Curriculum Vitae

Abraham (Ibrahim) Matta

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Computer Science Department
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Research Interests

Management and economics of virtualized distributed systems; application management over cloud and datacenter systems; machine learning for systems and systems for machine learning; clean-slate (recursive) architectures for transport and routing over programmable networks; transport and routing protocols for the Internet and wireless networks; feedback-based control design and analysis; modeling and performance evaluation; experimental research and education using testbeds.

Education

Ph.D. in Computer Science *August 1995*
University of Maryland at College Park.
Dissertation: Fast Evaluation and Dynamic Control of Integrated Services Networks.
Advisor: Professor A. Udaya Shankar.

M.S. in Computer Science and Automatic Control *June 1989*
Alexandria University, Egypt.
Thesis: Performance Evaluation of Tandem Packet Radio Networks.

B.S. in Computer Science and Automatic Control *June 1986*
Alexandria University, Egypt.
Project: Computer System Performance using Simulation.

Appointments

National Science Foundation, CISE Directorate, CNS Division
Program Director *September 2024 –*

Computer Science Department, Boston University
Chair *July 2018 – June 2024*
Full Professor *September 2012 –*
Associate Chair *July 2014 – June 2017*
Associate Professor *September 2003 – August 2012*
Director of Graduate Studies *September 2007 – June 2012*
Director of Laboratory Operations *September 2003 – August 2005*
Assistant Professor *July 1999 – August 2003*

Hariri Institute for Computing, Boston University
Director of Cyberinfrastructure Research & Innovation Lab *May 2017 – December 2018*
Affiliated Faculty *September 2011 – present*

Division of Systems Engineering, Boston University
Affiliated Faculty *September 2008 – present*

Telematics Engineering Department, Carlos III University of Madrid
Institute of IMDEA Networks, Madrid, Spain
Visiting Professor/Researcher *November 2012 – December 2012*

Mobile Networking Systems Department, BBN Technologies
Visiting Scientist *January 2006 – December 2007*

College of Computer Science, Northeastern University
Assistant Professor *September 1995 – June 1999*
Co-Director of Lab for Networking & Distributed Computing *April 1997 – June 1999*

Computer Science Department, Bowie State University
Adjunct Faculty *January 1994 – May 1994*

Computer Science Department, University of Maryland at College Park
Research Assistant *June 1990 – August 1995*
Teaching Assistant *August 1989 – May 1990*

Computer Science & Automatic Control, Alexandria University, Egypt
Teaching Assistant *December 1987 – July 1989*

Computer Science Department, College of Air Defense, Egypt
Teaching Assistant *July 1986 – November 1987*

Research Grants

- NSF CNS ($323,965) *10/1/22 – 9/30/25*
  Principal Investigator, "Collaborative Research: CNS Core: Small: A New Architecture for Petabyte-scale File Transfer Evaluated in FABRIC." Co-PI: Violet Syrotiuk (Arizona State University). Total budget: $647,965. **Substitute PI: John Liagouris, effective August 2024, to avoid COI when serving at NSF.**

- NSF CNS ($49,216) *10/1/19 – 9/30/23*
  Lead Principal Investigator, BU supplement awarded 8/23/2021 for "Collaborative Research: HEECMA: A Hybrid Elastic Edge-Cloud Application Management Architecture."

- NSF CNS subcontract from BBN ($22,000) *1/15/21 – 9/15/21*
  Project Director, "NSF FABRIC Student Internships under GENI Going Forward."

- NSF CNS ($249,774) *10/1/19 – 9/30/23*
  Lead Principal Investigator, "Collaborative Research: HEECMA: A Hybrid Elastic Edge-Cloud Application Management Architecture." Co-PIs: Flavio Esposito (Saint Louis University) and Vatche Ishakian (Bentley University). Total budget: $499,774.

- NSF CISE Research Resources ($395,944) *12/1/2016 – 9/30/2023*
  Project Director "Collaborative Research: Broadening Participation in GENI."

- Army STTR Phase I subcontract from Charles River Analytics ($50,000) *2/28/20 – 6/27/20*
  Project Director, "Resilient Execution of Localized Algorithms at the Tactical Edge (RELATE)."
- NSF CNS subcontract from BBN ($152,688) *3/1/16 – 9/15/21*
  Project Director, "GENI Going Forward."
- NSF CNS subcontract from BBN ($138,959) *6/1/17 – 9/15/21*
  Project Director, "SAVI-II (international collaboration on Smart Applications on Virtual Infrastructure), part of the GENI Going Forward project."
- Anita Borg Institute for Women and Technology ($3,000) *8/26/2019 – 12/31/2019*
  Project Director, "BRAID Affiliate Micro-Award"
- Hariri Institute Research Incubation Award ($36,268) *5/1/18 – 4/30/19*
  Principal Investigator (with Michael Dietze), "A Scalable and Secure Cyberinfrastructure for the Repeatability of Ecological Research."
- NSF CNS subcontract from BBN ($45,361) *6/1/17 – 12/31/17*
  Project Director, "SAVI-I (international collaboration on Smart Applications on Virtual Infrastructure), part of the GENI Project Office Phase 2 project."
- NSF CNS ($49,935) *5/15/16 – 4/30/18*
  Project Director, "Broadening Participation in Teaching and Research on GENI: A Regional Workshop in May 2016."
- NSF CNS subcontract from BBN ($110,252) *10/01/13 – 5/31/16*
  Principal Investigator, "Experimenting with Programmable Management Policies over GENI."
- NSF CNS – NeTS: Medium ($559,389) *05/01/10 – 04/30/15*
  Principal Investigator (with John Day), "A Recursive Internet Architecture."
- DoE – GAANN ($396,456) *08/16/10 – 08/15/14*
  Project Director, "Graduate Assistance in Areas of National Need in Computer Science."
- EU Network of Excellence on Energy Efficient Networking (travel support) *09/01/2010 – 2014*
  Collaborating Institution, "TREND: Towards Real Energy-efficient Network Design."
- NSF CCF – SRS ($400,000) *09/01/08 – 08/31/12*
  Co-Principal Investigator with Assaf Kfoury and Azer Bestavros, "Genericity in Network software: Using Type Systems and Formal Methods to Harness Diverse Theories and Calculi for Scalable and Safe Compositions of Network Services."
- NSF CSR – EHS/CPS ($99,999) *09/01/07 – 08/31/11*
  Co-Principal Investigator with Azer Bestavros and Assaf Kfoury, "Leveraging Type Systems for the Development of High-Assurance Cyber-Physical Systems and Applications."
- Movik Support for Application Performance over 3G/UMTS ($30,000) *07/01/08 – 12/31/08*
  Principal Investigator.
- DARPA subcontract from BBN Technologies ($117,470) *07/01/2006 – 12/31/07*
  Principal Investigator, "Energy-conscious Transport over Ad Hoc Networks."
- Sprint Support for Transport over Cellular Data Networks ($35,000) *09/01/06 – 08/31/07*
  Principal Investigator (co-PI: Azer Bestavros).

- NSF CNS Cyber Trust ($300,000) *10/01/05 – 09/30/09*
  Co-Principal Investigator with Azer Bestavros, "Towards Trusted Adaptation Dynamics in Computing Systems and Networks."

- Sprint Support for Characterization of Cellular Data Networks ($20,000) *05/01/05 – 08/31/05*
  Principal Investigator (co-PI: Azer Bestavros).

- EU / Information Societies Technology (IST) *01/01/04 – 06/30/06*
  Participating US member, "E-NEXT: Network of Excellence in Emerging Networking Experiments and Technologies."

- NSF Advanced Networking Research ($45,000) *09/01/02 – 12/31/03*
  Principal Investigator, "COST-IST (EU) / NSF (USA) Workskop on Networking."

- NSF ITR Software ($1,665,496) *10/01/02 – 09/30/07*
  Co-Principal Investigator with Azer Bestavros, John Byers, Assaf Kfoury, and Richard West, "Internet Flows as First-Class Values: Support for Dynamic, Flexible Internet Services."

- NSF EIA – CISE Research Infrastructure ($1,247,395) *09/01/02 – 08/31/07*
  Co-Principal Investigator with Azer Bestavros, Margrit Betke, Mark Crovella, and Stan Sclaroff, "SENSORIUM: Research Infrastructure for Managing Spatio-Temporal Objects in Video Sensor Networks."

- Sprint Support for IP Network Characterization and Analysis ($60,000) *9/1/02 – 8/31/03*
  Co-Principal Investigator with Mark Crovella, Azer Bestavros, and John Byers.

- Motorola Support for Research on QoS-based Home Networking ($20,000) *9/1/02 – 8/31/03*
  Principal Investigator.

- NSF Special Projects in Networking Award ($1,057,000) *9/1/01 – 8/31/05*
  Principal Investigator (co-PIs: Azer Bestavros, Mark Crovella, and Marwan Krunz from University of Arizona), "A Control Theoretic Approach to the Design of Internet Traffic Managers."

- CAIDA: Cooperative Association for Internet Data Analysis (4 Cisco routers) *12/01*
  Internet Engineering Curriculum, Internet Teaching Laboratory. Estimated @ $50,000
  Principal Investigator (co-PIs: John Byers and Gene Itkis).

- NSF Faculty Early Career Development Award ($200,000) *9/15/97 – 8/31/01*
  Principal Investigator, "Integrated Dynamic Control for Robust Quality-of-Service Routing."

- NSF Major Research Instrumentation Award ($227,794) *9/1/98 – 8/31/00*
  Co-Principal Investigator with Gene Cooperman (CS), David Kaeli and Waleed Meleis (ECE) at Northeastern University, "A High-Performance, Low-Cost Testbed for Network-based Research."

- NSF Connections Award to Northeastern University *1998*
  Contributor.

- Northeastern Univ. Research and Scholarship Development Fund ($7,800) *7/1/96 – 12/31/97*
  Principal Investigator, "Robust Routing in Quality-of-Service Networks."

Honors and Awards

- 2023 Best Demonstration Award, *MLED: A Layered Architecture for Reducing Undetected Error Probability in File Transfer*, presented at the KNIT 7 FABRIC Workshop, September 27-29, 2023.
- 2021 Best Paper Award (Research Track), *LIBRA: An Economical Hybrid Approach for Cloud Applications with Strict SLAs*, published at the 9^{th} IEEE International Conference on Cloud Engineering (IC2E 2021), October 4-8, 2021.
- 2018 GENI Experimenter Contest, First Place Award, *EL-SEC: ELastic Management of SECurity Applications on Virtualized Infrastructure*, presented at the IEEE INFOCOM International Workshop on Computer and Networking Experimental Research using Testbeds (CNERT 2018), Honolulu, HI, April 2018. Sponsors: NSF, PIER (Partners in Education and Research) Group, and Ciena.
- Certificate of Appreciation from IEEE and the Technical Committee on Computer Communications (TCCC), for outstanding service as the General Chair of the 16^{th} IEEE International Symposium on a Word of Wireless, Mobile and Multimedia Networks (WoWMoM), Boston University campus, Boston, MA, June 14–17, 2015.
- Best One Minute Madness (OMM) Award, IFIP Networking, May 2013.
- Leadership Award from the 20^{th} IEEE Conference on Computer Communication Networks (ICCCN), August 2011.
- Patent awarded April 2011 on "Systems and methods for energy-conscious communication in wireless ad-hoc networks," co-inventors: Niky Riga, Alberto Medina, Craig Partridge, Jason Redi, and Isidro Castineyra.
- Best Paper Award in the 9^{th} IEEE Med-Hoc-Net Workshop in Juan-Les-Pins, France, June 2010. Paper titled "Preferential Field Coverage Through Detour-Based Mobility Coordination", co-authored with Hany Morcos and Azer Bestavros.
- Best Paper Award in the International Conference on Distributed Computing in Sensor Systems (DCOSS), Applications Track, in Santorini Island, Greece, June 2008. Paper titled "An Information Theoretic Framework for Field Monitoring Using Autonomously Mobile Sensors", co-authored with Hany Morcos, George Atia, and Azer Bestavros.
- Elevated to ACM Senior Member, April 2007.
- Elevated to IEEE Senior Member, September 2006.
- Certificate of Appreciation from IEEE, Fall 2003.
- Listed in the AcademicKeys Who's Who in Sciences Higher Education (WWSHE), Fall 2003.
- Teaching Award, Computer Science Dept., Boston University, Fall 2001.
- National Science Foundation CAREER Award, 1997.
- Teaching Excellence Nomination, Computer Science Dept., Alexandria, Egypt, 1989.
- Certificate of Merit from College of Air Defense, Alexandria, Egypt, December 1987.
- Departmental Excellence Award (for first rank among 40 CS graduates), October 1986.
- Undergraduate Scholarship for Academic Excellence, 1981 – 1986.
- High School Badge of Honor, June 1981.

Book Chapters

[1] Ibrahim Matta. Optimizing and Modeling Dynamics in Networks. In Hamed Haddadi and Olivier Bonaventure, editors, *eBook on Recent Advances in Networking*, volume 1. ACM SIGCOMM, August 2013. Licensed under a CC-BY-SA Creative Commons license.

[2] Luca Chiaraiglio and Ibrahim Matta. Energy-Aware Network Management and Content Distribution. In *Green Communications: Theoretical Fundamentals, Algorithms, and Applications*, chapter 27, pages 765–791. CRC Press. Editors: Jinsong Wu, Sundeep Rangan, and Honggang Zhang, 2013.

Articles in Journals

[1] Zongshun Zhang, Andrea Pinto, Valeria Turina, Flavio Esposito, and Ibrahim Matta. Privacy and Efficiency of Communications in Federated Split Learning. *IEEE Transactions on Big Data*, May 2023.

[2] Ali Raza, Nabeel Akhtar, Vatche Isahagian, Ibrahim Matta, and Lei Huang. Configuration and Placement of Serverless Applications using Statistical Learning. *IEEE Transactions on Network and Service Management*, February 2023.

