Dola Saha

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Research Assistant Professor
WINLAB
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RESEARCH INTERESTS

Networking in WLAN, LTE, U-LTE and 5G systems, MAC-PHY cross-layer techniques, Higher layer optimizations and scheduling, Connectivity in Smart Cities, Internet of Things and Machine-to-Machine communication, Software Defined Networking, Cognitive Radios, Cloud Computing

EDUCATION

PhD in Computer Science, 2013
UNIVERSITY OF COLORADO BOULDER
Thesis: *MAC-PHY Cross-layer Techniques for Simultaneous Multiuser Communication in Wireless Networks*
Advisor: Prof. Dirk Grunwald

M.S. in Computer Science, 2008
UNIVERSITY OF COLORADO BOULDER
Thesis: *Channel Allocation using Interference Detection in Multichannel Wireless Networks*
Advisor: Prof. Dirk Grunwald

B.Tech. (Hons.) in Information Technology, 2002
KALYANI UNIVERSITY, INDIA (NETAJI SUBHASH ENGINEERING COLLEGE)

WORK EXPERIENCE (*Chronological*)

Research Assistant Professor   June 2015 – current
Rutgers, The State University of New Jersey
- Indoor localization for DAS systems
- Biomedical signal processing for personal usage

Researcher   2013 – 2015
NEC Labs America
- Wireless connectivity in Smart Cities with emphasis on video surveillance data transportation
- Managing interference in CloudRAN for Wi-Fi Multicast
- Load balancing in Internet of Things and Machine-to-Machine communication

Research Assistant   2007 – 2013
University of Colorado Boulder
- Utilizing OFDM for multiuser communication
    – for parallel polling in centralized network,
    – for simultaneous acknowledgment in mesh network,
    – for simultaneous multiuser communication,
    – for covert communication
- Centralized and distributed techniques for scheduling OFDMA/TDMA in wireless networks
- Deployed campus-wide 802.11 testbed using phased array antenna
- Worked on design and implementation of FPGA based radio platform

Intern   Summer 2009
WINLAB, Rutgers
- Developed code for data transfer to and from the FPGA based radio
- Developed an user interface to control the transceiver using Ethernet
- Worked in collaboration to migrate the transceiver to Xilinx Virtex-V based platform

Assistant Systems Engineer   2004 – 2006
TATA Consultancy Services, India
- Implemented MAC layer of Base Station and Service Station following IEEE 802.16-2004 standard.
- Designed the State Transition Matrix for implementation of MAC layer.
- Used *pcap* library to capture packet for evaluation of the MAC.
- Implemented an Operating System Adaptation Layer (OSAL) to handle the OS dependant system calls.

Research Engineer, ADHOCNET Project   2002 – 2004
Indian Institute of Management Calcutta, India
- Utilized directional antennas for improving the performance of wireless Ad Hoc Networks
- Worked on IEEE 802.11 Medium Access Control scheme using directional antennas
- Invented new MAC aware Routing protocol using directional antennas
- Designed new protocols for priority and fairness to flows in Ad Hoc Networks
- Simulation of MAC, Routing and Transport layer protocols in QualNet network simulator

Visiting Researcher   Summer 2004
ATR Adaptive Communications Research Laboratories, Japan
- Implemented wireless ad hoc network testbed with six nodes and Electronically Steerable Passive Array Radiator (ESPAR) antenna.
- Implemented multihop routing in the testbed.
- Used Cisco Aironet 350 series LM Cards to send data, to which the external ESPAR antenna was attached.
- Used raw sockets to control the antenna parameters through a separate Ethernet interface.

AWARDS
- Outstanding Research Award 2012, Department of Computer Science, University of Colorado
- Google Anita Borg Scholarship 2011
- Women Who Make a Difference Award 2011, Women's Resource Center, University of Colorado
- University of Colorado Dean's Outstanding Merit Fellowship, 2006
- University First Class First with distinction in Bachelors Degree, 2002
- National Scholarship Award in Secondary School Examination, 1995
- Student Travel Grants for GLOBECOM 2003, MOBISYS 2008, HOTNETS 2008, SIGCOMM 2009, MOBICOM 2010, ANCS 2010, DySPAN 2011, GraceHopper 2010 and 2011

SERVICES
- Technical Program Committee Member of
    – IEEE DySPAN 2015
    – IEEE GoSMART (GlObal Trends in Smart Cities) 2012-14
    – MoWNet 2014
    – Rocky Mountain Celebration of Women in Computing 2012, 2014
    – Panels and Workshops in Grace Hopper Celebration of Women in Computing 2010
- Frequent reviewer of Transactions on Mobile Computing, Transactions on Networking, Transaction on Communications, INFOCOM, VTC, GLOBECOM, ICC
- Chair of ACM-W Chapter of CU Women in Computing, 2010-12
- Student Representative in the Executive Committee of Computer Science Department 2011-12
- Student Representative in the Faculty Search Committee 2011-12

