Shweta S. Sagari

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Summary

PhD with 5+ years research and industry experience with strong analytical skills in wireless systems- 5G, LTE, Wi-Fi, IoT, MAC/PHY layer protocols, system modelling, communication theory, embedded firmware development in C, prototyping, hardware testing, MATLAB/ python/NS-3 based simulations

Education

WINLAB (Wireless Information Network Laboratory), Rutgers University

- *PhD in Electrical and Computer Engineering (May 2016)* GPA: 3.70
  Advisors: Dr. Dipankar Raychaudhuri and Dr. Wade Trappe
  Thesis: Novel algorithms for Wi-Fi/LTE-U coexistence, mobile WLAN and radio coverage mapping
- *M.S. in Electrical and Computer Engineering, (October 2011)* GPA: 3.75
  Thesis: Geo-location based coordination between 3GPP / cellular network with small cells

College of Engineering, Pune (COEP), India

- *B. Tech, Instrumentation and Control Engineering, (June 2007)* GPA: 3.58

Experience

Huawei Technologies, Santa Clara, CA Oct 2016 – present
Researcher / Systems Engineer, NextGen 5G IoT

- **Low latency CDMA-based Internet-of-Things (IoT) devices:** designing, modeling and prototyping a Network /MAC/PHY layer protocol, aiming for long battery life (> 1 year) and low latency (1-2ms) devices
- **Prototyped information-centric services in 5G network** for mobile devices simultaneously connected to LTE and Wi-Fi; **demonstrated** seamless data session reducing 10% signal (authentication) overhead

WINLAB, Rutgers University, NJ, USA
Research Fellow May - Oct 2016

- **Distributed spectrum management architecture and algorithms**: Developed distributed algorithms, simulation and experiment platform to support scalable coordinated control plane for wireless networks
- Mentored PhD students for projects in software defined networks and experiments using ORBIT testbed

Graduate Research Assistant 2009 – 2015

- **Radio resource management of LTE and Wi-Fi in shared unlicensed band for 5G** [2014–15]: Characterized performance in shared operation and investigated solutions leveraging 5G architecture
  - Characterized and validated interference model with software defined radio prototyping using open-sourced software LTE implementation and Wi-Fi 802.11g/n (Atheros/ Intel chipsets)
  - Led end-to-end project to investigate network-level optimization; improved throughput fairness
  - Received **best paper award** at IEEE DySPAN 2015
- **Building radio coverage map using machine learning** [2013–15]: Built radio maps with received power information using measurements from spectrum sensors to support efficient spectrum utilization
  - Developed path loss based interpolation implementing linear and Gaussian process regressions (machine learning concepts); improved 15% estimation accuracy

Mimosa Networks, Santa Clara, CA Nov 2015 – April 2016
Software Engineer - Wireless Systems Intern

- **Developed 2 product features**: Designed demand-based dynamic scheduler for Mimosa's proprietary PHY/MAC TDMA protocol for a 802.11ac outdoor radio; proof-of-concept using Python simulation
- **Embedded C SW development and testing**: Implemented end-to-end design with git, debug and tested low level 802.11ac hardware, optimized design for latency and hardware memory requirement
- **Incorporated features in alpha networks**: Increased TCP/UDP uplink throughput by 10-20%

Bell Labs, Alcatel-Lucent USA Inc., Murray Hill, NJ Summer 2014
Summer Research Intern

- **Performance estimation of high density distributed Wi-Fi network**: improved existing graph-theory based model to include practical PHY/MAC parameter and identified throughput starved Wi-Fi topologies
- **Proof-of-concept**: Validated model using simulations and 802.11a/g experiments on ORBIT test bed
- Presented work to Bell Labs president and resulted in a research paper

InterDigital Communications, LLC., King of Prussia, PA Summer 2012
Systems Engineering Intern - Next Generation Networks
Enhancement of 3GPP QoS management in small cells: proposed Local IP Access procedures in existing EPS architecture for broadband wireless multimedia; worked closely with 3G/4G architectures and protocols

Programming & Technical Expertise

C (proficient), python, C++, HTML, CSS, Ruby, Linux/Unix, Windows
MATLAB (proficient), NS-3, ORBIT testbed, openairinterface (open-sourced LTE implementation), USRP/GNU Radio, Network tools on UNIX/ Window, 3GPP architecture, MAC and Physical layer protocols, TCP/UDP

Graduate Courses

Communication theory, Wireless communications, Optimization of communication systems, Stochastic signals, Computer architecture, Data structure / algorithms, Communication networks, Software engineering

Honors/ Awards

- N2Women Young Researcher Fellowship (DySPAN'15) 2015
- Student travel grant at the (1) N2Women 2014 workshop, ACM SIGCOMM, (2) ACM MobiSys, and (3) IEEE CISS (ECE, Rutgers University) 2014
- Best Teaching Assistant of the year of ECE dept., Rutgers University 2011-12
- Performance Award at Accenture Services Pvt. Ltd., India 2008