[3] Ali Raza, Ibrahim Matta, Nabeel Akhtar, Vasiliki Kalavri, and Vatche Isahagian. Function-as-a-Service: From an Application Developer's Perspective. *Journal of Systems Research (JSYS)*, August 2021.

[4] Nabeel Akhtar, Ibrahim Matta, Ali Raza, Leonardo Goratti, Torsten Braun, and Flavio Esposito. Managing Chains of Application Functions over Multi-Technology Edge Networks. *IEEE Transactions on Network and Service Management*, 2021.

[5] Maryam Ghasemi, Ibrahim Matta, and Flavio Esposito. The Effect of (Non-)Competing Brokers on the Quality and Price of Differentiated Internet Services. *Computer Networks*, June 2019.

[6] Yuefeng Wang and Ibrahim Matta. Multi-Layer Virtual Transport Network Management. *Computer Communications*, 130:38–49, October 2018.

[7] Yuefeng Wang and Ibrahim Matta. Multi-Layer Virtual Transport Network Design. *Journal of Network and Systems Management*, 26:755–789, July 2018.

[8] Zhongliang Zhao, Eryk Schiller, Eirini Kalogeiton, Torsten Braun, Burkhard Stiller, Mevlut Turker Garip, Joshua Joy, Mario Gerla, Nabeel Akhtar, and Ibrahim Matta. Autonomic Communications in Software-driven Networks. *IEEE JSAC Special issue on Emerging Technologies in Software-driven Communication*, 35(11):2431–2445, November 2017.

[9] Flavio Esposito, Ibrahim Matta, and Yuefeng Wang. VINEA: An Architecture for Virtual Network Embedding Policy Programmability. *IEEE Transactions on Parallel and Distributed Systems (TPDS)*, 27(11):3381–3396, November 2016.

[10] Flavio Esposito, Donato Di Paola, and Ibrahim Matta. On Distributed Virtual Network Embedding with Guarantees. *IEEE/ACM Transactions on Networking*, December 2014.

[11] Flavio Esposito, Ibrahim Matta, and Vatche Ishakian. Slice Embedding Solutions for Distributed Service Architectures. *ACM Computing Surveys*, 46(1), March 2014.

[12] Vatche Ishakian, Joseph Akinwumi, Flavio Esposito, and Ibrahim Matta. On Supporting Mobility and Multihoming in Recursive Internet Architectures. *Computer Communications*, 35(13):1561–1573, July 2012.

[13] Flavio Esposito, Ibrahim Matta, Debajyoti Bera, and Pietro Michiardi. On the Impact of Seed Scheduling in Peer-to-peer Networks. *Computer Networks*, 55(15):3303–3317, October 2011.

[14] Hany Morcos, George Atia, Azer Bestavros, and Ibrahim Matta. An Information Theoretic Framework for Field Monitoring Using Autonomously Mobile Sensors. *Ad Hoc Networks: Special Issue on Distributed Computing in Sensor Systems*, 9(6):1049–1058, August 2011.

[15] J. Touch, I. Baldine, R. Dutta, G. Finn, B. Ford, S. Jordan, D. Massey, I. Matta, C. Papadopoulos, P. Reiher, and G. Rouskas. A Dynamic Recursive Unified Internet Design (DRUID). *Computer Networks – Special Issue on Architectures and Protocols for the Future Internet*, 55(4):919–935, March 2011.

[16] Nikolaos Laoutaris, Georgios Smaragdakis, Azer Bestavros, Ibrahim Matta, and Ioannis Stavrakakis. Distributed Selfish Caching. *IEEE Transactions on Parallel and Distributed Systems*, 18(10), October 2007.

[17] Georgios Smaragdakis, Nikolaos Laoutaris, Azer Bestavros, Ibrahim Matta, and Ioannis Stavrakakis. Mistreatment-Resilient Distributed Caching. *Computer Networks Journal (Elsevier COMNET)*, 51(11), August 2007.

[18] Mina Guirguis, Azer Bestavros, Ibrahim Matta, and Yuting Zhang. Adversarial Exploits of End-Systems Adaptation Dynamics. *Journal of Parallel and Distributed Computing (Elsevier)*, 67(3):318–335, March 2007.

[19] Mina Guirguis, Azer Bestavros, and Ibrahim Matta. Exogeneous-Loss Aware Traffic Management in Overlay Networks: Toward Global Fairness. *Computer Networks Journal (Elsevier COMNET)*, 50:2331–2348, 2006.

[20] Mohamed Hassan, Marwan Krunz, and Ibrahim Matta. Markov-based Channel Characterization for Tractable Performance Analysis in Wireless Packet Networks. *IEEE Transactions on Wireless Communications*, 3(3):821–831, May 2004.

[21] Anukool Lakhina, John Byers, Mark Crovella, and Ibrahim Matta. On the Geographic Location of Internet Resources. *IEEE Journal on Selected Areas in Communication (J-SAC)—Special Issue on Internet and WWW Measurement, Mapping, and Modeling*, 21(6), August 2003.

[22] Shudong Jin, Liang Guo, Ibrahim Matta, and Azer Bestavros. A Spectrum of TCP-friendly Window-based Congestion Control Algorithms. *IEEE/ACM Transactions on Networking*, 11(3), June 2003.

[23] Karu Ratnam and Ibrahim Matta. WTCP: An Efficient Mechanism for Improving Wireless Access to TCP Services. *International Journal of Communication Systems — Special Issue on Wireless Access to the Global Internet: Mobile Radio Networks and Satellite Systems*, 16:47–62, 2003.

[24] Liang Guo and Ibrahim Matta. Search Space Reduction in QoS Routing. *Computer Networks*, 41(1), January 2003.

[25] Marwan Krunz and Ibrahim Matta. Analytical Investigation of the Bias Effect in Variance-Type Estimators for Inference of Long-Range Dependence. *Computer Networks – Special Issue on Advances in Modeling and Engineering of Long-Range Dependent Traffic*, 40(3):445–458, October 2002.

[26] Vassilis Tsaoussidis and Ibrahim Matta. Open Issues on TCP for Mobile Computing. *Journal of Wireless Communications and Mobile Computing – Special Issue on Reliable Transport Protocols for Mobile Computing*, 2(1), February 2002.

[27] Karunaharan Ratnam, Ibrahim Matta, and Sampath Rangarajan. A Fully Distributed Location Management Scheme for Large PCS Networks. *Journal of Interconnection Networks - Special Issue on Performance Analyis and Evaluation of Wireless and Mobile Networks*, 2(1):85–102, March 2001.

[28] Ibrahim Matta and Liang Guo. QDMR: An Efficient QoS Dependent Multicast Routing Algorithm. *Journal of Communications and Networks - Special Issue on QoS in IP Networks*, 2(2):168–176, June 2000.

[29] Ibrahim Matta, Azer Bestavros, and Marwan Krunz. Load Profiling Based Routing for Guaranteed Bandwidth Flows. *European Transactions on Telecommunications - Special Issue on Architectures, Protocols and Quality of Service for the Internet of the Future*, 10(2):165–181, March/April 1999.

[30] Ibrahim Matta and A. Udaya Shankar. Fast Time-Dependent Evaluation of Integrated Services Networks. *Computer Networks and ISDN Systems - Special Issue on Modeling of Wired and Wireless ATM*, 29(17-18):1999–2020, February 1998.

[31] Marwan Krunz, Wei Zhao, and Ibrahim Matta. Scheduling and Bandwidth Allocation for the Distribution of Archived Video in VOD Systems. *Journal of Telecommunication Systems - Special Issue on Multimedia*, 9(3-4):335–355, September 1998.

[32] Ibrahim Matta and A. Udaya Shankar. Type-of-Service Routing in Datagram Delivery Systems. *IEEE Journal on Selected Areas in Communications – Special Issue on the Internet*, 13(8):1411–1425, October 1995.

[33] A. Udaya Shankar, Cengiz Alaettinoğlu, Klaudia Dussa-Zieger, and Ibrahim Matta. Transient and Steady-State Performance of Routing Protocols: Distance-Vector versus Link-State. *Journal of Internetworking: Research and Experience*, 6:59–87, 1995.

[34] Cengiz Alaettinoğlu, A. Udaya Shankar Klaudia Dussa-Zieger, and Ibrahim Matta. Design and Implementation of MaRS: A Routing Testbed. *Journal of Internetworking: Research and Experience*, 5(1):17–41, March 1994.

Articles in Refereed Periodicals

[1] Arash Sarabi, Ibrahim Matta, and Violet Syrotiuk. MLED: A Layered Architecture for Reducing Undetected Error Probability in File Transfer. *IEEE Communications Letters*, August 2021.

[2] Ilia Baldin, Jim Griffioen, KC Wang, J. Aikat, M. Berman, J. Breen, R. Brooks, P. Calyam, J. Chase, W. Chase, R. Clark, C. Elliott, D. Huang, J. Ibarra, T. Lehman, I. Monga, A. Matta, C. Papadopoulos, M. Reither, D. Raychaudhuri, G. Ricard, R. Ricci, P. Ruth, I. Seskar, J. Sobieski, K. Van der Merwe, T. Wolf, and M. Zink. The Future of Distributed Network Research Infrastructure. *ACM SIGCOMM Computer Communication Review (Editorial Note)*, 48(2):46–51, April 2018.

[3] Yuefeng Wang, Ibrahim Matta, Flavio Esposito, and John Day. Introducing ProtoRINA: A Prototype for Programming Recursive-Networking Policies. *ACM SIGCOMM Computer Communication Review*, July 2014.

[4] Hany Morcos, Ibrahim Matta, and Azer Bestavros. M2RC: Multiplicative-increase/additive-decrease Multipath Routing Control for Wireless Sensor Networks. *SIGBED Review—Special Issue on the Best of SenSys 2004 Work-in-Progress*, 2(1), January 2005.

[5] Azer Bestavros, Adam Bradley, Assaf Kfoury, and Ibrahim Matta. Safe Compositional Specification of Networking Systems. *ACM SIGCOMM Computer Communication Review*, 34(3):21–33, July 2004.

[6] Alberto Medina, Ibrahim Matta, and John Byers. On the Origin of Power Laws in Internet Topologies. *ACM Computer Communication Review*, 30(2), April 2000.

[7] A. Udaya Shankar, Cengiz Alaettinoğlu, Klaudia Dussa-Zieger, and Ibrahim Matta. Performance Comparison of Routing Protocols under Dynamic and Static File Transfer Connections. *ACM Computer Communication Review*, 22(5):39–52, October 1992.

Articles in Refereed Conferences

[1] Yuanli Wang, Lei Huang, Zikun Wang, Vasiliki Kalavri, and Ibrahim Matta. CAPSys: Contention-aware task placement for data stream processing. In *EuroSys 2025*, March 2025.

[2] Zongshun Zhang, Rohan Kumar, Jason Li, Lisa Korver, Anthony Byrne, Gianluca Stringhini, Ibrahim Matta, and Ayse Coskun. PraxiPaaS: A Decomposable Machine Learning System for Efficient Container Package Discovery. In *Proceedings of the 12th IEEE International Conference on Cloud Engineering (IC2E)*, Paphos, Cyprus, September 2024.

[3] Mina Morcos and Ibrahim Matta. A Throughput Optimizing Scheduler for Multi-Cloud Serverless Computing. In *Proceedings of the 14th IEEE International Conference on Cloud Computing (CloudCom)*, Napoli, Italy, December 2023.

[4] Ali Raza, Zongshun Zhang, Nabeel Akhtar, Vatche Ishakian, and Ibrahim Matta. LIBRA: An Economical Hybrid Approach for Cloud Applications with Strict SLAs. In *Proceedings of the* 9^{th} *IEEE International Conference on Cloud Engineering (IC2E)*, October 2021.

[5] Valeria Turina, Zongshun Zhang, Flavio Esposito, and Ibrahim Matta. Federated or Split? A Performance and Privacy Analysis of Hybrid Split and Federated Learning Architectures. In *IEEE International Conference on Cloud Computing (IEEE CLOUD)*, September 2021.

[6] Nabeel Akhtar, Ali Raza, Vatche Ishakian, and Ibrahim Matta. COSE: Configuring Serverless Functions using Statistical Learning. In *Proceedings of IEEE International Conference on Computer Communications (INFOCOM)*, Beijing, China, April 2020.

[7] Nabeel Akhtar and Ibrahim Matta and Ali Raza and Leonardo Goratti and Torsten Braun and Flavio Esposito. Virtual Function Placement and Traffic Steering over 5G Multi-Technology Networks. In *The* 4^{th} *IEEE Conference on Network Softwarization (NetSoft)*, pages 114–122, Montreal, Canada, June 2018.

[8] Torsten Braun, Davide Careglio, and Ibrahim Matta. Vehicular Networking in the Recursive InterNetwork Architecture. In *Proceedings of the IEEE* 87^{th} *Vehicular Technology Conference (VTC 2018)*, Porto, Portugal, June 2018.

[9] Yuefeng Wang, Ibrahim Matta, and Nabeel Akhtar. Application-Driven Network Management with ProtoRINA. In *Proceedings of the IEEE/IFIP Network Operations and Management Symposium (NOMS 2016)*, Istanbul, Turkey, April 2016.

[10] Nabeel Akhtar, Ibrahim Matta, and Yuefeng Wang. Managing NFV using SDN and Control Theory. In *Demonstrations Papers track of the IEEE/IFIP Network Operations and Management Symposium (NOMS2016)*, Istanbul, Turkey, April 2016.

[11] Flavio Esposito, Donato Di Paola, and Ibrahim Matta. A General Distributed Approach to Slice Embedding with Guarantees. In *Proceedings of IFIP Networking*, Brooklyn, New York, May 2013.

