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Wireless Information Network Laboratory (WINLAB)
Rutgers University, 671 Route 1 South,
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OBJECTIVE	A full time faculty/ industry R&D position in the field of wireless communications systems/networking.
SUMMARY	Have experience in analysis, design and implementation of infrastructure and ad-hoc wireless networks. In my work, I have attacked problems using broad range of techniques, including theoretical analysis, simulation and experimentation.
RESEARCH AREA	LARGE Mobile Wireless Networks, Intelligent Transportation Systems, Medium Access Control techniques, Wireless Channel Modeling, Emulation Testbeds.
STATUS	On F-1 VISA (Student)

EDUCATION

Rutgers University, NJ PhD. in Electrical and Computer Engineering (**GPA 3.867**)	Sep 2004 – Present (Expected May 2011)
Birla Institute of Technology, Ranchi, India BE in Electrical and Computer Engineering	May 2000

EMPLOYMENT AND PROJECTS

Wireless Information Network Laboratory (WINLAB), *Rutgers University, NJ* **Graduate Assistant** **Staff Member**	Sep 2004 – present Sep 2004-05

[2010-] Delay Optimal State Dissemination with Piggybacking: *Analyze the problem of reliable and timely broadcast of state information in large vehicular networks and design optimal schemes.[With Toyota ITC]*

[2010-] Minimizing Age of Information in Vehicular Networks using Rate Control: *Design and implement a rate control algorithm that minimizes the age of system information in vehicular networks. [With Toyota ITC]*

[2009-10] Vehicle-to-Vehicle channel modeling: *Model the channel between two vehicles in presence of other vehicles in proximity.*

[2009] Exploiting Spatio-Temporal Similarity for Reducing Messaging Loads in Vehicular Networks: *Empirically study prediction and compression schemes to reduce safety messaging in vehicular networks. [With Toyota ITC]*

[2008] GeoMAC: Geo-Backoff based Co-operative MAC for V2V networks: *Design and implement a location based MAC to disseminate safety information in sparse vehicular networks. [With Toyota ITC]*

[2006-07] Effects of antenna placement and vehicle (car) geometry: *Empirically evaluate the effect of antenna placement at different positions in a vehicle under varied propagation environments.*

[2005-06] Topology creation on wireless testbeds using noise injection: *Design algorithms that allow users of the ORBIT testbed to map a real-world wireless topology to a throughput equivalent one on the grid*

[2004-05] Mobility Emulation on wireless testbeds: *Provide users of the ORBIT testbed with a framework that can emulate one or more mobile nodes on the grid.*

InterDigital Communications, *Farmingdale, NY* **Summer Intern**	July 2005 – Sep 05

Load Balancing in Enterprise WLANs: *Modify and test algorithms that allow channel and access point selection in an infrastructure WLAN to distribute load over all access points and avoid channels with high traffic or interference on them.*

Ubinetics India Private Ltd. (now CSR), *Bangalore, India* **Senior Engineer**	Sep 2003-04

RRC layer for the UE: *Design and implementation of the RRC layer for the UE.* Specifically, handling of SIB5 and storage of the same in the database, development of Inter RAT Measurements handling, and testing and bug fixing.

Hughes Software Systems (now Aricent), *Gurgaon, India* **Senior Software Engineer** **Software Engineer**	2001 - Sep 03 Jan 2001 – Oct 2002

[2003] Porting SAAL/ALCAP/NBAP: *Port SAAL/ALCAP/NBAP stacks onto OSE-SFK. The stacks were available for Solaris and Linux Platforms. After porting on OSE-SFK, the stacks were compiled using GHS Multi IDE and run on a PPC simulator.*

[2003] Radio Resource Control layer for a Radio Network Controller in UTRAN: *Designed and developed the Node B RRC*

functionality. Worked on RAB setup, modification and release, and I$_u$ relocation.

[2002-03] <u>Geographical Redundancy Solution for a WCDMA Home Location Register (HLR):</u> *Requirement analysis, design and implementation of N:1 geographical redundancy for a HLR. It provided for movement of network operations from one location to another with minimum data loss and down time in case of a catastrophic disaster.*

[2001-02] <u>Subscriber Management for a WCDMA HLR:</u> *Involved providing a means of provision and query of Subscriber, AUC and EIR Data stored in the HLR Database. Worked on the design and development of the system.*

Tata Consultancy Services, Calcutta, India	July 2000 – Jan 2001
Assistant Software Engineer, Trainee	

<u>Malaysian railway reservation system:</u> *The project involved providing a web based railway reservation system for Malaysia. The graphical user interface was created using Oracle D-2K. The backend was Oracle 8i.*

