Curriculum Vitae

Abraham (Ibrahim) Matta

May 2009

Computer Science Department
Boston University
Boston, MA 02215, USA

office: (617) 358-1062
fax: (617) 353-6457

email: matta@cs.bu.edu
URL: www.cs.bu.edu/faculty/matta

Research Interests

Transport and routing protocols for the Internet and wireless networks; feedback-based control design and analysis; architectures for protocol design and large-scale traffic management; modeling and performance evaluation.

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

Computer Science Department, Boston University
Associate Professor *September 2003 – present*
Director of Graduate Studies *September 2007 – present*
Director of Laboratory Operations *September 2003 – August 2005*
Assistant Professor *July 1999 – August 2003*

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

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 – June 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 CCF – SRS ($400,000) *09/01/08 – 08/31/11*
  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."
- Movik Support for Application Performance over 3G/UMTS ($30,000) *07/01/08 – 12/31/08*
  Principal Investigator.
- NSF CSR – EHS/CPS ($99,999) *09/01/07 – 08/31/10*
  Co-Principal Investigator with Azer Bestavros and Assaf Kfoury, "snBench: An Integrated Programming and Verification Environment for the Compositional Development of Cyber-Physical Systems."
- 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).
- 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

- Best Paper Award in DCOSS'08, Applications Track, 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.
- Provisional Patent Application entitled "JTP: An Energy-conscious Transport Protocol for Wireless Ad Hoc Networks", August 2006.
- U.S. Patent Application 11/096,735 entitled "Providing Soft Bandwith Guarantees using Elastic TCP-Based Tunnels", November 24, 2005.
- 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.

Articles in Journals

[1] 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.

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

[3] 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.

[4] 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.

[5] 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.

[6] 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.

[7] 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.

[8] 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.

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

[10] 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.

[11] 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.

[12] 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.

[13] 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.

[14] 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.

[15] 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.

[16] 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.

[17] 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.

[18] 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.

[19] 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] 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.

[2] 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.

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

[4] 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] 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.

[2] 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.

[3] 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**.

[4] 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.

[5] 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.

[6] 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.

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

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

[9] Mina Guirguis, Azer Bestavros, Ibrahim Matta, and Yuting Zhang. Reduction of Quality (RoQ) Attacks on Dynamic Load Balancers: Vulnerability Assessment and Design Tradeoffs. In *Proceedings of IEEE Infocom*, Anchorage, Alaska, May 2007.

[10] Mina Guirguis, Azer Bestavros, and Ibrahim Matta. On the Impact of Low-Rate Attacks. In *Proceedings of the* 41st *IEEE International Conference on Communications (ICC'06)*, Istanbul, Turkey, June 2006.

[11] Georgios Smaragdakis, Nikolaos Laoutaris, Ibrahim Matta, Azer Bestavros, and Ioannis Stavrakakis. A Feedback Control Approach to Mitigating Mistreatment in Distributed Caching Groups. In *Proceedings of IFIP Networking 2006*, Coimbra, Portugal, May 2006.

[12] Azer Bestavros, Adam Bradley, Assaf Kfoury, and Ibrahim Matta. Typed Abstraction of Complex Network Compositions. In *Proceedings of the 13th IEEE International Conference on Network Protocols (ICNP'05)*, Boston, MA, November 2005.

[13] Yuting Zhang, Azer Bestavros, Mina Guirguis, Ibrahim Matta, and Richard West. Friendly Virtual Machines: Leveraging a Feedback-Control Model for Application Adaptation. In *Proceedings of the 2005 ACM/USENIX Conference on Virtual Execution Environments*, Chicago, Illinois, June 2005.

[14] Mina Guirguis, Azer Bestavros, and Ibrahim Matta. Reduction of Quality (RoQ) Attacks on Internet End-Systems. In *Proceedings of IEEE Infocom*, Miami, Florida, March 2005.