[12] Gonca Gursun, Mark Crovella, and Ibrahim Matta. Describing and Forecasting Video Access Patterns. In *Proceedings of the* 30^{th} *IEEE International Conference on Computer Communications (INFOCOM) - Mini Conference* , Shanghai, China, April 2011.

[13] Alberto Medina, Gonca Gursun, Prithwish Basu, and Ibrahim Matta. On the Universal Generation of Mobility Models. In *Proceedings of the* 18^{th} *Annual Meeting of the IEEE International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS)*, Miami Beach, Florida, August 2010.

[14] Luca Chiaraviglio and Ibrahim Matta. GreenCoop: Cooperative Green Routing with Energy-efficient Servers. In *Proceedings of the First International Conference on Energy-Efficient Computing and Networking*, University of Passau, Germany, April 2010.

[15] Sam Epstein, Karim Mattar, and Ibrahim Matta. Principles of Safe Policy Routing Dynamics. In *Proceedings of the 17th IEEE International Conference on Network Protocols (ICNP'09)*, Princeton, NJ, October 2009.

[16] Flavio Esposito and Ibrahim Matta. PreDA: Predicate Routing for DTN Architectures over MANET. In *Proceedings of the IEEE Globecom 2009 Next-Generation Networking and Internet Symposium (GC'09 NGNI)*, Honolulu, Hawaii, December 2009.

[17] Flavio Esposito, Ibrahim Matta, Pietro Michiardi, Nobuyuki Mitsutake, and Damiano Carra. Seed Scheduling for Peer-to-Peer Networks. In *Proceedings of the Eighth IEEE International Symposium on Network Computing and Applications (IEEE NCA09)*, Cambridge, MA, July 2009.

[18] Mina Guirguis, Joshua Tharp, Azer Bestavros, and Ibrahim Matta. Assessment of Vulnerability of Content Adaptation Mechanisms to RoQ Attacks. In *Proceedings of the Eighth International Conference on Networks*, Gosier, Guadeloupe/France, March 2009.

[19] Hany Morcos, George Atia, Azer Bestavros, and Ibrahim Matta. An Information Theoretic Framework for Field Monitoring Using Autonomously Mobile Sensors. In *Proceedings of International Conference on Distributed Computing in Sensor Systems (DCOSS)*, Santorini Island, Greece, June 2008. **Best Paper Award, Applications Track**.

[20] Hany Morcos, Azer Bestavros, and Ibrahim Matta. Amorphous Placement and Informed Diffusion for Timely Field Monitoring by Autonomous, Resource-Constrained, Mobile Sensors. In *Proceedings of IEEE SECON Conference*, San Francisco, CA, June 2008.

[21] Niky Riga, Ibrahim Matta, Alberto Medina, Craig Partridge, and Jason Redi. JTP: An Energy-conscious Transport Protocol for Multi-hop Wireless Networks. In *Proceedings of CoNEXT Conference*, New York, NY, December 2007.

[22] Niky Riga, Ibrahim Matta, and Azer Bestavros. A Geometric Approach to Slot Alignment in Wireless Sensor Networks. In *Proceedings of the IEEE Global Telecommunications Conference (Globecom'07) Ad-hoc and Sensor Networking Symposium* , Washington, DC, November 2007.

[23] Selma Yilmaz and Ibrahim Matta. An Adaptive Management Approach to Resolving Policy Conflicts. In *Proceedings of IFIP Networking 2007*, Atlanta, Georgia, May 2007.

[24] Karim Mattar, Ashwin Sridharan, Hui Zang, Ibrahim Matta, and Azer Bestavros. TCP over CDMA2000 Networks: A Cross-Layer Measurement Study. In *Proceedings of the* 8^{th} *Passive and Active Measurement Conference (PAM)*, Louvain-la-neuve, Belgium, 2007.

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Invited Papers

[1] John Day, Eleni Trouva, Eduard Grasa, Patrick Phelan, Miguel Ponce de Leon, Steve Bunch, Ibrahim Matta, Lou Chitkushev, and Louis Pouzin. Bounding the Router Table Size in an ISP Network using RINA. In *Proceedings of the 2011 Second International Conference on Network of the Future*, Universite Pierre et Marie Curie, Paris, November 2011.

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[2] Zongshun Zhang, Ayse Coskun, Vasiliki Kalavri, and Ibrahim Matta. Toward Optimal Placement of Deep Learning Tasks over Edge and Cloud Infrastructures. Under preparation for journal submission, January 2025.

[3] Shunyu Yao, Ali Raza, Muhammad Ali Gulzar, Ibrahim Matta, and Ali R. Butt. Towards Automatic FaaS Synthesis for Monolithic Applications. Submitted for conference publication, January 2023.

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Research Software

The following software is publicly available on the Internet at www.cs.bu.edu/fac/matta/software.html. It has been used for research and education at several sites. For example, BRITE and MaRS have each been downloaded by hundreds of academic and industrial sites in the US (e.g. UMass, UC Davis, Univ. of Virginia, Washington Univ. St. Louis, UPenn, CMU, Univ. of Texas at Austin, Columbia Univ., GeorgiaTech, Purdue Univ., Illinois-Urbana Champaign, UCLA, USC, Cisco, Nortel, HP Labs, NASA, DEC, NRL) and overseas (e.g. Tsinghua Univ., Bogazici Univ., National Chung Cheng Univ., National Sun Yat-Sen Univ., Univ. of Science and Technology of China, Univ. of Twente, Queens Univ., GMD-FOKUS Berlin, RWTH Aachen, BNR Canada, British Telecom Labs). Some of them have ported our software to other platforms, extended it, and incorporated it into other simulation platforms such as multicasting and real-time routing (USC), ATM testbed (Queens Univ., Canada), and a commercial routing testbed (Computer Sciences Corporation).

1. BRITE

   BRITE (Boston university Representative Internet Topology gEnerator) is an extensible Internet topology generation framework. It offers a library of topology generation models for both router and autonomous system (AS) levels. These generation models aim at reproducing observed power-law relationships and small-world properties in Internet topologies. New generation models aimed at capturing other properties of the Internet can easily be added to BRITE. Furthermore, topologies can be imported from AS-level mapping efforts such as the NLANR archives, or from router-level maps such as those obtained from CAIDA's Skitter infrastructure or the SCAN project's Mercator tool. Topologies can also be imported from other available generators such as GT-ITM or Inet. Topologies can be combined to produce unified Internet-like topologies. BRITE provides an easy way to obtain

representative topologies and export them to simulation software such as ns or SSF. BRITE also provides the infrastructure to develop topology generation models and verify that they capture known invariants of the Internet. To this end, BRIANA, the BRITE Analysis Engine, provides a repository of metrics and routines for topology analysis. BRIANA features an extensible graphical interface that automatically detects new routines. It is also language-independent, so routines may be added in any programming language.

BRITE is open source, and has been implemented in Java and C++ and tested on Linux, Solaris, and Windows. Documentation is available online, and there is a mailing list for technical support. BRITE version 1.0 was made publicly available on the Internet in January 2000. BRITE version 2.0 has been available since May 2001. I developed BRITE in collaboration with John Byers, Alberto Medina, and Anukool Lakhina.

My BRITE-based Computer Communication Review paper: *On the Origin of Power Laws in Internet Topologies, April 2000, co-authored with Alberto Medina and John Byers*, is among the 100 most-cited articles in Computer Science published in year 2000 according to the NEC CiteSeer ResearchIndex database at http://citeseer.nj.nec.com/articles2000.html

2. MaRS

   MaRS is a discrete-event simulation testbed for studying routing systems. It provides a flexible platform for the evaluation and comparison of network routing algorithms, especially in wide-area networks. It is implemented in C on UNIX platforms.

   MaRS version 1.1 (with X-window graphical interface) has been publicly available on the Internet since September 1991, along with user and programmer manuals. MaRS version 2.0 has been publicly available since October 1992. It has optional graphical interfaces (either X-window or Motif). I co-developed MaRS with Cengiz Alaettinoğlu and Klaudia Dussa-Zieger, as part of a DARPA project on Robust Routing at the University of Maryland, College Park.

3. Z-iteration

   The Z-iteration is a computational tool for studying the transient performance of adaptive connection-oriented networks. It consists of modules that transform the networking systems into multi-class multi-resource (MCMR) queueing models which are numerically solved.

   Version 1 of this software, including user-interface support for evaluation procedures, has been publicly available since March 1998. I developed and wrote the Z-iteration code as part of my Ph.D. thesis. It was then modified and extended by the Systems group at the University of Maryland College Park under a DARPA grant. Our release, which I developed in collaboration with Liang Guo, extends this later version to support the modeling and evaluation of scalable hierarchical networks.

4. WTCP

   WTCP (Wireless TCP) is an efficient transmission control scheme that hides wireless losses from the Transmission Control Protocol (TCP). WTCP runs at the base station; it buffers data packets destined for a mobile host, detects wireless link losses, and retransmits lost data. WTCP has unique features, including efficient flow control for the wireless link, end-to-end TCP semantics are maintained, and the time spent by the base station for local recovery is effectively hidden from the source. The latter feature shields the round trip time estimation at the TCP source so its ability to effectively detect congestion in the wireline portion of the network is not hindered.

   The WTCP code (compatible with the ns version 1 simulator) has been publicly available since July 1998. I developed WTCP in collaboration with Karu Ratnam.

5. QDMR

   QDMR (QoS Dependent Multicast Routing) is a fast algorithm for generating delay-constrained low-cost multicast routing trees. A salient feature of QDMR is that it dynamically adjusts its low-cost tree construction policy based on how far the current on-tree node is from violating the QoS/delay bound. This QoS dependent (adaptive) tree construction, together with the capability to merge least-delay paths into the low-cost tree in case of stringent delay requirements, make QDMR an attractive candidate for large-scale QoS-sensitive multicast routing.

   The QDMR code (which runs under the MCRSIM simulator from North Carolina State University) has been publicly available since August 1998. I developed QDMR in collaboration with Liang Guo.

6. Stateful TCP

   In collaboration with Shudong Jin, Liang Guo, and Azer Bestavros, I developed a new spectrum of TCP-friendly window-based congestion control algorithms. This spectrum explores a new design space between memory-less window controls and equation-based controls which use more history. These stateful controls exhibit much better transient behavior such as better responsiveness to bandwidth changes and better convergence-to-fairness.

   SIMD (Square-Increase/Multiplicative-Decrease) is one instance of such controls. SIMD has been publicly available as part of the ns-2 contributed code since November 2001.

7. Size-aware TCP Scheduler

   In collaboration with Liang Guo, I developed a size-aware scheduler for TCP flows (more generally, congestion-responsive flows). The scheduler gives priority to short TCP flows (and the first few bytes of long TCP flows) *inside* the network. The prototype implementation is built over the Linux netfilter API. This Linux code, together with ns-2 simulation code, have been publicly available since May 2003. This software is a product of the Internet Traffic Managers NSF-funded project.

8. itmBench

   In collaboration with Gali Diamant, Leonid Veytser, Azer Bestavros, Mina Guirguis, Yuting Zhang, and Sean Chen, I developed a Linux-based prototype for an interface that allows users (e.g. network managers, service providers, or experimental researchers) to register different traffic control functionalities to run on one machine or an overlay of machines. Traffic control applications could be developed either using a kernel API so they run in kernel space, or using a user-space API so they run in user space. itmBench has been publicly available since December 2003. This software is a product of the Internet Traffic Managers NSF-funded project.

9. SEP

   In collaboration with Georgios Smaragdakis and Azer Bestavros, I developed SEP (Stable Election Protocol), a heterogeneous-aware protocol to prolong the time interval before the death of the first node in a wireless sensor network (we refer to this time interval as stability period), which is crucial for many applications where the feedback from the sensor network must be reliable. SEP is based on weighted election probabilities of each node to become cluster head according to the remaining energy in each node. SEP code has been publicly available since June 2004.

10. DIP

    In collaboration with Niky Riga and Azer Bestavros, I developed DIP (Density Inference Protocol), a lightweight probabilistic protocol that allows each node in a sensor network to implicitly estimate its neighborhood size without the explicit exchange of node identifiers. DIP provides a fundamental

(inexpensive) service in wireless sensor networks and can be used to provide a building block for many applications. DIP code has been publicly available since June 2004.

11. APM

In collaboration with Selma Yilmaz, I developed APM (Adaptive Policy Management), a probabilistic feedback control system for resolving policy conflicts among independent control entities. The concept is applied to the Border Gateway Protocol (BGP) employed in the Internet to exchange reachability information among Autonomous Systems. APM code has been publicly available since November 2005.

12. TRAFFIC

In collaboration with Likai Liu, Azer Bestavros, and Assaf Kfoury, we developed TRAFFIC (Typed Representation and Analysis of Flows For Interoperability Checks), a domain specific language that facilitates specification, programming, and maintenance of distributed applications over a network. TRAFFIC abstracts low-level properties of network elements using "types" at their input/output interfaces. These types are derived from various compositional analysis techniques, e.g. network calculus, control theory, etc. TRAFFIC has been publicly available since March 2006.

13. PREDA

In collaboration with Gabriele Ferrari Aggradi (visiting master's student from Universita di Firenze in Italy) and Flavio Esposito, we developed an architecture, we call PREDA, for Predicate Routing in DTN-over-MANET networks. Predicate routing allows Delay-Tolerant-Network (DTN) users connected by an underlying Mobile Ad-hoc NETwork (MANET), to declaratively express high-level policy constraints on the routing of content. For example, a requirement might be to direct all images captured by camera X, attached to a MANET-only node S, to a DTN node B, for pre-processing and authorization before sending them to the user at DTN node C. PREDA maps high-level constraints of DTN nodes to low-level routing predicates within the MANET nodes. To evaluate our system for different use cases, our prototype testbed uses a Linux system architecture, where User-Mode-Linux (UML) is deployed to emulate every node with the Ad-hoc On-demand Distance Vector (AODV) routing protocol at the MANET level, and with or without a DTN Reference Implementation code. The network simulator ns-2 (ns-emulation version) is used to simulate the wireless connectivity and mobility of both DTN and MANET nodes. PREDA has been publicly available since July 2008.

