# Nabeel Akhtar

Department of Computer Science
Boston University
Boston. USA

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**RESEARCH INTERESTS**
Network Virtualization, Software Defined Networking (SDN), Future Internet Architectures (FIA), Wireless Networks (4G & 5G), VANETs

**EDUCATION**

**PhD candidate,** Computer Science                    2013 to present
Boston University, Boston, USA
*Expected graduation: 2019*
- *Advisers: Prof. Ibrahim Matta*
- *Current position: Research and teaching assistant*
- *Research Area: Network Function Virtualization (NFV), Cloud Computing, Future Internet Architectures (RINA)*

**Master of Science,** Computer Science & Engineering,           2011 to 2013
Koc University, Istanbul, Turkey.
- *Advisers: Prof. Oznur Ozkasap; Prof. Sinem Coleri Ergen*
- *Thesis: Vehicle Mobility, Communication Channel Modeling and Traffic Density Estimation in VANETs*

**Bachelor of Science,** Computer Science,                    2007-2011
Lahore University of Management Science (LUMS). Lahore, Pakistan.
- *Adviser: Prof. Fareed Zaffar*

**COMPUTER SKILLS**

**PROGRAMMING:**
Python, Java, C/C++, Java, HTML, Matlab, SQL
**BIG DATA:**
Hadoop, SPARK, Pig, SPARQL (RDF Query Language)
**OTHERS:**
OpenStack, AWS, GENI, Chameleon Cloud

**SELECTED PUBLICATIONS**

**Nabeel Akhtar**, Ibrahim Matta, Ali Raza, Leonardo Goratti, Torsten Braun and Flavio Esposito, "Virtual Function Placement and Traffic Steering over 5G Multi-Technology Networks". *IEEE Conference on Network Softwarization (NetSoft), 2018, Montreal, Canada., June 2018*                    (pdf)

**Nabeel Akhtar**, Ibrahim Matta, Ali Raza and Yuefeng Wang, "EL-SEC: ELastic Management of SECurity Applications on Virtualized Infrastructure". *IEEE INFOCOM International Workshop on Computer and Networking Experimental Research Using Testbeds (CNERT), 2018, Honolulu, Hawaii, USA, April 2018.*           (pdf)

**Nabeel Akhtar**, Ibrahim Matta, Ali Raza and Yuefeng Wang, "EL-SEC". *IEEE INFOCOM International Workshop on Computer and Networking Experimental Research Using Testbeds (CNERT), 2018, Honolulu, Hawaii, USA, April 2018.*   (pdf)

Zhongliang Zhao, Eryk Jerzy Schiller, Eirini Kalogeiton, Torsten Braun, Stiller Burkhard, Mevlut Turker Garip, Joshua Joy, Mario Gerla, **Nabeel Akhtar**, Ibrahim Matta. "Autonomic Communications in Software-Driven Networks". *IEEE Journal on Selected Areas in Communications (JSAC), 2017.*                    (pdf)

**N. Akhtar**, I. Matta, Y. Wang, "Managing NFV using SDN and Control Theory". *IEEE/IFIP International Workshop on Management of the Future Internet (ManFI 2016), co-located with NOMS 2016, Istanbul, Turkey, April 2016.* (pdf)

Y. Wang, I. Matta, **N. Akhtar**, "Application-Driven Network Management with ProtoRINA". *IEEE/IFIP Network Operations and Management Symposium (NOMS 2016), Istanbul, Turkey, April 2016.* (pdf)

**N. Akhtar**, S. Coleri Ergen, and O. Ozkasap, "Vehicle Mobility and Communication Channel Models for Realistic and Efficient Highway VANET Simulation," *IEEE Transactions on Vehicular Technology, vol.64, no.1, pp.248-262, January 2015* (pdf)

Y. Wang, **N. Akhtar**, I Matta, "Programming Routing Policies for Video Traffic," *International Workshop on Computer and Networking Experimental Research using Testbeds (CNERT 2014), co-located with ICNP 2014, Raleigh, NC, USA. October 2014.* (pdf)

Y. Wang, I Matta, **N. Akhtar**, "Experimenting with Routing Policies using ProtoRINA over GENI," *The Third GENI Research and Educational Experiment Workshop (GREE2014), Atlanta, Georgia. March, 2014* (pdf)

**N. Akhtar**, O. Ozkasap, & S. Coleri Ergen, "VANET Topology Characteristics under Realistic Mobility and Channel Models," accepted in the proceedings of IEEE Wireless Communication and Networking Conference (WCNC 2013), Shanghai, China, April 2013 (pdf)