PUBLICATIONS

- **[Accepted for publication]** S. K. Kaul, M. Gruteser, V. Rai, and J. Kenney, "**Minimizing age of information in congested vehicular networks**," in IEEE Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON), 2011.
- **[Submitted]** S. K. Kaul, R. Yates, M. Gruteser, "**On Piggybacking in Vehicular Networks**,", Globecom, 2011.
- **[Preparing for submission]** S. K. Kaul, R. Yates, M. Gruteser, "**Delay Optimal State Dissemination with Piggybacking**,", 2011.
- **[Preparing for submission]** S. K. Kaul, L. Greenstein, and M. Gruteser, "**Vehicle-to-Vehicle channel modeling with cars in vicinity**,", 2011.
- S. Kaul, M. Gruteser, V. Rai, and J. Kenney, "**On Predicting and Compressing Vehicular GPS Traces**," in Communications Workshops (ICC), 2010 IEEE International Conference on, pp. 1-5, 2010.
- Sangho Oh, Sanjit Kaul, Marco Gruteser, "**Exploiting Vertical Diversity in Vehicular Networks Channel Environments**," Proceedings of the IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), 2009.
- Suhas Mathur, Sanjit Kaul, Marco Gruteser, Wade Trappe, "**ParkNet: Harvesting Real-Time Vehicular Parking Information Using a Mobile Sensor Network**." The S3 Workshop at the 10th ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc), 2009.
- S. Kaul, M. Gruteser, R. Onishi, R. Vuyyuru, and T.I.T. Center, "**GeoMAC: Geo-Backoff based Co-operative MAC for V2V networks**," IEEE International Conference on Vehicular Electronics and Safety, 2008. ICVES 2008, 2008, pp. 334-339.
- S. Kaul, K. Ramachandran, P. Shankar, S. Oh, M. Gruteser, I. Seskar and T. Nadeem. "**Effect of Antenna Placement and Diversity on Vehicular Network Communications**", Proceedings of IEEE Sensor, Mesh, and Ad Hoc Communications and Networks (SECON), June 2007 [AR 20%].
- Sanjit Kaul, Marco Gruteser, and Ivan Seskar. "**Creating Wireless Multi-hop Topologies on Space-Constrained Indoor Testbeds Through Noise Injection**", 2nd International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities (Tridentcom), Barcelona, Spain 2006.
- K. Ramachandran, S. Kaul, S. Mathur, and M. Gruteser. "**Towards Mobility Emulation Through Spatial Switching on a Wireless Grid**", Proceedings of ACM E-WIND Workshop (held with ACM SIGCOMM), Philadelphia, PA, 2005.
- K. Ramachandran, S. Kaul, S. Mathur, and M. Gruteser. "**Mobility Emulation Through Spatial Switching on a Wireless Grid (Demo)**", ACM/USENIX Intl. Conference on Mobile Systems, Applications and Services (MOBISYS), Seattle, WA, June 2005.

TALKS and POSTERS

<u>On Predicting and Compressing Vehicular GPS Trace:</u> *Talk at (ICC), 2010.*

<u>On Predicting and Compressing Vehicular GPS Trace:</u> *Poster at WINLAB IAB, Dec 2009.*

<u>Geo-backoff based Co-operative MAC for V2V networks:</u> *At IEEE ICVES, Sep 2008.*

<u>Geo-Cooperative MAC Protocol (LocMAC) for Vehicular Networks:</u> *Poster at WINLAB IAB, June 2008.*

<u>Effect of Antenna Placement and Diversity on Vehicular Comm.:</u> *Talk at WINLAB IAB, Dec 2007.*

<u>Effect of Antenna Placement and Diversity on Vehicular Comm.:</u> *Talk at IEEE SECON, June 2007.*

<u>Creating Wireless Multi-hop Topologies on Space-Constrained Indoor Testbeds:</u> *Talk at WINLAB IAB, Nov 2006.*

<u>Creating Wireless Multi-hop Topologies on Space-Constrained Indoor Testbeds:</u> *Talk at Tridentcom, March 2006.*

PROFESSIONAL ACTIVITIES

Reviewer for ACM/IEEE conferences and journals: Infocom, Mobisys, IEEE Wireless Communications Magazine, IEEE JSAC Vehicular Networks, IEEE MASS, IEEE ITS, IEEE VNC, MobiOpp, nivi09, Oakland09, Winmee, Hotmobile, Wivec, V2VCOM 2008, Data & Knowledge Engineering Journal, GLOBECOM-ISET, Wowmom.

IEEE student member

Student volunteer at IEEE SECON 2007.

AWARDS	IEEE ICC 2010 travel grant.

PLATFORMS/SOFTWARE/TOOLS/LANGUAGES

Sun Solaris, Linux, Windows NT, OSE, VxWorks, ARM, Rational Rose, Rational Purify, Rational Clearcase, Rational Quantify, MSVC, GHS Multi, gdb, dbx, GNU Make, Atheros Madwifi Driver, C, C++, Perl, Java, Unix shell scripting.