14. BUtorrent

In collaboration with Flavio Esposito, Pietro Michiardi, Nobuyuki Mitsutake, and Damiano Carra, we developed BUtorrent (Boston University Torrent), a file-sharing client that modifies the scheduling of the seed in the BitTorrent protocol. Our seed scheduling algorithm is based on a proportional-fair sharing approach, whereby pieces of the file with higher short-term demand, but lower long-term service rate, are served by the seed at higher priority. This ensures that, while meeting instantaneous need, pieces (replicas) are equally distributed within the network, thus improving the file-exchange rate among peers. BUtorrent has been publicly available since March 2009.

15. VINEA

In collaboration with Flavio Esposito and Donato Di Paola, we developed CADE, a Consensus-based Auction for Distributed virtual network Embedding. By appropriate policy design, the CADE mechanism can be instantiated to accommodate the embedding goals of different service and infrastructure providers when deploying and managing virtualization-based network services. By leveraging the algorithmic approach of CADE, we built VINEA, a prototype implementation and a local virtual

network testbed of a policy-based VIrtual Network Embedding Architecture, based on our Recursive InterNetwork Architecture (RINA) (see below). VINEA has been publicly available since October 2013.

16. RINA

    In collaboration with John Day, Yuefeng Wang, and Flavio Esposito, we developed RINA, a Java prototype implementation of a clean-slate Recursive InterNetwork Architecture that is based on the fundamental principle that networking is inter-process communication (IPC). It recurses the IPC service over different scopes, allowing for better scalability, security, and manageability. The RINA code (version 1.0) has been publicly available since October 2013. Version 2.0 was released on April 30, 2017.

17. EL-SEC

    In collaboration with Nabeel Akhtar, we developed a framework for the ELastic management of SECurity applications on virtualized infrastructures. EL-SEC was instantiated with Snort, an intrusion detection system, over the GENI testbed. We leverage control theory to elastically increase / decrease the number of Snort instances based on the current load. The system is capable of detecting and stopping attacks (e.g., port scanning) more quickly. The latest release was made publicly available in January 2018. The initial version dates back to Fall 2015.

18. LIBRA

    In collaboration with Ali Raza, Zongshun Zhang, Nabeel Akhtar, and Vatche Ishakian, we developed LIBRA, a balanced (hybrid) approach that leverages both VM-based and serverless resources to efficiently manage cloud resources for the applications. LIBRA closely monitors the application demand and provisions appropriate VM and serverless resources such that the running cost is minimized, and Service-Level Agreements are met. First released in July 2021.

19. COSE

    In collaboration with Ali Raza, Zongshun Zhang, Lei Huang, Nabeel Akhtar, and Vatche Ishakian, we developed COSE, a framework that uses Bayesian Optimization to find the optimal configuration for serverless functions. COSE uses statistical learning techniques to intelligently collect samples and predict the cost and execution time of a serverless function across unseen configuration values. First released in 2019.

Selected Talks and Colloquia

LIBRA: Orchestrating Cloud Resources to Optimize Performance and Cost
CSE Speaker Series, Mississippi State University, College of Engineering *December 2022*

Outreach for Midscale Experimental Research Infrastructure
MERIF (Midscale Experimental Research Infrastructure Forum) Workshop, Madison, WI *June 2022*

MERI in the Era of Serverless and Microservices
MERIF (Midscale Experimental Research Infrastructure Forum) Workshop, FIU, FL *January 2020*

Serverless Applications: How to configure and deploy them on the cloud?
Upsilon Pi Epsilon (UPE) meeting, Boston University November 2019

Managing a Virtual Network Function using SDN and Control Theory
MERIF Education Workshop, GWU, Washington DC *May 2019*
GENI Summer Camp, University of Kentucky *May 2018*
GENI Summer Camp, Texas A&M University *May 2017*
GENI Regional Workshop, Clemson University *December 2016*
GENI Webinar *October 2016*
GENI Summer Camp, Boston University *May 2016*

The GENI Project
Northeast Research and Education Network (NEREN) Seminar, "Bridging the Gap - Sharing Computing Resources Across Campsuses"
Providence, RI April 2019

Introduction to GENI and ExoGENI
Chameleon User Meeting *February 2019*

EcoForecast: A Scalable and Secure Cyberinfrastructure for the Repeatability of Ecological Research – Research on Tap: Understanding and Forecasting Change in Our Natural World
Boston University *November 2018*

Introduction to GENI (Global Environment for Network Innovations)
GENI Regional Workshop, University of Kentucky *May 2018*

Introduction to OpenFlow and GENI Experiments
GENI Regional Workshop, Florida International University *March 2017*

Toward a Dynamic, Recursive SDN/SDX
NSF workshop on Software-defined Infrastructure and Exchanges, Washington DC *February 2016*

Running RINA on GENI
Tutorial at GEC19, Atlanta, GA *March 2014*

A Policy-based Recursive Approach to Building a Better Internet
BBN Technologies, Cambridge, MA *March 2014*

Experimenting with Programmable Management Policies over GENI
GENI Engineering Conference (GEC 18), Poly-NYU, NY *October 2013*

Assessing the Security of a Clean-Slate Internet Architecture
NPSec, Austin, Texas *October 2012*

RINA: Internet Security as a Consequence of Good Architecture
BU RISCS–InfraGard Boston Meeting, Boston, MA *April 2012*

Next-Generation Computer Networks
Panel at IEEE ICCCN, Maui, Hawaii *August 2011*

Revisiting A Soft-State Approach to Managing Reliable Transport Connections
PFLDNeT, Lancaster, PA *November 2010*

Transport Tussle
Panel at PFLDNeT, Lancaster, PA *November 2010*

Overview of RINA (Recursive InterNetwork Architecture)
Faculty Talk Series, Computer Science, Boston University *November 2010*

"Apps" in 2020
Panel at IEEE SECON, Boston, MA *June 2010*

On the Cost of Supporting Multihoming and Mobility
Network of the Future GLOBECOM, Miami, Florida *December 2010*
Future-Net, Boston, MA *May 2010*

On the Performance and Robustness of the Recursive InterNetwork Architecture (RINA)
Future-Net, Boston, MA *May 2009*

"Networking is IPC": A Guiding Principle to a Better Internet
Computer Science, Purdue University *April 2009*
ReArch '08 - Re-Architecting the Internet, Madrid, SPAIN *December 2008*

How about Internet 3.0?
Faculty Talk Series, Computer Science, Boston University *October 2008*

An IPC-based Approach to Network Control and Management
SNC (Sensor Network Consortium) Workshop, The CISE Center, Boston University *May 2008*

JTP: An Energy-conscious Transport Protocol for Multi-hop Wireless Networks
Systems Faculty Research Workshop, The CISE Center, Boston University *January 2008*

What is the Next Key Technology?
Panel at Sprint Research Retreat, Reston, VA *June 2007*

An Adaptive Management Approach to Resolving BGP Policy Conflicts
Cisco Systems, Foxboro, MA *July 2007*
The IFIP Networking 2007, Atlanta, Georgia *May 2007*

Architecting Energy-conscious Transport over Ad Hoc Networks (While Maintaining the Sanity of Layering/Modularity)
The IEEE 21^{st} Annual Computer Communications Workshop, Pittsburgh, PA *February 2007*

JAVeLEN Transport Protocol and Outlook
Project Demonstration to DARPA, BBN Technologies *March 2006*

An Adaptive Policy Management Approach to BGP Convergence
Laboratory of Networking and Information Systems, ECE Boston University *February 2006*

A Type-disciplined Approach to Scalable, Practical Composition of Networked Services
Science Development Program, BBN Technologies *January 2006*

Density Inference in Wireless Sensor Networks
Boston Area Networking And Networkers Annual Summit, BBN Technologies *January 2005*
German University in Cairo *December 2004*

itmBench: Generalized API for Internet Traffic Managers
IEEE CAMAD '04, Dallas, TX *December 2004*

Dynamics of Network Resource Management
Tutorial at ICENCO '04, Cairo, Egypt *December 2004*

Routing Tradeoffs inside a d-dimensional Torus with applicability to CAN
International Computer Engineering Conference (ICENCO), Cairo, Egypt *December 2004*

Exploiting the Transients of Adaptation for RoQ Attacks on Internet Resources
Old Dominium University, Computer Science Department *November 2004*

SEP: A Stable Election Protocol for clustered heterogeneous wireless sensor networks
SANPA '04, Boston, MA *August 2004*

Improving Internet Performance through Traffic Managers
Worcester Polytechnic Institute, Computer Science Department *March 2003*

Effectiveness of Loss Labeling in Improving TCP Performance in Wired/Wireless Networks
IEEE ICNP'2002, Paris, France *November 2002*

Research on TCP Traffic Management and Internet Topology Modeling
Broadband Networks Research Lab, Motorola Labs *August 2002*

Managing TCP Traffic
Boston University Electrical & Computer Engineering Colloquium *November 2001*

Internet Traffic Managers
Sprint Labs *August 2001*
DIMACS Mini-Workshop on Quality of Service Issues in the Internet *February 2001*
Nortel Networks *September 2000*

QoS Controllers for the Internet
NSF Workshop on Information Technology, Cairo, Egypt *March 2000*

Energy- & Throughput-Efficient Transport for Next Generation Wired/Wireless Internet
Panel on Next Generation Wireless Networks, IEEE ICNP 2000, Osaka, Japan *October 2000*

Differentiated Predictive Fair Service for TCP Flows
IEEE ICNP'2000, Osaka, Japan *October 2000*

A Fully Distributed Location Management Scheme for Large PCS
IEEE ISCC '2000, Antibes-Juan les Pins, France *July 2000*

SomeCast: A Paradigm for Real-Time Adaptive Reliable Multicast
IEEE RTAS'2000, Washington, DC *May 2000*

Challenges in QoS Networking Research
Boston University Computer Science Colloquium *September 1999*

On Routing Real-Time Multicast Connections
IEEE ISCC '99, Red Sea, Egypt *June 1999*

QDMR: An Efficient QoS Dependent Multicast Routing Algorithm
IEEE RTAS '99, Vancouver, British Columbia, Canada *June 1999*

QoS-aware Network Resource Management
University of Connecticut, University of Maryland Baltimore County, University of Kentucky, Boston University *February-March 1999*

Challenges in Building End-to-End QoS Architectures
Workshop on High Perf. Dist. Comp. and Gigabit WANs, Essen, Germany *September 1998*

WTCP: An Efficient Mechanism for Improving TCP Performance over Wireless Links
IEEE ISCC '98, Athens, Greece *June 1998*

WTCP: A Simple Mechanism for Improving TCP Performance for Wireless Users
Mini-Conference at University of California, Riverside *April 1998*

A Load Profiling Approach to Routing Guaranteed Bandwidth Flows
IEEE INFOCOM '98, San Francisco, CA *March 1998*

Load Profiling for Efficient Route Selection in Multi-Class Networks
IEEE ICNP '97, Atlanta, Georgia *October 1997*

Fast Time-Dependent Evaluation of Integrated Services Networks
Boston University Computer Science Colloquium *March 1996*

Z-Iteration: A Simple Method for Throughput Estimation in Time-Dependent Multi-Class Systems
ACM SIGMETRICS / PERFORMANCE '95, Ottawa, Canada *May 1995*

Fast Prototyping and Evaluation of Integrated Services Networks
FORE Systems, University of Dayton, Johns Hopkins University, York University, Towson State University, Iowa State University, Northeastern University *February-April 1995*

An Iterative Approach to Comprehensive Performance Evaluation of Integrated Services Networks
IEEE ICNP '94, Boston, Massachusetts *October 1994*

Type-of-Service Routing in Dynamic Datagram Networks
IEEE INFOCOM '94, Toronto, Ontario, Canada *June 1994*

On the Interaction between Gateway Scheduling and Routing
MASCOTS '94, Durham, North Carolina *January 1994*

Teaching Activity

See http://sites.bu.edu/matta/teaching for more details.

- I taught a short intensive Advanced Networks course during my sabbatical in Fall 2012 at Carlos III University in Madrid, Spain.
- I taught a Combinatorial Structures course CS 131, which introduces students to basic combinatoric data structures used in computer science. The course emphasizes rigorous reasoning.
- I teach a first course in networking CS 455/655, which introduces students to the underlying concepts and principles of computer networks. The course takes a hands-on approach to programming network applications and protocols.

- I co-taught the Graduate Initiation course CS 697, which serves as a guide for entering Ph.D. students through the challenging transition into the graduate program in Computer Science.

- I developed a second course in networking CS 556 (Advanced Computer Networks), which provides students with the deeper knowledge they need to pursue a professional career in the networking field.

- I developed an Internet Teaching Laboratory to provide hands-on experience as part of CS 556. The lab also provided support to other systems courses, including CS 553 (Experimental Operating Systems) and CS 670 (Performance Analysis).

- I revamped the contents of CS 210 (Introduction to Computer Systems), which now reflects a broader scope and covers important topics in sufficient depth. The course places the beginning student on a solid track for high-level computer science courses.

- Together with Azer Bestavros, John Byers, and George Kollios, we team-taught a Sensor Networks Seminar in Fall 2003. The seminar introduces students to the latest developments in networked systems of embedded computers.

- In Spring 2004, I supervised student projects continuing from our Fall 2003 Sensor Networks Seminar. All these (five) projects resulted in conference/workshop publications that appeared in 2004.

- I introduced Java labs in CS 552 (Operating Systems).