MENTORING AND OUTREACH
- Currently mentoring two PhD students at Rutgers University on Unlicensed LTE and SDN
- Summer 2014: Supervised intern from Ohio State University on routing algorithms for Smart City Video Surveillance
- April 2012: Sparkfun Lilypad Kit Tutorial for "CU in CS" Workshop
- Organized 'CU in CS' workshop for high school and open option students in University of Colorado
- June 2011: Taught an introductory CS course for underrepresented middle school students
- February 2011: Visited local high school in Boulder, CO to educate students about Computer Science
- Fall 2006: Teaching Assistant for "Introduction to Computer Programming" in SUNY Buffalo - 2007-13: Supervised undergraduate students for various summer projects

SKILL SET
- Programming and Scripting - C / C++, Python
- Analysis and Plotting - Matlab, R
- Linux Kernel and device drivers
- Network Simulators - ns3, QualNet and OPNET
- Instrumentation - Signal analyzers and generators
- Hardware Platforms - USRP/GNURadio, Xilinx FPGAs
- Design Tools - Xilinx System Generator, ISE

Conferences and Workshops:

1. Dynamic Spectrum Management of LTE and WiFi Heterogeneous Networks via Inter Network Coordination
   under reviw

2. A System Architecture to Aggregate Video Surveillance Data in Smart Cities
   under review

3. CODIPHY - Composing On-Demand Intelligent Physical Layers
   Aveek Dutta, Dola Saha, Dirk Grunwald, Douglas Sicker
   ACM SRIF 2013

4. Cognitive Radio Kit Framework : Experimental Platform for Dynamic Spectrum Research
   Khanh Le, Prasanthi Maddala, Craig Gutterman, Kyle Soska, Aveek Dutta, Dola Saha, Peter Wolniansky, Dirk Grunwald, Ivan Seskar
   ACM WiNTECH 2012

5. GRaTIS: Sensing and Intelligence for Performance in The Presence of Legacy Networks
   Dola Saha, Aveek Dutta, Dirk Grunwald, Douglas Sicker
   CROWNCOM 2012

6. Secret Agent Radio: Covert Communication through Dirty Constellations
   Aveek Dutta, Dola Saha, Dirk Grunwald, Douglas Sicker
   Information Hiding 2012

7. Blind Synchronization for NC-OFDMs - When "Channels" Are Conventions, Not Mandates
   Dola Saha, Aveek Dutta, Dirk Grunwald, Douglas Sicker
   IEEE DySPAN 2011

8. An Architecture for Software Defined Cognitive Radio
   Aveek Dutta, Dola Saha, Dirk Grunwald, Douglas Sicker
   ACM/IEEE ANCS 2010

9. Active Radar - A Cooperative Approach using Multicarrier Communication
   Dola Saha, Aveek Dutta, Dirk Grunwald and Douglas Sicker
   IEEE LCN ON-MOVE 2010

10. Practical Implementation of Blind Synchronization in NC-OFDM based Cognitive Radio Networks
    Aveek Dutta, Dola Saha, Dirk Grunwald, Douglas Sicker
    ACM CORONET 2010

11. Channel Assignment in Virtual Cut-Through Switching based Wireless Mesh Networks
    Dola Saha, Aveek Dutta, Dirk Grunwald and Douglas Sicker
    ICDCN 2010

12. SMACK - A SMart ACKnowledgment Scheme for Broadcast Messages in Wireless Networks
    Aveek Dutta, Dola Saha, Dirk Grunwald, Douglas Sicker
    SIGCOMM 2009

13. PHY Aided MAC: A New Paradigm
    Dola Saha, Aveek Dutta, Dirk Grunwald, Douglas Sicker
    IEEE INFOCOM 2009

14. A Phased Array Antenna Testbed for Evaluating Directionality in Wireless Networks
    Michael Buettner, Eric Anderson, Gary Yee, Dola Saha, Douglas C Sicker, Dirk Grunwald
    ACM MobiEval 2007

15. A Fair Medium Access Protocol using Adaptive Flow-rate Control through Cooperative Negotiation among Contending Flows in Ad Hoc Wireless Networks using Directional Antenna
    Dola Saha, Siuli Roy, Somprakash Bandyopadhyay, Tetsuro Ueda, Shinsuke Tanaka
    IWDC 2004

16. A Priority-based QoS Routing Protocol with Zone Reservation and Adaptive Call Blocking for Mobile Ad Hoc Networks with Directional Antenna
    Tetsuro Ueda, Shinsuke Tanaka, Siuli Roy, Dola Saha, Somprakash Bandyopadhyay
    IEEE GLOBECOM 2004

17. A Distributed Feedback Control Mechanism for Priority-based Flow-Rate Control to Support QoS Provisioning in Ad hoc Wireless Networks with Directional Antenna
   Dola Saha, Siuli Roy, Somprakash Bandyopadhyay, Tetsuro Ueda, Shinsuke Tanaka
   IEEE ICC 2004