[15] Abhishek Sharma, Azer Bestavros, and Ibrahim Matta. dPAM: A Distributed Prefetching Protocol for Scalable Asynchronous Multicast in P2P Systems. In *Proceedings of IEEE Infocom*, Miami, Florida, March 2005.

[16] Hany Morcos, Ibrahim Matta, and Azer Bestavros. BiPAR: A Bimodal Power-Aware Routing Protocol for Wireless Sensor Networks. In *Proceedings of the First International Computer Engineering Conference (ICENCO 2004)*, Cairo, Egypt, December 2004.

[17] Mina Guirguis, Azer Bestavros, and Ibrahim Matta. Routing Tradeoffs inside a d-dimensional Torus with applicability to CAN. In *Proceedings of the First International Computer Engineering Conference (ICENCO 2004)*, Cairo, Egypt, December 2004.

[18] Dhiman Barman, Georgios Smaragdakis, and Ibrahim Matta. The Effect of Router Buffer Size on HighSpeed TCP Performance. In *Proceedings of Global Internet and Next Generation Networks Symposium, IEEE Global Telecommunications Conference (Globecom'04)* , Dallas, TX, December 2004.

[19] Mina Guirguis, Azer Bestavros, and Ibrahim Matta. Bandwidth Stealing via Link Targeted RoQ Attacks. In *Proceedings of the Second IASTED International Conference on Communication and Computer Networks (CCN'04)*, Cambridge, Massachusetts, November 2004.

[20] Selma Yilmaz and Ibrahim Matta. A Randomized Solution to BGP Divergence. In *Proceedings of the Second IASTED International Conference on Communication and Computer Networks (CCN'04)*, Cambridge, Massachusetts, November 2004.

[21] Vijay Erramilli, Ibrahim Matta, and Azer Bestavros. On the Interaction between Data Aggregation and Topology Control in Wireless Sensor Networks. In *Proceedings of the First IEEE Communications Society Conference on Sensor and Ad Hoc Communications and Networks (IEEE SECON 2004)*, Santa Clara, CA, October 2004.

[22] Mina Guirguis, Azer Bestavros, and Ibrahim Matta. Exploiting the Transients of Adaptation for RoQ Attacks on Internet Resources. In *Proceedings of the 12th IEEE International Conference on Network Protocols (ICNP'04)*, Berlin, Germany, October 2004.

[23] Mina Guirguis, Azer Bestavros, Ibrahim Matta, Niky Riga, Gali Diamant, and Yuting Zhang. Providing Soft Bandwidth Guarantees Using Elastic TCP-based Tunnels. In *Proceedings of ISCC '2004: The Ninth IEEE Symposium on Computers and Communications*, Alexandria, Egypt, June 2004.

[24] Dhiman Barman and Ibrahim Matta. Model-based Loss Inference by TCP over Heterogeneous Networks. In *Proceedings of WiOpt'04: Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks*, University of Cambridge, UK, March 2004.

[25] Dhiman Barman, Ibrahim Matta, Eitan Altman, and Rachid El Azouzi. TCP Optimization through FEC, ARQ and Transmission Power Tradeoffs. In *Proceedings of WWIC 2004: The 2nd International Conference on Wired/Wireless Internet Communications*, Frankfurt (Oder), Germany, February 2004.

[26] Dhiman Barman and Ibrahim Matta. Effectiveness of Loss Labeling in Improving TCP Performance in Wired/Wireless Networks. In *Proceedings of ICNP'2002: The 10th IEEE International Conference on Network Protocols*, Paris, France, November 2002.

[27] Liang Guo and Ibrahim Matta. The War between Mice and Elephants. In *Proceedings of ICNP'2001: The 9th IEEE International Conference on Network Protocols*, Riverside, CA, November 2001.

[28] Shudong Jin, Liang Guo, Ibrahim Matta, and Azer Bestavros. TCP friendly SIMD Congestion Control and Its Convergence Behavior. In *Proceedings of ICNP'2001: The 9th IEEE International Conference on Network Protocols*, Riverside, CA, November 2001.