**N. Akhtar**, S. Coleri Ergen, & O. Ozkasap, "Analysis of Distributed Algorithms for Density Estimation in VANETs," IEEE Vehicular Networking Conference (VNC) (VNC 2012), Seoul, Korea, Nov. 2012 (pdf)

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| **TECHNICAL REPORTS** | **N. Akhtar**, I. Matta, Y. Wang, "Managing NFV using SDN and Control Theory," *Technical Report BUCS-TR-2015-013, Boston University, 2015* (pdf) |

Y. Wang, I Matta, **N. Akhtar**, "Application-Driven Network Management with ProtoRINA," *Technical Report BUCS-TR-2015-003, Boston University, 2015* (pdf)

Y. Wang, **N. Akhtar**, I Matta, "Programming Routing Policies for Video Traffic," *Technical Report BUCS-TR-2015-005, Boston University, 2014* (pdf)

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| **RESEARCH EXPERIENCE** | **EL-SEC: ELastic Management of SECurity Applications on Virtualized Infrastructure** [details] |

*Adviser: Prof. Ibrahim Matta* **Spring 2015 to present**
Concepts from Control theory and SDN (Software Defined Networking) are used for NFV (Network Function Virtualization) elastic management and deployment.

**Network Function Placement, Orchestration and Management**
*Adviser: Prof. Ibrahim Matta* **Spring 2016 - present**
NFV placement and traffic routing problem.

**Recursive InterNetwork Architecture (RINA)** [details]
*Adviser: Prof. Ibrahim Matta* **Spring 2013 to Present**
RINA is a new network architecture that is based on the fundamental principle that networking is inter-process communication (IPC). It recurses the IPC service over different scopes.

**Analysis of realistic Channel Models for VANETs**  [details]
*Advisers: Dr. Sinem Ergen and Dr. Oznur Ozkasap*  **Fall 2011 to Spring 2013**
This project deals with analyzing different channel models and proposing a realistic model for vehicular ad-hoc network (VANET).

**Realistic Mobility Modeling for VANETs**  [details]
*Advisers: Dr. Sinem Ergen and Dr. Oznur Ozkasap*  **Fall 2011 to Spring 2013**
In this project, we integrate real-world road topology and real-time data extracted from the Freeway Performance Measurement System (PeMS) database into the microscopic mobility model in order to generate realistic traffic flows along the highway.

**Distributed Algorithms for density estimation in VANETs**  [details]
*Advisers: Dr. Oznur Ozkasap & Dr. Sinem Ergen* **Summer 2011 to Spring 2013**
The project deals with proposing fully distributed and infrastructure-free mechanisms for the density estimation in vehicular ad-hoc networks.

**Providing VANET security through group based approach**
*Advisers: Dr. Fareed Zaffar*  **Fall 2010 to Spring 2011**
The project deals with security aspects in VANETs. We analysed existing frameworks for providing security and proposed a more efficient framework for evaluating security.

**Shortest path traffic flow optimization in VANETs**
*Advisers: Dr. Fareed Zaffar*  **Summer 2011**
The project deals with computing the shortest path for vehicles using heuristic data and active query caching.

**Development and Analysis of P2P Network Size Estimation**
*Advisers: Dr. Oznur Ozkasap*  **Summer 2010**
In this project, we analysed and implemented distributed algorithm for network size estimation in P2P networks using Planet-Lab as the underlying test bed.

**Color-based feature matching to track objects in consecutive video frames**
*Advisers: Dr. Sohaib Khan* -**Best Project Award** at International Conference on Machine Vision (ICMV 2010)

**WORK EXPERIENCE**

**Research Intern at Akamai Technologies, Cambridge, USA**  Summer 2016
Project: Over-Representation Analyzer for Anomaly Detection.
Description: Developing a tool which will help Akamai Media Performance team to identify problems (anomalies) in Akamai media delivery network.

**Researcher, Mobile Networks at CREATE-NET, Italy**  January-May 2016
Project: NFV and SDN for wireless networks.
Description: Virtual Network Function management and deployment for 4G and 5G networks in Europe.

**Research Intern at Akamai Technologies, Cambridge, USA**  Summer 2015
Project: Feature Selection, Anomaly Detection and Change Detection in Media Delivery.

