

Sumit Maheshwari

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Education

- 2016–Current **WINLAB, Rutgers University, PhD**, CGPA: 4.0/4.0, *Electrical & Computer Engg.*
- 2016–2018 **WINLAB, Rutgers University, MS**, CGPA: 4.0/4.0, *Electrical & Computer Engg.*
- 2009–2012 **IIT Kharagpur, India, MS**, CGPA: 9.22/10, *Electronics & Electrical Communication Engg.*
- 2005–2009 **Dr. MGR Univ., India, B.Tech**, CGPA: 9.89/10, *Electronics & Communication Engg.*

Technical Skills

- Programming C, C++, HTML5, CSS3, JS, SQL, Ruby, Python, Data Structures & Algorithms
- System Multithreading, Socket Programming (TCP/IP)
- Tools Eclipse, NetBeans, Click, Matlab, VM, LXD, Docker
- Framework Fabric.js, Three.js, Anaglyph.js, Node.js
- OS Linux, Windows
- Collaboration Git

Work Experience

- Sep. 2016 – **Research Assistant**, WINLAB.
- Current City scale edge-cloud modeling and analysis to improve overall system capacity using a combination of hierarchical and flat network routing. Design, develop and test the named-object based simple and scalable virtual network with application specific routing feature to fulfill user service requirements.
- Jul. 2015 – **Assistant Professor**, CMR INSTITUTE OF TECHNOLOGY, Bangalore, India.
- Jun. 2016 Teach Wireless Communication and Analog Electronics Circuits to 200+ students (Theory and Labs). Guide bachelors and masters research projects.
- Jul. 2012 – **Lead Engineer**, SAMSUNG R&D, Bangalore, India.
- Jun. 2015 Create authoring & presentation engine for Note3 using fabric.js (patent). Develop context prediction engine for Webkit based Blink browser. Propose and publish solutions for Circuit Switched Fallback in LTE. Attend global operators' meet, understand network problems and align LTE solutions to their needs.

Internship Experience

- Jun. 2018 – **Technical Research Intern**, AT&T LABS, NJ, USA.
- Aug. 2018 Develop an end-to-end system for faster disaster recovery during disasters by determining UE locations.

Research Projects

- Sep. 2018 – **Edge Cloud Control Framework**, WINLAB.
- Current Develop a cross layer control framework to exchange information (e.g. compute) between edge cloud nodes to enhance application performance by enabling: (a) application to edge requirement mapping, (b) state synchronization during user mobility, (c) application specific routing, (d) local as well as global resource view and (e) efficient load balancing.
- Jun. 2018 – **Faster Network Recovery during Disasters**, AT&T.
- Aug. 2018 Place mobile small cells at the optimal locations during disaster for faster network recovery. Collect 3GPP physical layer measurements between a mobile eNB and UEs enriching with MME/HSS logs. Develop system for drone based measurements using portable eNB, MME and HSS [Patent].