[29] Liang Guo, Mark Crovella, and Ibrahim Matta. How does TCP Generate Pseudo-Self-Similarity? In *Proceedings of MASCOTS '01: The International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems*, Cincinnati, Ohio, August 2001.

[30] Alberto Medina, Anukool Lakhina, Ibrahim Matta, and John Byers. BRITE: An Approach to Universal Topology Generation. In *Proceedings of MASCOTS '01: The International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems*, Cincinnati, Ohio, August 2001.

[31] Selma Yilmaz and Ibrahim Matta. On Class-Based Isolation of UDP, Short-Lived and Long-Lived TCP Flows . In *Proceedings of MASCOTS '01: The International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems*, Cincinnati, Ohio, August 2001.

[32] Ibrahim Matta and Liang Guo. Differentiated Predictive Fair Service for TCP Flows. In *Proceedings of ICNP'2000: The 8th IEEE International Conference on Network Protocols*, Osaka, Japan, October 2000.

[33] Jaehee Yoon, Azer Bestavros, and Ibrahim Matta. SomeCast: A Paradigm for Real-Time Adaptive Reliable Multicast. In *Proceedings of RTAS'2000: The IEEE Real-Time Technology and Applications Symposium*, Washington, DC, May 2000.

[34] Jaehee Yoon, Azer Bestavros, and Ibrahim Matta. Adaptive Reliable Multicast. In *Proceedings of ICC'2000: The IEEE International Conference on Communications*, New Orleans, June 2000.

[35] Karu Ratnam, Ibrahim Matta, and Sampath Rangarajan. A Fully Distributed Location Management Scheme for Large PCS. In *Proceedings of ISCC '2000: The Fifth IEEE Symposium on Computers and Communications*, Antibes-Juan les Pins, France, July 2000.

[36] Karu Ratnam, Ibrahim Matta, and Sampath Rangarajan. Analysis of Caching-based Location Management in Personal Communication Networks. In *Proceedings of ICNP '99: The 7th International Conference on Network Protocols*, Toronto, Canada, November 1999.

[37] Ibrahim Matta and Liang Guo. On Routing Real-Time Multicast Connections. In *Proceedings of ISCC '99: The Fourth IEEE Symposium on Computers and Communications*, Red Sea, Egypt, June 1999.

[38] Liang Guo and Ibrahim Matta. Search Space Reduction in QoS Routing. In *Proceedings of ICDCS '99: The 19th International Conference on Distributed Computing Systems*, Austin, Texas, June 1999.

[39] Liang Guo and Ibrahim Matta. QDMR: An Efficient QoS Dependent Multicast Routing Algorithm. In *Proceedings of RTAS '99: The Fifth IEEE Real-Time Technology and Applications Symposium*, Vancouver, British Columbia, Canada, June 1999.

[40] Ibrahim Matta and Mohamed Eltoweissy. A Scalable QoS Routing Architecture for Real-Time CSCW Applications. In *Proceedings of RTAS'98: The Fourth IEEE Real-Time Technology and Applications Symposium*, Denver, Colorado, June 1998.

[41] Ibrahim Matta, MMohamed Eltoweissy, and Karl Lieberherr. From CSCW Applications to Multicast Routing: An Integrated QoS Architecture. In *Proceedings of ICC'98: The IEEE International Conference on Communications*, Atlanta, Georgia, June 1998.

[42] Karu Ratnam and Ibrahim Matta. WTCP: An Efficient Mechanism for Improving TCP Performance over Wireless Links. In *Proceedings of ISCC '98: The Third IEEE Symposium on Computer and Communications*, Athens, Greece, June 1998.

[43] Mohamed Eltoweissy and Ibrahim Matta. Computer Supported Generative Learning. In *Proceedings of ICTE '98: The International Conference on Technology and Education*, Santa Fe, New Mexico, March 1998.