- My QoS Networking Seminar (Spring 2000) formed the basis for my new regular advanced networking course (CS 556). The seminar is listed as part of the Internet Engineering Curriculum Repository (IEC) of CAIDA (Cooperative Association for Internet Data Analysis) at
http://www.caida.org/outreach/iec/courses/grad.index.xml

- Together with Azer Bestavros, John Byers, and Mark Crovella, we developed a new Ph.D. subject exam in networking. This exam ensures that students who plan to pursue a Ph.D. in topics associated with computer networking have the required depth and nuanced understanding of the field.
http://www.cs.bu.edu/groups/wing/exam

- I supervised and participated in reading and research groups aimed at introducing students to latest research results and developments: Network Reading Group, Topology Modeling Group, and Real-Time Computation and Communication Group.

- I supervised many projects that broaden the knowledge of students in networking and systems building. These student projects included the Linux-based implementation of real-time scheduling, load-aware name service, and programmable traffic managers.

- At Northeastern University, I revamped the undergraduate Computer Networks course; I developed two new graduate courses (Internetworking and Multimedia Networking); I offered new seminars (Distributed Systems, Wireless and Mobile Networking); I developed a new Ph.D. exam in Networks.

Research Advising and Theses Committees

- PhD Thesis Supervision

  - Karunaharan Ratnam, Ph.D. completed in Fall 1999. Electrical and Computer Engineering, Northeastern University. Dissertation: *Efficient Location Management and Packet Delivery in Mobile Communications Networks.* Post PhD position: Cisco Systems.

- Liang Guo, Ph.D. completed in April 2003. Computer Science Department, Boston University. Dissertation: *Size-aware Scheduling of TCP Flows.* Post PhD position: Senior Engineer at Broadband Networks Research Lab, Motorola Labs, Massachusetts. Now at Akamai, Cambridge, MA.
- Alberto Medina, Ph.D. completed in March 2003. Computer Science Department, Boston University. Dissertation: *Practical Estimation of Internet Traffic Demands.* Post PhD position: Post-Doctoral position at ICIR—the ICSI (International Computer Science Institute) Center for Internet Research at Berkeley. Now at Google.
- Selma Yilmaz, Ph.D. completed in January 2006. Computer Science Department, Boston University. Dissertation: *An Adaptive Policy Management Approach to BGP Convergence.* Post PhD position: Cisco Systems.
- Mina Guirguis, Ph.D. completed in August 2006. Computer Science Department, Boston University. Dissertation: *Reduction-of-Quality Attacks on Adaptation Mechanisms.* Post PhD position: Assistant Professor, Computer Science Department, Texas State University at San Marcos. Now Tenured Associate Professor.
- Hany Morcos, Ph.D. completed in August 2008. Computer Science Department, Boston University. Dissertation: *Service Provisioning in Mobile Networks Through Distributed Coordinated Resource Management.* Post PhD position: Contact Networks, Boston, MA. Now at TripAdvisor.
- Karim Mattar, Ph.D. completed in November 2010. Computer Science Department, Boston University. Dissertation: *Policy Routing Dynamics: Theory and Applications.* Post PhD position: Akamai, Cambridge, MA. Now at Facebook.
- Niky Riga, Ph.D. completed in July 2013. Computer Science Department, Boston University. Dissertation: *JTP, An Energy-Aware Transport Protocol for Mobile Ad Hoc Networks.* Post MA and PhD position: BBN Technologies, Cambridge, Massachusetts. Now at Facebook.
- Flavio Esposito, Ph.D. completed in October 2013. Computer Science Department, Boston University. Dissertation: *A Policy-based Architecture for Virtual Network Embedding.* Post PhD position: Exegy, St. Louis, MO. Now, Tenured Associate Professor at Saint Louis University.
- Yuefeng Wang, Ph.D. completed in December 2016. Dissertation: *Multi-Layer Virtual Transport Network Design and Management*. Post PhD position: Akamai, Cambridge, MA.
- Maryam Ghasemi, Ph.D. completed in August 2017. Dissertation: *Multi-attribute Demand Characterization and Layered Service Pricing*. Post PhD position: Beyond Finance.
- Nabeel Akhtar, completed in August 2019. Dissertation: *Orchestration and Management of Application Functions Over Virtualized Cloud Infrastructures*. Post PhD position: Akamai, Cambridge, MA.
- Ali Raza, completed in August 2023. Dissertation: *Orchestrating Cloud Resources to Optimize Performance and Cost*. Post PhD position: Akamai, Cambridge, MA.
- Zongshun Zhang, Ph.D. candidate, started Fall 2019.

- PhD Advising
  - Lei Huang, Ph.D. student, in progress, started Fall 2021. Co-advised with Vasia Kalavri.
  - Prateek Jain, Ph.D. student, started January 2024.

  - Luca Chiaraviglio, Ph.D. completed in February 2011. Thesis on Green Networking. Exchange PhD student from Politecnico di Torino, Italy, August 2009 – July 2010.
  - Marco Papa Manzillo, Ph.D. student. Project: Video Streaming. Exchange PhD student from Politecnico di Torino, Italy, February 2010 – August 2010.
  - Donato Di Paola, Visiting Researcher. Project: Distributed Resource Allocation. National Research Council (CNR), Italy, August 2013 – September 2013.

- MA Thesis/Project Supervision

  - Luan Tran, M.A. completed in Spring 2000. Project: Dispersity Multicast Routing.
  - Dario Accornero, M.A. completed in Fall 2000. Project: Integrated QoS/best-effort Routing Simulation.
  - Chris LoBue, M.A. completed in Spring 2001. Project: QoS Extensions to BGP (Border Gateway Protocol).
  - Carlos Sa, M.A. completed in Spring 2001. Project: Implementation of Load-aware DNS.
  - Stephen Peckham, M.A. completed in Spring 2001. Project: Multipath Routing.
  - Nam Nguyen, M.A. completed in Fall 2001. Project: Aggregate TCP Control.
  - Sara Mathews, M.A. completed in Spring 2002. Project: Performance of TCP-Probing over Wired / Wireless Networks.
  - Ran Kern, M.A. completed in Spring 2002. Project: Fair Scheduling in Wireless Networks.
  - Ashok Maram, M.A. completed in Spring 2003. Project: Multipath and Deflection Routing.
  - Dhiman Barman, M.A. completed in Spring 2003. Thesis: Packet Loss Inference in Wired/Wireless Networks.
  - Denis Knjazihhin, M.A. completed in Spring 2003. Project: Multimedia Streaming.
  - Sean Chen, M.A. completed in Summer 2003. Project: Building Guaranteed Bandwidth Tunnels.
  - Devin Nial, M.A. completed in Summer 2003. Project: Wireless Scheduling.
  - Leonid Veyster, M.A. completed in Fall 2003. Project: User Space Functionalities in Extensible Traffic Managers.
  - Gregory Sipress, M.A. completed in Fall 2003. Project: Fault-tolerant Multicast.
  - Tao Wang, M.A. completed in Spring 2004. Thesis: Open Architecture for Bandwidth Allocation.
  - Vance Chen, M.A. completed in December 2004. Project: Comparison of High-speed Transport Protocols.

- Bhuvana Mahalingam, M.A. completed in Spring 2005.
  Project: Low-rate Denial-of-Service Attacks.
- Arwa Chunawala, M.A. completed in Spring 2006.
  Project: Simulating TCP over a CDMA2000 Wireless Scheduler.
- Niky Riga, M.A. completed in Fall 2006.
  Thesis: Density Inference in Wireless Sensor Networks.
- Karim Mattar, M.A. completed in Fall 2007.
  Thesis: TCP over CDMA2000 Networks: A Cross-Layer Measurement Study.
- Gabriele Ferrari Aggradi, M.Eng. completed in Summer 2008.
  Thesis: Predicate-based Routing for Integrated DTN-MANET Networks.
  Exchange Student from University of Florence, Italy.
- Sam Epstein, M.A. completed in Fall 2008.
  Thesis: An Online Distributed Algorithm for Inferring Policy Routing Configurations.
- Peng Ge, M.A. completed in Fall 2009.
  Project: Design of Security Protocols for a Clean-slate Internet Architecture (RINA).
- Antonino Davolos, Master student. Project: An Emulation Testbed for Space Networks.
  Exchange master's student from Politecnico di Torino, Italy, February 2009 – October 2009.
- Qi Guo, M.A. completed in Spring 2010.
  Project: Implementation of Security Protocols for a Clean-slate Internet Architecture (RINA).
- Nobuyuki Mitsutake, M.A. completed in Summer 2010.
  Project: An Energy-efficient Wireless MAC Protocol.
- Yue Zhu, M.A. completed in Spring 2013.
  Project: Video Streaming over RINA.
- Namank Shah, B.A./M.S. completed in Spring 2014.
  Project: Secure Transport Protocol for RINA.
- Steve Jarvis, Spring 2016.
  Directed Study, Boston University, Computer Science.
- Justin Chen, Fall 2017 and Spring 2018.
  Directed Study: Using Machine Learning in Content Management.
- Marco Raigoza, Spring 2023.
  Directed Study: Multi-Level Error Control for Astronomy Data Transfers.
- Harsh Kapadia, Spring 2023.
  Directed Study: Congestion Control in Datacenters.
- Mina Morcos, M.S. completed in Spring 2024.
  Thesis: A Throughput Optimizing Scheduler for Multi-Cloud Serverless Computing.

• Senior Independent Work

- Trevor MacDowell, M.A. completed in Spring 2003.
  Project: Wireless Ad-hoc Routing.

• Undergraduate Research / Summer Interns

- Safae Lahjouji, June and July 2010.
  Project: Security Protocols for a Recursive Network Architecture.
  Visiting student from Ecole Nationale Superieure d'Ingenieurs, France.
- Prakash Lalwani, Joe Zatkovich, Chris Gomes, Summer 2010.
  Project: Simulator for Urban Traffic Networks (MetroSim).
  UROP (Undergraduate Research Opportunities), Boston University, Computer Science.
- Yue Zhu, Summer 2012.
  Project: Video Streaming over RINA.
  MA student, Boston University, Computer Science.
- Mao-Chi (Mike) Weng, Summer 2012.
  Project: RINA on Android.
  Undergraduate student, Boston University, Computer Science.
- Namank Shah, Fall 2013 and Spring 2014.
  Directed Study, Boston University, Computer Science.
- Samir Tazine, Summer 2014.
  Project: On the Reconfiguration of Embedded Virtual Networks.
  Visiting Student from ENSTA ParisTech, France.
- Roman Bogdanowski and Sridevi Suresh, Spring 2016.
  Directed Study, Boston University, Computer Science.
- Kaviarasan Selvam, Spring 2018.
  Directed Study: Using Machine Learning in Content Management, Boston University, Computer Science.
- Natalie Pienkowska, Fiona Whittington, Fall 2017 and Spring 2018.
  Project: Gender Restricted Environments and Women in Computer Science: Factors That Influence Undergraduate Womens Interest in Computer Science.
  UROP (Undergraduate Research Opportunities), Cross-College Award, co-advised with Professor Michael Elasmar (College of Communication). Boston University, Computer Science.
- Alexander Farra, Summer and Fall 2018, Spring 2019.
  Project: Cyberinfrastructure for Ecological Research, Boston University, Computer Science.
- Filip Vukelic, Spring 2019.
  Directed Study: Container Technologies and their Orchestration.
- Jing Song, Donovan Jones, Komal Kango, Tian Chen, Kristi Perreault, Spring 2020.
  Cloud Computing EC 528 Course Project, *Building A Cyberinfrastructure for Researchers*.

• Committee Member

- Anam Farrukh (PhD Thesis Defense, January 2025, Chair, Advisor: Rich West)
- Zongshun Zhang (PhD Thesis Proposal, December 2024, Advisor)
- Zongshun Zhang (PhD Oral Exam, April 2023, Advisor)
- Ali Raza (PhD Thesis Defense, April 2023, Advisor)
- Ali Raza (PhD Thesis Defense, March 2023, Advisor: Oran Krieger)
- Esmail Asyabi (PhD Thesis Defense, February 2023, 3^{rd} reader and Chair, Advisor: Azer Bestavros)

- Parul Sohal (PhD Oral Exam, November 2022, Advisor: Renato Mancuso)
- Sasan Golchin (PhD Thesis Defense, August 2022, Chair, Advisor: Rich West)
- Esmail Asyabi (PhD Thesis Proposal, June 2022, 3^{rd} Reader, Advisor: Azer Bestavros)
- Ali Raza (PhD Thesis Proposal, May 2022, Advisor: Oran Krieger)
- Ali Raza (PhD Thesis Proposal, May 2022, Advisor)
- Sasan Golchin (PhD Thesis Proposal, October 2021, Chair, Advisor: Rich West)
- Cody Doucette (PhD Thesis Defense, December 2020, 2^{nd} Reader, Advisor: John Byers)
- Ali Raza (PhD Oral Exam, November 2020, Advisor)
- Cody Doucette (PhD Thesis Proposal, April 2020, Advisor: John Byers)
- Louis Jensen (PhD Oral Exam, February 2020, Advisor: Peter Chin)
- Sasan Golchin (PhD Oral Exam, December 2019, Advisor: Rich West)
- Nabeel Akhtar (PhD Thesis Defense, August 2019, Advisor)
- James Cadden (PhD Thesis Defense, August 2019, Advisor: Jonathan Appavoo)
- William Koch (PhD Thesis Defense, August 2019, Advisor: Azer Bestavros)
- Katherine Zhao (PhD Thesis Proposal, June 2019, Chair, Advisor: Rich West)
- Craig Einstein (PhD Area Exam, April 2019, Advisor: Rich West)
- Nabeel Akhtar (PhD Thesis Proposal, February 2019, Advisor)
- James Cadden (PhD Thesis Proposal, November 2018, Advisor: Jonathan Appavoo)
- Zhuoqun Cheng (PhD Thesis Defense, August 2018, Advisor: Rich West)
- Ajjen Joshi (PhD Thesis Defense, July 2018, Chair, Advisor: Margrit Betke)
- Hanwen Wu (PhD Thesis Defense, August 2018, Advisor: Hongwei Xi)
- Qiaobin Fu (PhD Area Exam, May 2018, Advisor: John Byers)
- Zhuoqun Cheng (PhD Thesis Proposal, March 2018, 3^{rd} Reader, Advisor: Rich West)
- Nabeel Akhtar (PhD Oral Exam, October 2017, Advisor)
- Ying (Chris) Ye (PhD Thesis Defense, July 2017, Advisor: Rich West)
- Eric Missimer (PhD Thesis Defense, July 2017, Chair, Advisor: Rich West)
- Maryam Ghasemi (PhD Thesis Defense, May 2017, Advisor)
- Zhuoqun Cheng (PhD Oral Exam, December 2016, Advisor: Rich West)
- Cody Doucette (PhD Oral Exam, December 2016, Advisor: John Byers)
- Yuefeng Wang (PhD Thesis Defense, November 2016, Advisor)
- Zhiqiang Ren (PhD Thesis Defense, November 2016, Chair, Advisor: Hongwei Xi)
- Maryam Ghasemi (PhD Thesis Proposal, August 2016, Advisor)
- Saber Mirzaei (PhD Thesis Defense, July 2016, Chair, Advisor: Assaf Kfoury)
- Ying (Chris) Ye (PhD Thesis Proposal, May 2016, Advisor: Rich West)
- James Cadden (PhD Area Exam, June 2015, Advisor: Jonathan Appavoo)
- Ye Li (PhD Thesis Defense, June 2015, 2^{nd} Reader, Advisor: Rich West)

