

Muhammad Kumail Haider

Contact Information

Department of Electrical and Computer Engineering
Rice University
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Research Interests

- mmWave Networks with focus on mobility management and MU-MIMO.
- Wireless networking, cross-layer design, modeling and evaluation of MAC protocols in Next-Gen WiFi and 5G systems.
- Machine Learning and Internet of Things.

Education

Ph.D. , Electrical and Computer Engineering (Expected: Oct.-Dec. 2018)
Rice University
Advisor: Prof. Edward W. Knightly

M.S. , Electrical and Computer Engineering (2013-2015)
Rice University

- Thesis: Overhead Constrained Joint Adaptation of MCS, Beamwidth and Antenna Sectors for 60 GHz WLANs with Mobile Clients
- Brief Coursework: Mobile and Wireless Networking, Advanced Wireless Communication, Information Theory, Energy Efficient Machine Learning Systems

B.S. , Electrical Engineering (2009-2013)
LUMS School of Science and Engineering, Pakistan

- Senior Thesis: An Experimental Platform for Cooperative Communication
- GPA: 3.98/4.0 (*major*), 3.96/4.0 (*cumulative*)

Publications

- **M. Haider**, Y. Ghasempour, D. Koutsonikolas and E. Knightly, “LiSteer: mmWave Beam Acquisition and Steering by Tracking Indicator LEDs on Wireless APs.” In *Proc. of ACM MobiCom* (2018).
- Y. Ghasempour, **M. Haider**, C. Cordeiro, D. Koutsonikolas and E. Knightly, “Diversity Steering with PDP for Multi-Stream 60 GHz WLANs.” In *Proc. of ACM MobiCom* (2018).
- **M. Haider**, Y. Ghasempour and E. Knightly, “SearchLight: Tracking Device Mobility using Indoor Luminaries to Adapt 60 GHz Beams.” In *Proc. of ACM MobiHoc* (2018).
- Y. Ghasempour, **M. Haider** and E. Knightly, “Decoupling Beam Steering and User Selection for MU-MIMO 60 GHz WLANs,” in *IEEE/ACM Transactions on Networking* (In submission)
- **M. Haider** and E. Knightly, “iTrack: Tracking Indicator LEDs on APs to Bootstrap mmWave Beam Acquisition and Steering.” In *Proc. of ACM HotMobile* (2018).
- S. Saha, Y. Ghasempour, **M. Haider**, and et al., “X60: A Programmable Testbed for Wideband 60 GHz WLANs with Phased Arrays.” In *Proc. of ACM WiNTECH* (2017). (Runner-up, Best Paper Award)
- **M. Haider** and E. Knightly, “Mobility Resilience and Overhead Constrained Adaptation in Directional 60 GHz WLANs: Protocol Design and System Implementation.” In *Proc. of ACM MobiHoc* (2016).
- M. Khan, T. Anwar, **M. Haider**, and M. Uppal, “Efficient Relaying Strategy Selection and Signal Combining using Error Estimation Codes.” In *Proc. of IEEE WCNC* (2014).
- **M. Haider**, A. Ismail, and I. Qazi, “Markovian Models for Electrical Load Prediction in Smart Buildings.” In *Proc. of ICONIP* (2012).

Poster Presentations

- **M. Haider** and E. Knightly, “Measurement Study with a Programmable Testbed for Wideband 60 GHz WLANs with Phased Arrays.” Third NSF mmWave RCN Workshop, Tucson, AZ, January 2018.
- S. Saha, Y. Ghasempour, **M. Haider**, and et al., “Poster: X60: A Programmable Testbed for Wideband 60 GHz WLANs with Phased Arrays,” in *Proceedings of ACM MobiCom 2017*, Snowbird, UT, September 2017.
- **M. Haider** and E. Knightly, “60 GHz Networking with Mobile Clients: System Design and Implementation.” Second NSF mmWave RCN Workshop, Madison, WI, July 2017.
- **M. Haider** and E. Knightly, “Mobility Resilience and Overhead Constrained Adaptation in Mobile 60 GHz Networks.” First NSF mmWave RCN Workshop, Washington DC, December 2016.

Professional Experience

Rice Networks Group, Rice University

Graduate Research Associate, Advisor: Prof. Edward Knightly Dec 2013-Present
Mobility Management and MU-MIMO in mmWave Networks

Intel Labs, JF Campus, OR

Wireless Connectivity Intern, Supervisor: Dr. Minyoung Park May 2015 - Aug 2015
ns-3 based Implementation of Next Gen WiFi Systems

CS Dept. LUMS School of Science and Engineering

Research Assistant, Advisor: Prof. Ihsan Qazi Feb-Aug 2012
Load prediction, demand response and communications in Smart Grids

Teaching Assistantships

Rice University: Communication Networks (Prof. Knightly) Fall 2014, 2015, 2016, 2017
LUMS SSE: Communication Systems Spring 2013

Skills

- MAC Protocol design for Next-Gen WiFi networks, including Full Duplex, UHF and mmWave networks
- Experience with wireless standards including 5G-NR and 802.11 (a/b/g/n/ac/ad/ay)
- **Languages:** C/C++, MATLAB, Python (Tensorflow, Keras), Shell Scripting, Assembly
- **Software:** ns-3 simulator, LabVIEW, WARPLab, SIMULINK, RPi GPIO, OpenWRT, GRC, tcpdump, Awk, Wireshark
- **Hardware:** USRP radios, WARP, NI mmWave SDRs, Talon 60 GHz APs, optical sensors
- **Communication Skills:** Proficiency in spoken English, experience in academic and technical report writing, research paper writing
- Strong organizational, professional and problem solving skills

Awards & Honors

- Runner Up, Best Paper Award, ACM WiNTECH 2017.
- Student Travel Award, ACM HotMobile 2018, Tempe, AZ.
- Student Travel Award, ACM MobiHoc 2016, Paderborn, Germany.
- 2nd Position in BS Electrical Engineering, LUMS SSE
- *LUMS Deans Honor List of Distinguished Students* : all semesters
- **National Talent Scholarship** by Govt. of Pakistan (2009-2013)
- National level distinctions at Secondary and Higher Secondary School Examination.
- A part of the program: “Academic Tour to Top Ranked Universities in Europe and UK”, by Pakistan Government; traveled Sweden, France, Germany, Netherlands and UK and visited over 30 prestigious universities. Visit included research laboratory tours, meeting with professors and PhD students and interaction with students from diverse academic and cultural backgrounds.