[44] Ibrahim Matta and Azer Bestavros. A Load Profiling Approach to Routing Guaranteed Bandwidth Flows. In *Proceedings of IEEE INFOCOM '98: The Conference on Computer Communications*, March 1998.

[45] Azer Bestavros and Ibrahim Matta. Load Profiling for Efficient Route Selection in Multi-Class Networks. In *Proceedings of ICNP '97: The IEEE International Conference on Network Protocols*, Atlanta, Georgia, 1997.

[46] Mohamed Eltoweissy and Ibrahim Matta. A Framework for Computer Supported Generative Learning. In *Proceedings of ESCCC '97: The 13th Eastern Small College Computing Conference*, pages 197–206, Stockton, NJ, October 1997.

[47] Ibrahim Matta and Marwan Krunz. Packing and Least-Loaded Based Routing in Multi-Rate Loss Networks. In *Proceedings of ICC '97: The IEEE International Conference on Communications*, pages 827–831, Montreal, Quebec, Canada, June 1997.

[48] Ibrahim Matta and A. Udaya Shankar. Dynamic Routing of Real-Time Virtual Circuits. In *Proceedings of ICNP '96: The IEEE International Conference on Network Protocols*, Columbus, Ohio, October 1996.

[49] Ibrahim Matta and A. Udaya Shankar. *Z*-Iteration: A Simple Method for Throughput Estimation in Time-Dependent Multi-Class Systems. In *Proceedings of ACM SIGMETRICS / PERFORMANCE '95*, pages 126–135, Ottawa, Canada, May 1995.

[50] Cengiz Alaettinoglu, Ibrahim Matta, and A. Udaya Shankar. A Scalable Virtual Circuit Routing Scheme for ATM Networks. In *Proceedings of ICCCN '95: The International Conference on Computer Communications and Networks*, pages 630–637, Las Vegas, Nevada, September 1995.

[51] Ibrahim Matta and A. Udaya Shankar. Type-of-Service Routing in Dynamic Datagram Networks. In *Proceedings of IEEE INFOCOM '94: The Conference on Computer Communications*, pages 992–999, Toronto, Ontario, Canada, June 1994.

[52] Ibrahim Matta and A. Udaya Shankar. An Iterative Approach to Comprehensive Performance Evaluation of Integrated Services Networks. In *Proceedings of ICNP '94: The IEEE International Conference on Network Protocols*, Boston, Massachusetts, October 1994.

[53] Ibrahim Matta and Khalil Ahmed. End-to-End Flow Control for Tandem Packet Radio Networks. In *Proceedings of ICCCN '93: The Second International Conference on Computer Communications and Networks*, San Diego, California, June 1993.

[54] A. Udaya Shankar, Cengiz Alaettinoğlu, Ibrahim Matta, and Klaudia Dussa-Zieger. Performance Comparison of Routing Protocols using MaRS: Distance-Vector versus Link-State. In *Proceedings of ACM SIGMETRICS / PERFORMANCE*, volume 20, pages 181–192, Newport, Rhode Island, June 1992.

Articles in Refereed Workshops

[1] John Day, Ibrahim Matta, and Karim Mattar. "Networking is IPC": A Guiding Principle to a Better Internet. In *Proceedings of ReArch'08 - Re-Architecting the Internet*, Madrid, SPAIN, December 2008. Co-located with ACM CoNEXT 2008.

[2] Gali Diamant, Leonid Veytser, Ibrahim Matta, Azer Bestavros, Mina Guirguis, Liang Guo, Yuting Zhang, and Sean Chen. itmBench: Generalized API for Internet Traffic Managers. In *Proceedings of the 10th IEEE Workshop on Computer-Aided Modeling, Analysis and Design of Communication Links and Networks (CAMAD '04)*, Dallas, TX (in conjunction with Globecom 2004), December 2004.