**Research Assistant at Boston University, USA**  Fall 2013 to Present
Network Virtualization, Network Resource Allocation, Network Function Virtualization (NFV), Future Internet Architectures

**Research Assistant at Koc University, Turkey**  Fall 2011 to Spring 2013
Wireless Network Laboratory, Department of Computer Engineering,

Chanel Modeling, Realistic Mobility Modeling and distributed algorithms for density estimation in vehicular ad-hoc networks

**Summer Research Assistant at Koc University, Turkey**          Summer 2010
Project: Distributed Protocol for Frequent Item Set Discovery and network size estimation for P2P network

**IT Consultant**          Summer 2009
IT Department, Sidat Hayder
- Worked on the second biggest database system in Pakistan, "Land Record Management Information System" (LRMIS)
- Worked as software quality assurance consultant

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| **AWARDS/ HONORS** | Project Title: *Color-based Feature Matching to track objects in consecutive video frames.* **N. Akhtar**, A. Arif, and J. Ali, 2nd International Conference on Machine Vision (ICMV 2010). **Best Project Award**.          2010 |

Presented at *International Training School on Energy Efficiency*          2011
COST0804 International Training School on Energy Efficiency in Large Scale Distributed Systems. Palma de Majorca, Balearic Islands, Spain.

*M.Sc. Vehbi Koc Fellowship*          2011-2013
Full tuition fee waiver & living stipend. Koc University.

*B.Sc. merit scholarship*          2007-2011
90% tuition fee waiver. Lahore University of Management Sciences.

Selected for *Summer Research Program*          2010
Koc University, Istanbul, Turkey

*National Science Talent Contest (NSTC)*          2007
Top 50 among 10,000 high school students. Represented Pakistan.

*All-Pakistan Higher Education Commission Water Polo Championship*          2009
Silver Medal

**TEACHING EXPERIENCE**

**Teaching Assistant**
**Department of Computer Science, Boston University**

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| *CS101 Introduction to Computing* | Fall 2013 |
| *CS105 Introduction to Databases and Data Mining* | Fall 2015 |
| *CS655 Computer Networks* | Fall 2016 |
| *CS210 Computer Systems* | Spring 2018 |

**Department of Computer Engineering, Koc University**

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| *ENG 200 Probability* | Spring 2013 |
| *COMP 416 Computer Networks* | Fall 2012 |
| *COMP 202 Data Structures and Algorithm* | Spring 2012 |
| *COMP 132 Advanced Programming* | Fall 2011 |

**Department of Computer Science, LUMS**

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| *CS 212 Computational Problem Solving* | Spring 2011 |
| *CS 371/ CMPE 371 Computer Networks* | Fall 2010 |

**SERVICES**          **As TPC committee member:**
IEEE Conference on Network Softwarization (NetSoft) 2019

**As Reviewer for:**
Conference IEEE NFV-SDN 2018
Journal IEEE Transactions on Intelligent Transportation Systems (ITS) 2018
Workshop IEEE CNERT 2018
Conference IEEE INFOCOM 2017
Conference IEEE NFV-SDN 2017
Journal Future Generation Computer Systems 2017
Journal IEEE Communications Letters 2017
ITC 29 Soft5 Workshop 2017
Journal IEEE Intelligent Transportation Systems Transactions (ITST) 2017
Journal IEEE Transactions on Mobile Computing (TMC) 2017
Journal IEEE Communications Letters 2016
IEEE International Conference on Network Protocols (ICNP) 2014
IEEE International Conference on ITS Telecommunications (ITST) 2012
IEEE International Conference on Vehicular Electronics and Safety (ICVES) 2012
**As Organizer:**
Currently organizing Networking Reading Group (NRG) at Boston University
May 22-26, 2017: Student Volunteer/Organizer for GENI Regional Workshop and
Camp, Texas A&M University, College Station, TX


**ACTIVITIES**     **Mountaineering:** Active member of Koc Mountaineering Club. Climbed several
peaks above 4500m in Himalayas and Karakorum Mountain Range.
**Sports:** Water Polo, Soccer, Swimming, Biking, Badminton


**REFERENCES**     **Prof. Ibrahim Matta**: Ph.D. Thesis Advisor, Boston University. matta@bu.edu
**Prof. Oznur Ozkasap**: M.Sc. Thesis Advisor, Koc University. oozkasap@ku.edu.tr
**Prof. Sinem Ergen** : M.Sc. Thesis Advisor, Koc University. sergen@ku.edu.tr