- Christine Bassem (PhD Thesis Defense, June 2015, 2^{nd} Reader, Advisor: Azer Bestavros)
- Eric Missimer (PhD Thesis Proposal, March 2015, Chair, Advisor: Rich West)
- Matthew Danish (PhD Thesis Defense, March 2015, Advisor: Hongwei Xi)
- Christine Bassem (PhD Thesis Proposal, January 2015, 2^{nd} Reader, Advisor: Azer Bestavros)
- Ye Li (PhD Thesis Proposal, October 2014, Advisor: Rich West)
- Yuefeng Wang (PhD Oral Exam, August 2014, Advisor)
- Michel Machado (PhD Thesis Defense, April 2014, Advisor: John Byers)
- Likai Liu (PhD Thesis Defense, March 2014, Chair, Advisor: Hongwei Xi)
- Ying (Chris) Ye (PhD Oral Exam, January 2014, Advisor: Rich West)
- Eric Missimer (PhD Oral Exam, January 2014, Advisor: Rich West)
- Flavio Esposito (PhD Thesis Defense, October 2013, Advisor)
- Niky Riga (PhD Thesis Defense, July 2013, Advisor)
- Andrej Cvetkovski (PhD Thesis Defense, May 2013, Chair, Advisor: Mark Crovella)
- Flavio Esposito (PhD Thesis Proposal, May 2013, Advisor)
- Gonca G$\ddot{u}$rsun (PhD Thesis Defense, March 2013, Advisor: Mark Crovella)
- Michel Machado (PhD Thesis Proposal, February 2013, Advisor: John Byers)
- Vatche Ishakian (PhD Thesis Defense, January 2013, 3^{rd} Reader, Advisor: Azer Bestavros)
- Ray Sweha (PhD Thesis Defense, November 2012, 2^{nd} Reader, Advisor: Azer Bestavros)
- Chong Wang (PhD Thesis Defense, October 2012, Chair and 3^{rd} Reader, Advisor: John Byers)
- Vatche Ishakian (PhD Thesis Proposal, October 2012, Advisor: Azer Bestavros)
- Vatche Ishakian (PhD Oral Exam, February 2012, Advisor: Azer Bestavros)
- Chong Wang (PhD Thesis Proposal, December 2011, Chair, Advisor: John Byers)
- Ray Sweha (PhD Thesis Proposal, December 2011, 2^{nd} Reader, Advisor: Azer Bestavros)
- Ray Sweha (PhD Oral Exam, December 2010, Advisor: Azer Bestavros)
- Karim Mattar (PhD Thesis Defense, October 2010, Advisor)
- Karim Mattar (PhD Thesis Proposal, September 2010, Advisor)
- Andrei Lapets (PhD Thesis Defense, August 2010, Chair, Advisor: Assaf Kfoury)
- Flavio Esposito (PhD Oral Exam, May 2010, Advisor)
- Kebin Wang (PhD Thesis Defense, October 2009, Chair, Advisor: Shanghua Teng)
- Gabriel Parmer (PhD Thesis Defense, July 2009, 3^{rd} Reader, Advisor: Rich west)
- Niky Riga (PhD Thesis Proposal, July 2009, Advisor)
- Kyle Burke (PhD Thesis Defense, April 2009, Advisor: Shanghua Teng)
- Vijay Erramili (PhD Thesis Defense, December 2008, Advisor: Mark Crovella)
- Nahur Fonseca (PhD Thesis Defense, November 2008, Chair, Advisor: Mark Crovella)
- Nahur Fonseca (PhD Thesis Proposal, September 2008, Advisor: Mark Crovella)
- George Smaragdakis (PhD Thesis Defense, August 2008, Advisor: Azer Bestavros)

- Michael Ocean (PhD Thesis Defense, July 2008, 3^{rd} Reader, Advisor: Azer Bestavros)
- Hany Morcos (PhD Thesis Defense, July 2008, Co-advisor and 2^{nd} Reader)
- Hany Morcos (PhD Thesis Proposal, February 2008, Co-advisor and 2^{nd} Reader)
- Michael Ocean (PhD Thesis Proposal, Feb 2008, 3^{rd} Reader and Chair, Advisor: Bestavros)
- Niky Riga (PhD Oral Exam, January 2008, Advisor)
- George Smaragdakis (PhD Oral Exam, October 2007, Advisor: Azer Bestavros)
- Michael Ocean (PhD Oral Exam, June 2007, Advisor: Azer Bestavros)
- Jorge Londono (PhD Oral Exam, June 2007, Advisor: Azer Bestavros)
- Gerald Fry (PhD Oral Exam, May 2007, Advisor: Rich West)
- Karim Mattar (PhD Oral Exam, December 2006, Advisor)
- Hany Morcos (PhD Oral Exam, December 2006, Co-advisor and 2^{nd} Reader)
- Nahur Fonseca (PhD Oral Exam, December 2006, 3^{rd} Reader, Advisor: Mark Crovella)
- Yuting Zhang (PhD Thesis Defense, August 2006, 3^{rd} Reader, Advisor: Rich West)
- Mina Guirguis (PhD Thesis Defense, August 2006, Co-advisor and 2^{nd} Reader)
- Selma Yilmaz (PhD Thesis Defense, August 2005, Advisor)
- Yuting Zhang (PhD Thesis Proposal, June 2006, 3^{rd} Reader, Advisor: Rich West)
- Mina Guirguis (PhD Thesis Proposal, May 2006, Co-advisor and 2^{nd} Reader)
- Yuting Zhang (PhD Oral Exam, October 2004, 3^{rd} Reader, Advisor: Rich West)
- Mina Guirguis (PhD Oral Exam, June 2004, Co-advisor and 2^{nd} Reader)
- Gu-In Kwon (PhD Thesis Defense, May 2004, 2^{nd} Reader, Advisor: John Byers)
- Tao Wang (M.A. Thesis Defense, April 2004, Co-Advisor and 2^{nd} Reader)
- Gu-In Kwon (PhD Proposal Defense, November 2003, 2^{nd} Reader, Advisor: John Byers)
- Adam Bradley (PhD Thesis Defense, September 2003, 4^{th} Reader, Advisor: Azer Bestavros)
- Adam Bradley (PhD Proposal Defense, May 2003, 4^{th} Reader, Advisor: Azer Bestavros)
- Liang Guo (PhD Thesis Defense, April 2003, Advisor)
- Shudong Jin (PhD Thesis Defense, April 2003, 2^{nd} Reader, Advisor: Azer Bestavros)
- Trevor MacDowell (B.A. Work for Distinction Defense, April 2003, Advisor)
- Ryan Mahon (B.A. Work for Distinction Defense, Apr 2003, 3^{rd} Reader, Advisor: J. Byers)
- Marwan Fayed (M.A. Thesis Defense, April 2003, 3^{rd} Reader, Advisor: John Byers)
- Dhiman Barman (M.A. Thesis Defense, April 2003, Advisor)
- Alberto Medina (PhD Thesis Defense, March 2003, Advisor)
- Jun Liu (PhD Defense, May 2002, 2^{nd} Reader, Advisor: Mark Crovella)
- Selma Yilmaz (PhD Oral Exam, May 2002, Advisor)
- Liang Guo (PhD Proposal Defense, May 2002, Advisor)
- Alberto Medina (PhD Proposal Defense, May 2002, Advisor)
- Shudong Jin (PhD Proposal Defense, April 2002, 2^{nd} Reader, Advisor: Azer Bestavros)

- Jun Liu (PhD Proposal Defense, March 2002, 2^{nd} Reader, Advisor: Mark Crovella)
- Raj Ashar (BA Project Defense, December 2001, Advisor: Rich West)
- Khaled Harfoush (PhD Defense, November 2001, 3^{rd} Reader, Advisor: Azer Bestavros)
- Sumit Mehrotra (MA Thesis Defense, June 2001, Advisor: Azer Bestavros)
- Shudong Jin (PhD Oral Exam, Spring 2001, 2^{nd} Reader, Advisor: Azer Bestavros)
- Khaled Harfoush (PhD Proposal Defense, Feb 2001, 3^{rd} Reader, Advisor: Azer Bestavros)
- Paul Barford (PhD Defense, December 2000, Advisor: Mark Crovella)
- Liang Guo (PhD Oral Exam, Fall 2000, Advisor)
- Alberto Medina (PhD Oral Exam, Fall 2000, Advisor)
- Jaehee Yoon (PhD Oral Exam, Fall 2000, Advisor)
- Khaled Harfoush (M.A. Thesis Defense, Fall 2000, 3^{rd} Reader, Advisor: Azer Bestavros)
- Stanislav Rost (Work for Distinction Defense, April 2000, Advisor: John Byers)
- Karu Ratnam (PhD Thesis Defense, Northeastern U., Oct 1999, Advisor)
- Muxiang Zhang (PhD Thesis Proposal, Northeastern U., June 1999, Advisor: Agnes Chan)

• External Committee Member

- Jeremiah Small (MS Thesis Defense, BU, May 12, Advisor: John Day)
- Dhananjay Raghunathan (PhD Thesis Defense, BU, Sep 10, Advisor: John Baillieul)
- Gowtham Boddapati (MS Thesis Defense, BU, Sep 10, Advisor: Lou Chitkushev)
- Ashish Agarwal (PhD Thesis Defense, BU, April 10, Advisor: Tom Little)
- Ashish Agarwal (PhD Proposal Defense, BU, March 10, Advisor: Tom Little)
- Gabriele Ferrari Aggradi (M.Eng., U. of Florence, July 08, Co-advisor: Romano Fantacci)
- Dhananjay Raghunathan (PhD Proposal Defense, BU, May 08, Advisor: John Baillieul)
- Lin Wing Kai (MS Thesis, Chinese U. of Hong Kong, Aug 05, Advisor: Dah Ming Chiu)
- Chi Zhang (PhD Thesis Defense, Northeastern U., May 2003, Advisor: V. Tsaoussidis)
- Adrian Lahanas (PhD Thesis Defense, Northeastern U., May 2003, Advisor: Tsaoussidis)
- Keqin Zhu (PhD Thesis Defense, U. of Ottawa, Canada, March 2003, Advisor: Hasan Ural)
- Manav Khanna (MS Thesis Defense, Northeastern U., Jun 2002, Advisor: V. Tsaoussidis)
- Muxiang Zhang (PhD Thesis Defense, Northeastern U., May 2000, Advisor: Agnes Chan)
- Tamer Dag (PhD Thesis Defense, Northeastern U., Mar 1999, Advisor: Ioannis Stavrakakis)
- Zoe Antoniou (PhD Thesis Defense, Northeastern U., Mar 1999, Advisor: Ioannis Stavrakakis)
- Cesar Santivanez (MS Thesis Defense, Northeastern U., Aug 98, Advisor: Ioannis Stavrakakis)
- Firass Abi-Nassif (MS Thesis Defense, Northeastern U., Aug 98, Advisor: Ioannis Stavrakakis)
- Jeff Capone (PhD Thesis Defense, Northeastern U., May 1997, Advisor: Ioannis Stavrakakis)
- Jeff Capone (PhD Thesis Proposal, Northeastern U., Mar 1997, Advisor: Ioannis Stavrakakis)
- Tamer Dag (MS Thesis Defense, Northeastern U., Feb 1997, Advisor: Ioannis Stavrakakis)

- Steve Iatrou (MS Thesis Defense, Northeastern U., Feb 1997, Advisor: Ioannis Stavrakakis)
- Karu Ratnam (PhD Thesis Proposal, Northeastern, Sep 96, Advisor: Sampath Rangarajan)
- Vanitha Aravamudhan (MS Thesis Defense, Northeastern, May 96, Advisor: S. Rangarajan)
- Jianyu Zeng (PhD Thesis Defense, Northeastern U., May 96, Advisor: Lazarous Merakos)

University Service

I serve my department and college in several capacities. For example, I was the first coordinator of our new Industrial Affiliates Program (IAP). Each year, among other activities, I organized a Career day in the Fall and a Research day in the Spring. I have also been on the College's Natural Sciences Curriculum Committee (NSCC), where a great number of changes to our CS curriculum have been approved (e.g. changes to our prerequisites structure, new courses on security, networking, web, etc.)