- Sep. 2017 – **Edge Cloud Modeling and Migration**, WINLAB.
- May. 2018 Develop a city-scale simulation framework to study networking for an edge-cloud system in terms of latency, bandwidth and server load [SEC2018].
Analyze the impact of various metrics of cloud applications, including the number of pending requests in the cloud queue, system latency, processing latency, missed edge requests, and missed deadlines.
Prototype and experiment impact of predictive server migration on service quality and container technology for static as well as mobile users for fixed/variable load [ANTS2018].
- Aug. 2017 – **Satellite Content Delivery Network**, WINLAB.
- Dec. 2017 Build a satellite based asymmetric content distribution network using MobilityFirst (MF) architecture and multiple client locations (Rutgers, Woodbine and Princeton). Use multicast-aware routing and proactive caching to deliver content and satisfy different geographical needs using satellite's multi-beam feature.
- Sep. 2016 – **Named Object Based Virtual Networks using MobilityFirst**, WINLAB.
- Jul. 2017 Design, prototype and experiment named-object based scalable virtual networks using MF architecture, inherently handling link and node failures.
Integrate application specific routing (ASR) with virtual network to route traffic to the best available network resource based upon network load and latency considerations using Click modular router [ICDCN2019].
- Jul. 2014 – **LTE Network Optimization**, SAMSUNG.
- Jun. 2015 Attend global operator's meet, gather RFP information, translate to technical design and provide research solutions catering their needs.
Create tools to efficiently analyze LTE traffic traces and seek optimization spots. Improve CSFB (Circuit Switched Fallback) performance by tweaking signaling and proposing intuitive switching techniques.
- Jan. 2014 – **Hardware Accelerated Software Technology**, SAMSUNG.
- Jun. 2014 Develop a Webkit-browser based predictive engine for content pre-fetching by tapping Chromium data before rendering.
Design a ranking based algorithm for selective content caching using real-time cursor movement, browsing history data and Google's ngram database.
- Jul. 2012 – **Authoring, Rendering and Presentation Engine for Note Device**, SAMSUNG.
- Dec. 2013 Develop an infinitely zoomable, end-to-end authoring, rendering and presentation engine using HTML5 Canvas and fabric.js.
Design and develop a collaboration framework using Node.js web server [patent].
Implement a 3D engine using Three.js converting 2D presentations to a 3D scene. Integrate anaglyph.js to view 3D presentation using anaglyph glasses to improve user experience.
- Jun. 2009 – **Measurement, Modeling and Forecasting of Traffic in NGWI**, IIT-VODAFONE.
- Apr. 2012 Develop traffic models for applications to foresee wireless Internet traffic. Implement TCP and UDP based tools to measure traffic on a mobile device with packet size & inter-packet delay as settable parameters. Study convergence of heterogeneous wireless networks and propose a vertical handover technique using fuzzy logic [patent].

Graduate Coursework

- Communication Networks I and II (Teaching Assistant)
- Wireless Communication Techniques
- Mobile Communications and Fading
- Modern Digital Communication
- Design of Internet Services
- Information Theory and Coding
- Error Control Coding
- Convex Optimization

Publications | Select

Patents

- An energy and QoS aware methodology for vertical handover among heterogeneous wireless networks.
- Method and system for real time collaboration on a canvas (USA, India and S.Korea).
- Method and system for identifying intent of a plurality of editors in a collaborative environment.

Journals

- A joint parametric prediction model for wireless Internet traffic using Hidden Markov Model (Springer Journal).
 - QoS-aware fuzzy rule-based vertical handoff decision algorithm incorporating a new evaluation model for wireless heterogeneous networks (Eurasip Journal).
 - Energy and quality of service aware FUZZY-technique for order preference by similarity to ideal solution based vertical handover decision algorithm for heterogeneous wireless networks (IET Networks Journal).
- (conference publications available)

Awards | Select

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| 2018 | Best paper award at the IEEE International Conference on Advanced Networks and Telecommunications Systems |
| 2018 | AT&T VURI (Virtual University Research Initiative) fellowship (\$20k) |
| 2018 | NSF travel grant for SEC 2018 (\$1k) |
| 2018 | TA/GA fellowship at Rutgers University (WINLAB) |
| 2018 | Recipient of Rutgers professional development fund 2018 |
| 2017 | Best TA of the year award (ECE, Rutgers University) |
| 2017 | Best poster award at ECE Research Day (Rutgers University) |
| 2017 | TA/GA fellowship at Rutgers University (WINLAB) |
| 2016 | TA/GA fellowship at Rutgers University (WINLAB) |
| 2013 | Best idea in Creative Lab and Innovation (C-LAB) Contest at Samsung (~1300 submissions) |
| 2011 | Best paper award at IEEE CSQRWC China |
| 2009 | Gold Medal and University Topper B.Tech (ECE) |