi devices and speeding up distributed network simulations.

- Study the 802.11 power control and its applications into sensor network protocol design.
- Research into efficient transfer of local information in a network simulation.
- Mobility management in MANs, with wireless in the last hop, using routing updates. Use of EIGRP in the core to help route packets correctly. Since EIGRP has quick convergence, it can be used to reconfigure the routes when nodes disconnect at an 'accesspoint' and reconnect at the neighbouring one.

### **Office of Information Technology, Georgia Tech, Atlanta, GA**

Graduate Research Assistant

Aug 2005 - Dec 2005

Responsibilities include setting up a network tap using commodity hardware on the Georgia Tech Gigabit uplink for capturing complete packet traces. This work required choosing a relevant OS and writing a network device driver for the Intel Gig-E cards that is tuned to high-speed packet capture. It also required the relevant userspace tools to archive and classify traffic characteristics for archival purposes. Activities include ::

- Port and fine tune a network device driver for the Intel Gig-E cards in the NetBSD OS. (Ported from FreeBSD).
- Userspace tools to efficiently capture and analyze packet traces via the bpf interface for archival and research purposes.
- Performance evaluation of such a network setup and improvements. (Less than 0.01 % packet drops at > 600 Mbps traffic )

### **Corporate Technology Group, Intel Corporation, Hillsboro OR**

Graduate Intern

May 2005 - Aug 2005

Responsibilities include design, development and performance evaluation of virtual network device driver on an OS virtualization platform. This work required a complete understanding of the firmware(BIOS) and OS interfaces on the Intel platform and also complete knowledge of memory management and network device drivers in the Linux kernel. Performance evaluation and enhancement required complete understanding and tweaking the network stack implementation. Activities include ::

- Design and develop a virtual network device driver in the Linux kernel.
- Add sufficient infrastructure support in the network stack for this network driver to interface correctly with the userspace tools.
- Performance evaluation of such a network setup and improvements. (Above 90 % of line rate on a 100 Mbps full duplex network)

### **TCS-UCR Research Laboratory, Riverside CA**

Research Engineer

Jan 2001 - Jan 2002

Responsibilities include research insight into extending Directory Services for new application domains. Study of the relevant rfc's and X.500 series of ITU recommendations. Other responsibilities include studying various new technologies including UDDI/XML and RTOS extensions in Linux.

### **Nortel Networks , Istanbul, TURKEY**

(Deputed from Tata Consultancy Services)

Design Engineer

Jan 2000 - Dec 2000

Responsibilities include design, implementation and support of ISDN BRI Conference Calling conforming to ETSI ISDN recommendations on Nortel's DMS range of local switches. Additional responsibilities include Product Verification and support for Turkish CCS7 support.

### **TCS-Nortel Technology Laboratory, Mumbai, INDIA**

Design Engineer

Apr 1999 - Dec 1999

Responsibilities include design of software for the interworking of CAS/CCS7 ISUP and CAS/ETSI PRI for the Turkish ETSI ISUP development for Nortel's DMS range of toll switches. Gaining familiarity and expertise in Q.764-767 and Q.900- series of ITU recommendations. Additional responsibilities include webpage maintenance for the Signaling Core Group and tools development (CGI/Perl).

### **Indian Institute of Technology, Madras, INDIA**

Graduate Teaching Assistant

Aug 1997 - Feb 1999

Responsibilities include administering Digital Systems and Microprocessor Laboratory, taking Digital System Design tutorial exercises, grading assignments and preparing quizzes and final examination.

### **Mysore Electric Industries, Bangalore, INDIA**

Summer Internship

May 1996 - Jun 1996

Responsibilities include studying the various processes in the switchgear manufacturing facility and preparing a report comparing the principles discussed in course work and the practical aspects of the same.

## **Major Academic Projects**

A multiplexed media streamer and player that selects streams to play based on the identity of a person. This identification mechanism is implemented using a microcontroller and sensor assembly on a doorway.

An 802.11 simulator using a custom simulation environment based on the discrete-event simulation paradigm.

Design and coding of a circuit simulator following Object Oriented Principles for discrete and continuous time-domain analysis

Design and development of a discrete event network simulator that mimics a real network closely. (the network and the MAC layer).

A kernel-assisted packet injector and its integration into the network simulator for hardware in loop simulations.

Gathering statistics for a WLAN using a driver plugin to the NetBSD wi driver.

Use of Wavelet Transformation based Signal Processing to detect minor faults in High Voltage Testing

Design of a feedback less controller for an induction machine using SABER simulator.

Study of a Power Distribution Station, devise the Power System Problem for it and solve the same using analytical and digital techniques.

## **Programming Languages and Operating Systems**

C, C++, Python, Perl, ANSI SQL, TCL/Tk, Shell scripting, VC++ and PROTEL (Nortel Networks' proprietary programming language)

Linux, NetBSD, FreeBSD, OpenBSD, Sun Solaris, Windows XP and HP-UX SOS (RTOS on Nortel's DMS switches).

Extremely comfortable with special purpose tools like ns-2 simulator, MATLAB, SPICE and LaTeX.

## **Technical Skills**

Proficient in using GNU and Solaris C/C++ compilers and debuggers.

Excellent coding and system level debugging (h/w and s/w) skills.

Good grasp of computer science disciplines including databases, networking and Operating Systems.

Excellent understanding of the TCP/IP protocols.

Very comfortable with Linux and the NetBSD kernel internals especially the network stack, device drivers and the vfs layer.

Extremely proficient in Linux, FreeBSD and NetBSD system administration including sendmail, bind and djbdns.

Very good at using simulation tools like MATLAB, SABER, SPICE, GTNetS and ns-2.

Miscellaneous hacking with Emacs and the X-Window System.

Very good at Programming using the VC++ (Visual Studio) Compiler

Thorough knowledge of ETSI and ITU ISUP and ISDN (Q.700 and Q.900 series) recommendations.

Working knowledge of X.500 series of ITU recommendations and IETF RFCs for LDAP for directory services.

Contribution to NetBSD, FreeBSD and DragonFlyBSD projects via bug-reports and patches.

## **Memberships and Awards**

Member of IEEE (1998 - present).

Consistent academic performance throughout my career.

Stood 100 in All India GATE examination for graduate scholarships.(M.Tech)

University Gold Medallist in undergraduate studies. (B.Tech)

Won the All India Discover India Quiz conducted by Jammu University.

Armed Forces Scholarship for pursuing undergraduate studies.

Played basketball and shuttle badminton for university.

## **List of Publications**

Talal Jaafar, Dheeraj Reddy, George Riley, Dana Blair: Simulation-Based Routing Protocol Performance Analysis - A Case Study. IEEE Winter Simulation Conference 2006

Dheeraj Reddy and George Riley: Measuring and Explaining Differences in Wireless Simulation Models. MASCOTS 2006

Charles R. Simpson, Dheeraj Reddy, George F. Riley: Empirical Models of TCP and UDP End-User Network Traffic from NETI@home Data Analysis. IEEE PADS 2006

ElMoustapha Ould-Ahmed-Vall, Dheeraj Reddy, George F. Riley, Bonnie S. Heck: Simulation of Large-Scale Sensor Networks Using GTSNetS. MASCOTS 2005

Dheeraj Reddy, George F. Riley: Simulating Realistic Packet Routing without Routing Protocols. IEEE PADS 2005