I am also the first to assume the new position of Director of Laboratory Operations—my responsibilities included managing our Computer Science teaching and research labs, supervising our technical staff, and overseeing equipment and software purchases.

As Associate Chair, the department was able to respond to pressures of increasing enrollments. Six new lecturers were hired during my 3 years of service (2014-17). We hired an Associate Professor of the Practice to lead efforts in experiential learning. Mechanisms were also developed to better match Teaching Fellows to courses, balance load on TFs when assigning general tutoring duties, and scale critical courses by creating new lecture sections and team-teaching.

As Chair, the size of the CS program has grown to 2000+ students, 45+ faculty, and 14 staff. I led the development of a Departmental Broadening Participation in Computing (BPC) Plan, four new joint X+CS degrees, and an MS in AI program. Our faculty and students were recognized by many high-profile awards, including Sloan, NSF CAREER, ACM Fellows, Google and IBM PhD Fellowships, etc. And to support our growth, I have led the Department's move to renovated space in 2019, and in January 2023, into a new building (the "Center for Computing and Data Sciences").

- Chair of Computer Science *2018-2024*
- Member of BU's Research Computing Governance Committee *2017-2024*
- Reviewer of BU's Limited Submission Opportunity (LSO) in Computer Science *2020-2022*
- Member of BU CS Faculty Search Committee *2017-2018*
- Member of the Systems Staff Search Committee *2017-2018*
- Member of Graduate Students' Professional Development Task Force *2017-2018*
- Director of Hariri's Cyberinfrastructure Research & Innovation Lab *2017-2018*
- Associate Chair of CS *2014-2017*
- Internal member, Academic Program Review Committee, BU Linguistics *2016-2017*
- CAS Appointment, Promotion and Tenure (APT) Committee *2013-2014, 2015-2017*
- External member of the MET CS Faculty Search Committee *2015-2016*
- Trustee Scholar Selection Committee *2014-2015*

- Chair, BU CS Faculty Search Committee *2013-2014*
- Coordinator of After School CS Program for Boston Area High Schools *2013*
- Departmental MS Program Review Committee *2013*
- Member of the CS Distinguished Alumna Selection Committee *2012*
- Director of Graduate Studies *2007 – 2012*
- Member of the Graduate Admissions Committee *2010 – 2011, 2013*
- Member of the BU Information Security Governance Committee *2011*
- Member of Information Security Governance Standards Working Group *2011*
- Coordinator of Practice Teaching Fellow Session at CAS Fall Orientation *2009 – 2011*
- Member of the Academic Policy Committee *2007 – 2008*
- Poster Session Coordinator for Industrial Affiliates Program *2003 – 2007*
- Member of the Center for Information and Systems Engineering (CISE) *2002 – present*
- Member of the Boston University Sensor Network Consortium (SNC) *2002 – present*
- Founding Member of the Center for Reliable Information Systems and Cyber Security (RISCS) *2005 – present*
- Director of Laboratory Operations *2003 – 2005*
- Member of the Faculty Annual Review Committee *2003 – 2004*
- Member of the Graduate Research Excellence Award Committee *2004, 2007 – 2012*
- Member of the CAS Natural Sciences Curriculum Committee *2001 – 2004*
- Curriculum Coordinator *2003 – 2004*
- Member of the Space Committee *2000 – 2003*
- Member of the Faculty Search Committee *2001*
- Chair of the Systems Doctoral Written Examination Committee *2000*
- Member of Systems/Networking Doctoral Examination Committee *1999 – present*
- Industrial Affiliates Program Coordinator *2000 – 2003, 2005*
- Member of the Equipment Committee *2000*
- Founding Faculty Member of the WING (Web and InterNetworking Group) *1999 – present*
- Director of QoS Networking Laboratory *1999 – 2003*
- Member of Graduate Committee (at Northeastern) *1995 – 1999*
- Colloquium Chair (at Northeastern) *1997 – 1999*

- Member of U. Graduate Council and New Programs Comm. (at Northeastern) *1997 – 1999*
- Field Chair of Networks Qualifying PhD Exam (at Northeastern) *1997 – 1999*

Service to Profession

- Program Director, National Science Foundation, Computer and Information Science and Engineering (CISE) Directorate, Division of Computer and Network Systems (CNS), September 2024-present.
- FOUNT Science Advisory Board. The Chameleon FOUNT project for advancing CS and data science education. November 2023-August 2024.
- FABRIC Scientific Advisory Board. The FABRIC project is part of NSF's Mid-scale Research Infrastructure Big 10 Ideas. January 1, 2020-August 2024.
- Associate Editor, IEEE Networking Letters, June 2018-present.
- Co-organizer, NSF MERIF (Midscale Experimental Research Infrastructure Forum) Workshop, UMKC, Kansas City, MO, September 25-27, 2024.
- Steering Committee Member, Computer and Networking Experimental Research using Testbeds (CNERT), 2016-present.
- Associate Editor, IEEE Transactions on Mobile Computing, April 2017-January 2022.
- Co-organizer, NSF MERIF (Midscale Experimental Research Infrastructure Forum) Workshop, Boston University, May 22-24, 2023.
- Co-organizer, NSF MERIF (Midscale Experimental Research Infrastructure Forum) Workshop, Madison, June 1-3, 2022.
- Co-organizer, NSF MERIF (Midscale Experimental Research Infrastructure Forum) Workshop, FIU, January 7-8, 2020.
- Co-organizer and TPC Co-chair, MERIT (Midscale Education and Research Infrastructure and Tools) Workshop, co-located with IEEE ICNP, Chicago, Illinois, October 7, 2019.
- Co-organizer, NSF MERIF (Midscale Experimental Research Infrastructure Forum) Education Workshop, George Washington University, May 29-30, 2019.
- Co-organizer, GENI at the Chameleon User Meeting, Austin, Texas, February 6-7, 2019.
- Co-organizer, the Second Global Experimentation for Future Internet (GEFI) Workshop, Tokyo, Japan, October 25-26, 2018.
- Member of the Steering Committee of the International Conference on Wired/Wireless Internet Communications (WWIC), February 2005 - present.
- Co-organizer, GENI Regional Workshop (GRW) and Summer Camp, University of Kentucky, Lexington, May 14-18, 2018.
- General Co-chair, the 16^{th} International Conference on Wired & Wireless Internet Communications (WWIC 2018), Boston, MA, June 18-20, 2018.

- Co-organizer, the First Global Experimentation for Future Internet (GEFI) Workshop, Rio de Janeiro, Brazil, October 26-27, 2017.
- Co-organizer, GENI Regional Workshop (GRW), University of Oregon, Eugene, Oregon, November 3-4, 2017.
- Co-organizer, GENI NICE (Network Innovators Community Event) workshop, co-located with IEEE ICNP, Toronto, Canada, October 10, 2017.
- Co-organizer, GENI Regional Workshop (GRW) and Summer Camp, Texas A&M University, College Station, Texas, May 22-26, 2017.
- Co-organizer, GENI Regional Workshop (GRW), Florida International University, Miami, March 13, 2017.
- Technical Program Committee Co-chair, The 15^{th} IFIP International Conference on Wired/Wireless Internet Communications (WWIC 2017), St. Petersburg, Russia, June 21-23, 2017.
- Co-organizer, The Network Innovators Community Event (GENI NICE), co-located with ACM CoNEXT, Irvine, CA, December 12, 2016.
- Co-organizer, GENI Regional Workshop (GRW), Boston University, Boston, MA, May 23, 2016.
- Co-organizer, GENI Summer Camp, Boston University, Boston, MA, May 23-27, 2016.
- General Co-chair, the 14^{th} International Conference on Wired & Wireless Internet Communications (WWIC 2016), Thessaloniki, Greece, May 25-27, 2016.
- General Chair, the 16^{th} IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM), Boston, MA, June 15-18, 2015.
- Technical Program Committee Area Chair, the 21^{th} IEEE International Conference on Network Protocols (ICNP 2013), Göttingen, Germany, October 7-11, 2013.
- Technical Program Committee Area Chair, the 20^{th} IEEE International Conference on Network Protocols (ICNP 2012), Austin, Texas, October 30-November 2, 2012.
- Technical Program Co-chair, the 2012 IEEE Online Conference on Green Communications (GreenCom 2012), September 25-28, 2012.
- Technical Program Co-chair, the 10^{th} International Conference on Wired/Wireless Internet Communications (WWIC 2012), Island of Santorini, Greece, June 6-8, 2012. Lecture Notes in Computer Science, Vol. 7277, Koucheryavy, Y.; Mamatas, L.; Matta, I.; Tsaoussidis, V. (Eds.), ISBN 978-3-642-30629-7, June 13, 2012, `http://dx.doi.org/10.1007/978-3-642-30630-3`.
- Organizer and Technical Program Co-Chair, IEEE Computer Communications Workshop (CCW), Hyannis, Cape Cod, MA, October 10-12, 2011.
- Track Co-Chair, Track on Trustworthy Cyber-Physical Systems and Infrastructures (CPSI), NSF/PNNL Workshop on Cooperative Autonomous Resilient Defenses in Cyberspace (CyberCARD), Arlington, VA, January 27-28, 2011.
- Technical Program Chair, Network Algorithms and Performance Evaluation (NAPE), the 20^{th} IEEE Conference on Computer Communication Networks (ICCCN), Maui, Hawaii, July 31-August 4, 2011.

- Member of the Editorial Board, Computer Networks (COMNET) Journal, January 2003 - 2007.
- Member of the Advisory Council of the IEEE International Symposium on Computers and Communications (ISCC), May 2002 - present.
- Member of the Steering Committee of the Workshop on Applications and Services in Wireless Networks (ASWN), August 2003 - 2006.
- General Chair, the 4^{th} International Symposium on Modeling and Optimization in Mobile, Ad-hoc, and Wireless Networks (WiOpt 2006), Boston, MA.
- Technical Program Co-chair, the 3^{rd} Workshop on Measurement, Modeling, and Performance Analysis of Wireless Sensor Networks (SenMetrics 2005), San Diego, CA.
- Co-organizer and Technical Program Co-chair, the 13^{th} IEEE International Conference on Network Protocols (ICNP 2005), Boston, MA.
- Co-organizer and Technical Program Co-chair, NeXtworking 2003 (COST-IST and NSF funded workshop), June 23-25, Chania, Crete, Greece.
- Co-organizer and Technical Program Chair, the IEEE 4^{th} Workshop on Applications and Services in Wireless Networks (ASWN 2004), Boston, MA.
- Technical Program Co-chair, the 1^{st} International Workshop on Wired/Wireless Internet Communications (WWIC 2002), in conjunction with the 3^{rd} International Conference on Internet Computing.
- Co-organizer, Student Poster Session, the 11^{th} IEEE International Conference on Network Protocols (ICNP 2003), Atlanta, Georgia.
- Executive Committee Member:
  - Co-organizer, NSF MERIF Workshop, UMKC, 2024.
  - Co-organizer, NSF MERIF Workshop, Boston University, 2023.
  - Co-organizer, NSF MERIF Workshop, Madison, Wisconsin, 2022.
  - Co-organizer, NSF MERIF Workshop, FIU, Florida, 2020.
  - Co-organizer, MERIT Workshop, Chicago, IL, 2019.
  - Co-organizer, NSF MERIF Education Workshop, Washington DC, 2019.
  - Co-organizer, GENI at the Chameleon User Meeting, Austin, Texas, 2019.
  - Co-organizer, GENI Regional Workshop and Summer Camp, Kentucky, 2018.
  - General Co-Chair, IFIP WWIC 2018.
  - Co-organizer, GENI Regional Workshop (GRW), Oregon, 2017.
  - Co-organizer, GENI NICE, Toronto, 2017.
  - Co-organizer, GENI Regional Workshop and Summer Camp, Texas, 2017.
  - Co-organizer, GENI Regional Workshop (GRW), Miami, 2017.
  - Co-organizer, GENI NICE, CA, 2016.
  - Co-organizer, GENI Regional Workshop (GRW), Boston, 2016.
  - Co-organizer, GENI Summer Camp, Boston, 2016.

- General Co-Chair, IFIP WWIC 2016.
- General Chair, IEEE WoWMoM 2015.
- Organizer, IEEE CCW 2011.
- Publication Chair, NSF CRI 2007.
- General Chair, WiOpt 2006.
- Co-organizer, IEEE ICNP 2005.
- Internet Co-chair, IEEE Infocom 2005.
- General Co-chair, WWIC 2004.
- Co-organizer, IEEE ASWN 2004.
- Co-organizer, NeXtworking 2003.
- Publication Chair, IEEE Infocom 2003.
- Tutorial and Panel Chair, IEEE Hot Interconnects 9: Stanford University, August 2001.

