

# Shreyasee Mukherjee

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## CAREER OBJECTIVE

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PhD researcher with design and prototyping experience in network architecture, wireless/5G, vehicular and Internet-of-Things (IoT) systems, seeking a challenging opportunity in research or advanced development.

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## RESEARCH INTERESTS

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Network design, Routing protocols, Mobile wireless access, Internet of Things (IoTs), Vehicular networking.

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## EDUCATION

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- *Ph.D. candidate in Electrical & Computer Engineering* 2013 - Present  
WINLAB, Rutgers University Advisor: Prof. Dipankar Raychaudhuri  
Thesis: Network Protocols for the Mobility-Centric Future Internet
- *MS in Electrical & Computer Engineering* 2011 - 2013  
WINLAB, Rutgers University Advisor: Prof. Dipankar Raychaudhuri  
Thesis: Network-Assisted Multihoming for Emerging Heterogeneous Wireless Access Scenarios
- *Bachelor of Electrical Engineering* 2007 - 2011  
IEST Shibpur, India Advisor: Prof. Amal Barman

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## PROGRAMMING SKILLS

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- **Languages:** Python, C, C++, SQLite.
- **Experimental Tools:** Open Air Interface (OAI), Click, Network Simulator (NS-3), Spark, MatLab, R, AMPL, NI LabVIEW.

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## EXPERIENCE

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- **Graduate Research Assistant** *2012 - Present*  
*WINLAB, Rutgers University*
  - **Low latency LTE networks [Industry funded]:** Ongoing work on design and evaluation of light-weight protocols for cellular networks in order to support low latency 5G applications.
    - Designed cellular core network protocols to support low latency and large scale of subscribers.
    - Ongoing prototyping on software defined radios using Open Air Interface.
  - **Clean-slate multicast routing [NSF funded]:** Design and evaluation of an inter-domain multicast scheme, enabled by name-address separation and global name resolution.
    - Analyzed and compared protocol overhead with existing multicast protocols.
    - Developed proof-of-concept prototype on Click modular router.
  - **Inter-domain routing [NSF funded]:** Design of a clean-slate inter-domain routing protocol providing new abstractions for expressing inter-domain topologies and edge-aware routing.
    - Performed internet-scale simulations using topology datasets from CAIDA.
    - Developed prototype on Click modular router and performed mobility studies on the ORBIT testbed.
  - **Internet standards [Multi-industry collaboration]:** Participation in the Identity Enabled Networks (IDEAS) group in the Internet Engineering Task Force (IETF).
    - Collaborated on Internet drafts on the concept of a standardized network mapping system for name-address separation protocols.
    - Attended IETF 98 to present current research in the IDEAS meeting.
  - **Network-assisted multi-homing [NSF funded]:** Development of a technique for enabling multi-homing in a “hetnet” mobile wireless access scenario, with use of WiFi and LTE simultaneously.
    - Performed detailed NS-3 simulations.
    - Simulated real-world vehicular mobility with WiFi & cellular access datasets.
  - **Vehicular networking: [NSF funded]:** Design and development of protocols for vehicular networking on top of the MobilityFirst future Internet architecture.
    - Formulated service requirements for enabling V2I and V2V communication.
    - Performed connectivity and data-delivery simulations using NS-3.

## • Summer Intern

*Nokia Bell Labs, Murray Hill, NJ*

*Summer 2016*

- **Lean IoT Protocols for a 5G SDN Network:** Design of lean protocols and an IoT proxy for protocol translation.
  - Proposed a low overhead and low latency protocol for a 5G IoT network.
  - Implemented a proxy using Linux kernelspace packet capture libraries.

## • Summer Intern

*AT&T Labs, Middletown, NJ*

*Summer 2014*

- **SDN based tunneling using K-shortest paths:** Analysis of linear program based routing algorithms for centralized traffic engineering.
  - Formulated LP based algorithm for K-shortest paths and evaluated using AMPL.
  - Designed a multi-commodity flow problem for splitting tunnels across optical backbone links.
  - Evaluated proposed algorithm using backbone topology and traffic matrices of a large cellular network provider.

## COURSE PROJECTS

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- **K-SVD implementation on Spark:** Implementation of a distributed K-SVD algorithm for dictionary learning and sparse representation of signals in Spark.
- **Inter-domain path diversity through virtual peering:** Analysis of virtual peering between autonomous systems (ASes) to improve inter-domain path diversity.
- **Gesture recognition for 3D camera based wearable glasses:** Prototyping of hand finger based gesture recognition to control 3D camera based wearable glasses.

## RELEVANT COURSES

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- **Graduate Courses:** Communication Networks, Advanced Computer Networks, Data Structure & Algorithms, Computer Architecture, Digital Communications, Cloud Computing, Wireless Communication Technologies.
- **Independent coursework:** Machine Learning, Software Defined Networking, TensorFlow & the Google Cloud

## AWARDS

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- **IEEE ComSoc Young Professionals, Hot Topics in Communication Award:** IEEE ICC 2017.
- **PhD Research Excellence Award:** Rutgers ECE 2016.
- **Student travel grants:** Richard Tapia 2017, N2 Women Workshop 2016, Globecom 2016, Grace Hopper 2015.

## PUBLICATIONS

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- **Mukherjee, S.,** Ravindran, R., Raychaudhuri, D., “A Distributed Core Network Architecture for 5G Systems and Beyond”, in Proc. of ACM NEAT 2018 (to appear).
- Karimi, P., **Mukherjee, S.,** Kolodziejski, J., Seskar, I., Raychaudhuri, D., “Measurement Based Mobility Emulation Platform for Next Generation Wireless Networks”, in Proc. of IEEE CNERT 2018 (to appear).
- **Mukherjee, S.,** Sriram, S., Vu, T., Raychaudhuri, D., “EIR: Edge-Aware Inter-Domain Routing Protocol for the Future Mobile Internet”, in Elsevier Computer Networks, ISSN: 1389-1286, November 2017.
- Bronzino, F., **Mukherjee, S.,** Raychaudhuri, D., “The Named-Object Abstraction for Realizing Advanced Mobility Services in the Future Internet”, in Proc. of ACM MobiArch 2017.
- **Mukherjee, S.,** Shravan, S., Raychaudhuri, D., “Edge-Aware Inter-Domain Routing for Realizing Next-Generation Mobility Services”, in Proc. of IEEE ICC 2017.
- **Mukherjee, S.,** Bronzino, F., Srinivasan, S., Chen, J., Raychaudhuri, D., “Achieving Scalable Push Multicast Services Using Global Name Resolution”, in Proc. of IEEE Globecom 2016.
- **Mukherjee, S.,** Raychaudhuri, D., “Integrating Advanced Mobility Services into the Future Internet Architecture”, in Proc. of IEEE Comsnets 2015 (Invited paper).
- **Mukherjee, S.,** Baid, A., Seskar, I., Raychaudhuri, D., “Network-Assisted Multihoming for Emerging Heterogeneous Wireless Access Scenarios”, in Proc. of IEEE PIMRC 2014.
- **Mukherjee, S.,** Su, K., Mandayam, N. B., Ramakrishnan, K. K., Raychaudhuri, D., Seskar, I., “Evaluating Opportunistic Delivery of Large Content with TCP over WiFi in I2V Communication”, in Proc. of IEEE LANMAN 2014.

## PATENT

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- US Patent Application 819871, Bhatia, R., Gupta, B., Lakshman, T., **Mukherjee, S.,** Samardzija, D., “A Proxy for Serving Internet-Of-Things (IOT) Devices”, Filed on April, 2017.