18. Service differentiation in Multi-hop Inter-Vehicular Communication using Directional Antenna
   Siuli Roy, Dola Saha, Somprakash Bandyopadhyay, Tetsuro Ueda, Shinsuke Tanaka
   IEEE VTC Spring 2004

19. A Power-Efficient MAC Protocol with Two-Level Transmit Power Control in Ad Hoc Network Using Directional Antenna
   Dola Saha, Siuli Roy, Somprakash Bandyopadhyay, Tetsuro Ueda, Shinsuke Tanaka
   IWDC 2003

20. Improving End-to-End Delay through Load Balancing with Multipath Routing in Ad Hoc Wireless Networks using directional Antenna
   Siuli Roy, Dola Saha, Somprakash Bandyopadhyay, Tetsuro Ueda, Shinsuke Tanaka
   IWDC 2003

21. An Adaptive Framework for Multipath Routing via Maximally Zone-Disjoint Shortest Paths in Ad hoc Wireless Networks with Directional Antenna *Dola Saha, Siuli Roy, Somprakash Bandyopadhyay, Tetsuro Ueda, Shinsuke Tanaka*
   IEEE GLOBECOM 2003

22. An Adaptive Packet Injection Rate Control Protocol to Support Priority-based QoS Provisioning in Ad hoc Network with Directional Antenna
   Dola Saha, Siuli Roy, Somprakash Bandyopadhyay , Tetsuro Ueda, Shinsuke Tanaka
   IEEE WPMC 2003

23. An Efficient MAC Protocol with Direction Finding Scheme in Wireless Ad Hoc Network Using Directional Antenna
   Tetsuro Ueda, Shinsuke Tanaka, Dola Saha, Siuli Roy, Somprakash Bandyopadhyay
   IEEE RAWCON 2003

24. A Rotational Sector-based, Receiver- Oriented mechanism for Location Tracking and medium Access Control in Ad Hoc Networks using Directional Antenna
   Tetsuro Ueda, Shinsuke Tanaka, Dola Saha, Siuli Roy, Somprakash Bandyopadhyay
   PWC 2003

25. A Network-Aware MAC and Routing Protocol for Effective Load Balancing in Ad Hoc Wireless Networks with Directional Antenna
   Siuli Roy, Dola Saha, Somprakash Bandyopadhyay, Tetsuro Ueda, Shinsuke Tanaka
   ACM MobiHoc 2003

26. Improving System Performance of Ad Hoc Wireless Network with Directional Antenna
   Somprakash Bandyopadhyay, M.N. Pal, Dola Saha, Tetsuro Ueda, Kazuo Hasuike
   IEEE ICC 2003

Journals:

1. GRATIS: Free Bits in the Network
   Dola Saha, Aveek Dutta, Dirk Grunwald, Douglas Sicker
   IEEE Transactions on Mobile Computing, Vol. PP, February 2013

2. Wireless Innovation through Software Radios
   Dola Saha, Dirk Grunwald, Douglas Sicker
   ACM SIGCOMM Computer Communication Review, Vol. 39, 2009

3. A Priority-Based QoS Routing for Multimedia Traffic in Ad Hoc Wireless Networks with Directional Antenna using a Zone-Reservation Protocol
   Tetsuro Ueda, Shinsuke Tanaka, Siuli Roy, Dola Saha and Somprakash Bandyopadhyay
   IEICE Transaction on Communications: Special Section on Mobile Multimedia Communications,. Vol.E87-B No.5 pp.1085-1094

4. Location-Aware Power-Efficient Directional MAC Protocol in Ad Hoc Networks Using Directional Antenna
   Tetsuro Ueda, Shinsuke Tanaka, Siuli Roy, Dola Saha and Somprakash Bandyopadhyay
   IEICE Transaction: Special Issue on Networking Technologies for Mobile Internet Systems

5. ACR: An Adaptive Communication-Aware Routing through Maximally Zone-Disjoint Shortest Paths in Ad Hoc Wireless Networks with Directional Antenna
   Tetsuro Ueda, Shinsuke Tanaka, Siuli Roy, Dola Saha and Somprakash Bandyopadhyay
   Special issue on Ad Hoc Wireless Networks for Journal of Wireless Communications and Mobile Computing, 2004

References

1. Prof. Dirk Grunwald
   Dept. of Computer Science &
   Dept. of Electrical, Computer & Energy Engg.
   University of Colorado Boulder
   Email: Dirk.Grunwald@Colorado.EDU
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2. Prof. Dipankar Raychaudhuri
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   Director of WINLAB
   Rutgers University
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3. Prof. Douglas Sicker
   Department Head, Engineering & Public Policy
   School of Computer Science
   Carnegie Mellon University
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4. Prof. Timothy X Brown
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