• Co-Editor:

- The 16^{th} IFIP International Conference on Wired/Wireless Internet Communications (WWIC 2018), Boston, MA, June 18-20, 2018. Lecture Notes in Computer Science, Vol. 10866, Kaushik Roy Chowdhury, Marco Di Felice, Ibrahim Matta, Bo Sheng (Editors), ISBN 978-3-030-02931-9, http://dx.doi.org/10.1007/978-3-030-02931-9. Special Issue in the *Computer Communications* journal.
- The 15^{th} IFIP International Conference on Wired/Wireless Internet Communications (WWIC 2017), St. Petersburg, Russia, June 21-23, 2017. Lecture Notes in Computer Science, Vol. 10372, Yevgeni Koucheryavy, Lefteris Mamatas, Ibrahim Matta, Panagiotis Papadimitriou (Editors), ISBN 978-3-319-61382-6, http://dx.doi.org/10.1007/978-3-319-61382-6.
- The 14^{th} IFIP International Conference on Wired/Wireless Internet Communications (WWIC 2016), Thessaloniki, Greece, May 25-27, 2016. Lecture Notes in Computer Science, Vol. 9674, Lefteris Mamatas, Ibrahim Matta, Panagiotis Papadimitriou, Yevgeni Koucheryavy (Editors), ISBN 978-3-319-33936-8, http://dx.doi.org/10.1007/978-3-319-33936-8.
- The 10^{th} International Conference on Wired/Wireless Internet Communications (WWIC 2012), Island of Santorini, Greece, June 6-8, 2012. Lecture Notes in Computer Science, Vol. 7277, Yevgeni Koucheryavy, Lefteris Mamatas, Ibrahim Matta and Vassilis Tsaoussidis (Editors), ISBN 978-3-642-30629-7, http://dx.doi.org/10.1007/978-3-642-30630-3.
- Special Issue on "Advances in Communications and Networking," Journal of Communications, Vol.7, No.1, 2012 (ISSN 1796-2021).
- Special Issue on "Applications and Services in Wireless Networks," Elsevier Computer Communications Journal, September 2005.
- The Second International Conference on Wired/Wireless Internet Communications (WWIC 2004), Frankfurt/Oder, Germany, February 4-6, 2004. Lecture Notes in Computer Science, Vol. 2957, Peter Langendoerfer, Mingyan Liu, Ibrahim Matta and Vassilis Tsaoussidis (Editors), ISBN 978-3-540-20954-6.
- Report on NeXtworking 2003, COST-IST (EU) / NSF-ANIR (USA) workshop, Crete, Greece.
- Special Issue on "Quality of Service Routing," the IEEE Communications Magazine, June 2002.

- Special Issue on "Reliable Transport Protocols for Mobile Computing," the Journal of Wireless Communications and Mobile Computing, February 2002.

• Program Committee Member:

- ECO 2024, 1^{st} International Workshop on Edge to Cloud Orchestration, co-located with the 29^{th} IEEE Symposium on Computers and Communications (ISCC), Paris, France, June 2024.
- 2024 EuCNC & 6G Summit - Operational & Experimental Insights (OPE) Track, Belgium, 2024.
- The 1^{st} International Workshop on Edge Intelligence (EI 2021), part of the 17^{th} International Conference on Network and Service Management, Izmir, Turkey, 2021.
- MERIF (Midscale Experimental Research Infrastructure Forum) Workshop, Florida International University, Florida, 2020.
- The 6^{th} International Workshop on the Recursive InterNetwork Architecture (RINA 2019), co-located with the 22^{nd} Conference on Innovation in Clouds, Internet and Networks (ICIN 2019).
- First IEEE International Workshop on Smart network Technologies and Edge computing for the Tactile Internet (STET 2018), co-located with IEEE NetSoft 2018.
- IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN), 2015, 2016, 2017.
- First International Workshop on Softwarized Infrastructures for 5G and Fog Computing, co-located with ITC-29, 2017.
- GENI Engineering Conference 25 (GEC25) Student Competition, 2017.
- The 2^{nd} International Workshop on Software-Driven Flexible and Agile Networking (SWFAN), co-located with IEEE INFOCOM, 2017.
- The International Conference on Wired/Wireless Internet Communications (WWIC), 2002, 2004, 2005, 2016.
- The International Workshop on Computer and Networking Experimental Research using Testbeds (CNERT), 2014, 2015, 2016.
- First International Workshop on Sustainability, Implementation and Resilience of Energy-Aware Networks (SIREN), 2016.
- GENI Engineering Conference 22 (GEC22) Student Competition, 2015.
- IEEE ICNP (IEEE International Conference on Network Protocols), 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2006, 2007, 2009, 2010, 2011, 2014.
- The International Conference on NETworked sYStems (NETYS), 2014.
- The 22^{nd} International Teletraffic Congress (ITC) Specialist Seminar on Energy Efficient and Green Networking (SSEEGN), 2013.
- The 24^{th} Tyrrhenian International Workshop on Digital Communications (TIWDC): Green ICT, 2013.
- IEEE International Conference on Communications (ICC), Workshop on Green Communications and Networking, 2012.
- IEEE INFOCOM Workshop on Communications and Control for Sustainable Energy Systems: Green Networking and Smart Grids, 2012.

- IEEE International Conference on Communications (ICC), FutureNet Workshop, 2011, 2012.
- E6 (Energy in Communication, Information, and Cyber-physical Systems) Workshop (co-located with COMSNETS), 2012.
- IFIP MedHocNet (The 8th IFIP Annual Mediterranean Ad Hoc Networking Workshop Med-Hoc-Net), 2009, 2010, 2011.
- IEEE INFOCOM 2011 Workshop on Green Communications and Networking, 2011.
- International Workshop on Seamless Connectivity in Vehicular Networks (SCVN), 2011.
- IEEE International Conference on Communications (ICC), Wireless and Mobile Networking Symposium, 2010.
- ACM CoNEXT (ACM Conference on Future Networking Technologies), 2006, 2007, 2009.
- WASA (International Conference on Wireless Algorithms, Systems and Applications), 2009.
- E-DTN (Workshop on the Emergence of Delay-/Disruption-Tolerant Networks), 2009.
- PAM (Passive and Active Measurement), 2008.
- ACM MobiCom (International Conference on Mobile Computing and Networking), 2007.
- ACM MobiHoc (International Symposium on Mobile Ad Hoc Networking and Computing), 2007.
- IEEE LANMAN (IEEE Workshop on Local and Metropolitan Area Networks), 2007.
- IFIP-TC6 Networking, 2004, 2007.
- IEEE ICDCS (IEEE International Conference on Distributed Computing Systems), 2002, 2007.
- IEEE Infocom, 1999, 2003, 2004, 2005, 2006.
- IFIP-TC6 WAC (International Workshop on Autonomic Communication), 2004, 2005.
- Mobiquitous (International Conference on Mobile and Ubiquitous Systems: Networking and Services), 2005.
- IEEE ISCC (IEEE Symposium on Computers and Communications), 1999, 2000, 2001, 2002, 2003, 2004, 2005.
- NEW2AN (International Conference on Next Generation Teletraffic and Wired/Wireless Advanced Networking), 2004.
- ICENCO (International Computer Engineering Conference), 2004.
- IEEE Vehicular Technology Conference, 2003.
- IC (International Conference on Internet Computing), 2002, 2003.
- CNDS (Communication Networks and Distributed Systems Modeling and Simulation Conference), part of the SCS Western Multiconference on Computer Simulation, 2002, 2003.
- ICPADS (IEEE International Conference on Parallel and Distributed Systems), Communication Networks and Protocols track, 2002.
- RTAS (IEEE Real-Time Technology and Applications Symposium), 1999, 2000, 2001.
- Multimedia Services and Technologies Symposium, part of IEEE Globecom 1999 conference.
- Future Wireless Communication Systems Symposium, part of IEEE Globecom 1999 conference.

  - Symposium on Architectures, Tools and Algorithms for Networks, Parallel and Distributed Systems, part of SCI/ISAS 1999 conference.

- Panelist:
  - Panel on The Work Life of a Chair/Director: Voices of Experience (OR: Things We Wish We Knew When We Started), BU CAS New Chairs and Directors Orientation, August 2020, 2021.
  - Panel on Next Generation Midscale Research Infrastructure Requirements/Issues, MERI 2020.
  - Panel on Hot Topics in Networking and Testbed Requirements, GENI NICE 2017.
  - Panel on Next-Generation Computer Networks, IEEE ICCCN 2011.
  - Panel on Transport Tussle, PFLDNeT 2010.
  - Panel on "Apps" in 2020, IEEE SECON 2010.
  - Panel on Next Generation Wireless Networks, IEEE ICNP 2000.

- Session Chair:
  - ISCC 1998, RTAS 1999, BU/NSF Workshop on Internet Measurement, Instrumentation and Characterization (IMIC) 1999, Hot Interconnects 2001, ICNP 2000, 2001, 2002, 2003, 2006, SANPA (International Workshop on Sensor and Actor Network Protocols and Applications) 2004, Infocom 2005, SenMetrics 2005, FutureNetIII GLOBECOM 2010, New England Faculty Summit on Cyber Security 2011, IEEE ICCCN 2011, IFIP Networking 2013, GENI NICE 2016, GENI NICE 2017, ICNP MERIT 2019, MERIF 2020, FABRIC Virtual Community Workshop (breakout on Networking) 2020, MERIF 2022, INFOCOM CNERT 2020, 2021, 2022, 2023.
  - CCSCNE (Consortium for Computing in Small Colleges – Second Annual Northeastern Conference), Northeastern University, 1997.

- Session Organizer:
  - BU/NSF IMIC 1999, Globecom 2000, NSF CRI 2007, GENI NICE 2016 and 2017.

- Representative of TCCC (IEEE Communications Society Technical Committee on Computer Communications) for IEEE Globecom 1999 conference.

- Member, National Science Foundation panels to review grant proposals for Advanced Networking Research, Information Technology Research, Research Resources, CISE Community Research Infrastructure, and CAREER.

- Member, External Advisory Board of the European IRATI Project, 2013-2014.

- Senior Member of both the ACM and the IEEE.

- Served as a referee for the GENI Project Office (2008, 2009, 2010).

- Served as a referee for the Israel Science Foundation.

- Served as a referee for the Italian Research and University Evaluation Agency (ANVUR).

- Served as a reviewer for books such as:
  - *Network Routing: Algorithms, Protocols, and Architectures*. By Deep Medhi and Karthik Ramasamy. Publisher: Morgan Kaufmann, 2007.

- *Patterns in Network Architecture: A Return to Fundamentals*. By John Day. Publisher: Prentice Hall, 2008.
- *Mathematical Foundations of Computer Networking*. By S. Keshav. Publisher: Pearson, 2012.
- *Computer Systems: A Programmer's Perspective*. By Randal E. Bryant and David R. O Hallaron. Publisher: Prentice Hall, Second Edition, 2010.

- Served as a referee for many journals such as:

  Performance Evaluation Journal,
  IEEE/ACM Transactions on Networking,
  Journal of Internetworking: Research & Experience,
  Journal of Computer Communications,
  Computer Networks Journal,
  Journal of Ad Hoc Networks,
  Journal of Wireless Communications and Mobile Computing,
  IEEE Transactions on Wireless Communications,
  Journal of Interconnection Networks,
  Journal of High-Speed Networks,
  ACM/Balzer Journal on Wireless Networks,
  IEEE Journal on Selected Areas of Communications,
  ACM/Baltzer Mobile Networks and Applications Journal,
  IEEE Transactions on Mobile Computing,
  IEEE Transactions on Computers,
  IEEE Transactions on Parallel and Distributed Systems,
  Information Sciences Journal,
  Theory and Practice of Object Systems Journal,
  Journal of Intelligent and Fuzzy Systems,
  IEEE Transactions on Software Engineering.

- Served as a referee for many periodicals such as:

  IEEE Communications Magazine,
  ACM Sigcomm Computer Communication Review,
  ACM Mobile Computing and Communication Review,
  IEEE Communications Letters,
  Computer Networks magazine,
  IEEE Network magazine.

- Served as a referee for many conferences such as:

  ACM Sigcomm,
  IEEE Infocom Conference,
  IEEE International Conference on Network Protocols,
  IEEE Globecom Conference,
  International Conference on Computer Communications and Networks,
  IEEE International Conference on Communications,
  ACM SIGMETRICS/PERFORMANCE,
  IEEE International Symposium on Computers and Communications,
  International Symp. on Modeling, Analysis & Simulation of Comp. and Telecomm. Systems,
  Conference on Network Control and Engineering,
  ACM Multimedia Conference,
  International Conference on Internet Computing,

Communication Networks and Distributed Systems Modeling and Simulation Conference,
IEEE Vehicular Technology Conference,
Personal Wireless Communications Conference,
IEEE International Conference on Distributed Computing Systems,
International Conference on Parallel and Distributed Systems,
IEEE American Control Conference,
Fault-Tolerant Computing Symposium,
IEEE Real-Time Technology and Applications Symposium,
IEEE Real-Time Systems Symposium,
Symposium on Principles of Distributed Computing,
Compass Conference,
International Conference on Multimedia Computing and Systems,
Internationa Conference on High Performance Computing Conference,
ACM Symposium on Principles of Distributed Computing,
IEEE International Conference on Universal Personal Communications,
Networld+Interop Engineers Conference,
Y2000 Zurich Seminar,
Networking Conference,
Consortium for Computing in Small Colleges Northeastern Conference.

- Served as a judge at the BostonHacks (2018) and SheHacks (2018).

Service to Community

- Youth Soccer Coach, Wayland, MA. Licensed "F" from Mass Youth Soccer.
  - Girls U16, BAYS League, Division 1A1, Spring 2016.
  - Boys U18/19, BAYS League, Division 3A1, Spring 2016.
  - Boys U14, BAYS League, Division 2E, Spring 2015. Team reached playoffs.
  - Boys U14, BAYS League, Division 2G, Fall 2014.
  - Boys U14, BAYS League, Division 2E, Spring 2014. Team reached playoffs.
  - Boys U14, BAYS League, Division 2B, Fall 2013.
  - Boys U12, BAYS League, Division 2B, Spring 2013. Team reached playoff semifinals.
  - Boys U12, BAYS League, Division 2B, Fall 2012.
  - Boys U11, BAYS League, Division 2B, Spring 2012.
  - Boys U11, BAYS League, Division 2A, Fall 2011.
  - Girls U11, BAYS League, Division 3L, Fall 2011.
  - Boys U10, BAYS League, Division 2F, Spring 2011.
  - Boys U10, BAYS League, Division 3B1, Fall 2010.
  - Boys U9, BAYS League, Division 3A, Spring 2010.

- Computer Science representative in the Wayland High School Annual Career Colloquium since its inception in 2009 (2009, 2010, 2011, 2012, 2013, 2014, 2015, 2017, 2018).