Other Work

WINLAB, Rutgers University, NJ, USA May'09 - present

- **Link budget analysis of coexistent Mobile/Fixed heterogeneous WLANs** [2012-13]: Designed and modeled performance of mobile cellular-Wi-Fi tethering service coexisting with dense fixed WLANs
  - Mitigated interference at mobile hotspot based on its mobility speed and achieved 42% throughput gain when coexisted with dense fixed WLANs with improved quality-of-experience at user
  - Collaborated with multi university team, NEC Japan

Accenture Services Pvt. Ltd., India 2007-2008

Associate Software Engineer

Trained in 'Data Warehousing' and supported Financial Services Quality program which is required for data analysis and reporting/presentation skills; received 'Performance Award' for maximizing team's productivity.

Mentoring

ECE Dept. / WINLAB, Rutgers University, NJ

- *Course Instructor* / *Teaching Assistant* Sep 2009 - Dec 2012
  Instructed undergraduate sophomore summer course independently and assisted faculty with sophomore/junior courses with responsibilities of designing course, lectures, quiz/exams and mentoring students; received positive feedback through departmental survey and **the Best ECE TA award**
- *Research Mentor* Sep 2014 - Oct 2015
  Mentored an undergraduate student on a project 'Wi-Fi / LTE-U Coexistence in Unlicensed Spectrum'; resulted in his independent poster at 2015 IEEE MIT Undergraduate Research Technology Conference

Selected Publications

1) *Coordinated Dynamic Spectrum Management of LTE-U and Wi-Fi Networks,* S. Sagari, S. Baysting, D. Saha, I. Seskar, W. Trappe, D. Raychaudhuri, DySPAN 2015, **Best Paper Award**
2) *Fair Allocation of Throughput under Harsh Operational Conditions,* A. Garnaev, S. Sagari, W. Trappe, MACOM 2015, **Best Paper Award**
3) *Fair Channel Sharing by Wi-Fi and LTE-U Networks with Equal Priority,* A. Garnaev, S. Sagari, W. Trappe, International Conference on Cognitive Radio Oriented Wireless Networks 2016
4) *Modeling and Throughput Analysis of Distributed WiFi Networks,* S. Sagari, K. Balachandran, J. H. Kang, K. Karakayali, K. M. Rege, PIMRC 2016
5) *Modeling the Coexistence of LTE and WiFi Heterogeneous Networks in Dense Deployment Scenarios,* S. Sagari, I. Seskar, D. Raychaudhuri, ICC workshop 2015
6) *An Interpolation Scheme for Constructing Radio Frequency Maps from Spatial Samples*, S. Sagari, L. Greenstein, W. Trappe, N2Women workshop, ACM SIGCOMM 2014
7) *Emulating Co-Channel Interference in Wireless Networks Using Equivalent Low-Tap Filters*, S. Sagari, L. Greenstein, W. Trappe, CISS 2014
8) *Performance Evaluation of Mobile Hotspots in Densely Deployed WLAN Environments*, S. Sagari, A. Baid, I. Seskar, T. Murase, M. Oguchi, D. Raychaudhuri, PIMRC 2013
9) *Adaptive Geolocation based Interference Control for Hierarchical Cellular Network with Femtocells*, S. Sagari, G. Bhanage, D. Raychaudhuri, PIMRC 2011

Talks

1) *Dynamic Resource Management of Heterogeneous Small Cell Network*, NIST, Dec 2015
2) *Coexistence of LTE and WiFi in co-channel deployment- network harmony: Illusion or reality*?, Intern presentation, Bell Labs, Alcatel-Lucent Inc., Aug 2014
3) *Efficient Emulation of Wideband Channels with Interference*, IAB, WINLAB, May 2013
4) *Adaptive Geolocation Based Interference Control for Hierarchical Cellular Network with Femtocells*, Rutgers Engineering Society (Alumni Group), May 2011

Professional Activities

- Peer reviewed for leading ACM / IEEE journals and conferences
- Organized PhD Forum @ DySPAN'15 and volunteered (student) for ACM MobiSys 2014
- Initiated and led Student Forum@ WINLAB to share research work among peers, alumni and students from other research institute; initiated carpool student group to WINLAB

Other Activities

- Volunteered and led Stressbuster events in affiliation with Rutgers recreation center to support students
- Elected as Publicity Head for Rutgers Indian Graduate Student Association (2009 - 2010)
- Led team of 21 undergraduate students at COEP to design and manage theatrical backdrop; team won state-level recognition (2006-2007)

Hobbies

Fitness activities - Yoga, Zumba; badminton, water sports (scuba), skiing