[3] Abhishek Sharma, Azer Bestavros, and Ibrahim Matta. Performance Evaluation of Distributed Prefetching for Asynchronous Multicast in P2P Networks. In *Proceedings of the Ninth International Workshop on Web Content Caching and Distribution*, Bejing, China, October 2004.

[4] Niky Riga, Ibrahim Matta, and Azer Bestavros. DIP: Density Inference Protocol for wireless sensor networks and its application to density-unbiased statistics. In *Proceedings of the Second International Workshop on Sensor and Actuator Network Protocols and Applications (SANPA '04)*, Boston, MA (in conjunction with Mobiquitous 2004), August 2004.

[5] Georgios Smaragdakis, Ibrahim Matta, and Azer Bestavros. SEP: A Stable Election Protocol for clustered heterogeneous wireless sensor networks. In *Proceedings of the Second International Workshop on Sensor and Actuator Network Protocols and Applications (SANPA '04)*, Boston, MA (in conjunction with Mobiquitous 2004), August 2004.

[6] Jun Liu, Ibrahim Matta, and Mark Crovella. End-to-end Inference of Loss Nature in Hybrid Wired/Wireless Environment. In *Proceedings of WiOpt'03: Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks*, INRIA Sophia-Antipolis, France, March 2003.

[7] Anukool Lakhina, John Byers, Mark Crovella, and Ibrahim Matta. On the Geographic Location of Internet Resources. In *Proceedings of the Internet Measurement Workshop*, Marseille, France, November 2002. Short Abstract.

[8] Ibrahim Matta. On Network Resource Management for End-to-End QoS. In *Workshop on Wide Area Networks and High Performance Computing*, volume 249 of *Lecture Notes in Control and Information Sciences*, pages 199–218, Essen, Germany, 1999. Springer Verlag.

[9] Liang Guo and Ibrahim Matta. On State Aggregation for Scalable QoS Routing. In *Proceedings of the IEEE ATM '98 Workshop*, Fairfax, VA, May 1998.

[10] Ibrahim Matta and A. Udaya Shankar. On the Interaction between Gateway Scheduling and Routing. In *Proceedings of MASCOTS '94: The International Workshop on Modeling, Analysis and Simulation of Computer and Telecommunications Systems*, pages 84–88, Durham, North Carolina, January 1994.

Refereed Poster Papers

[1] Gabriele Ferrari Aggradi, Flavio Esposito, and Ibrahim Matta. Supporting Predicate Routing in DTN over MANET. In *Proceedings of ACM MobiCom Workshop on Challenged Networks (CHANTS 2008)*, San Francisco, CA, September 2008. **Demo**.

[2] Niky Riga, Alberto Medina, Ibrahim Matta, Craig Partridge, Jason Redi, and Isidro Castineyra. Transport Services for Energy Constrained Environments. In *Proceedings of ACM SIGCOMM'05*, Philadelphia, PA, August 2005. Work-in-progress Session.

[3] Hany Morcos, Ibrahim Matta, and Azer Bestavros. M2RC: Multiplicative-increase/additive-decrease Multipath Routing Control for Wireless Sensor Networks. In *Proceedings of the Second ACM Conference on Embedded Networked Sensor Systems (ACM SenSys '04)*, Baltimore, Maryland, November 2004. Poster.

[4] Mina Guirguis, Azer Bestavros, and Ibrahim Matta. Adaptation=Vulnerability: Under RoQ Attacks. In *Proceedings of the ACM SIGCOMM 2004*, Portland, Oregon, September 2004. Poster.

[5] Kanishka Gupta, Azer Bestavros, and Ibrahim Matta. Context-aware Real-time Scheduling. In *Proceedings of the IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS 2004)*, Toronto, Canada, May 2004. Work-in-progress Session.

[6] Mina Guirguis, Azer Bestavros, and Ibrahim Matta. XQM: eXogenous-loss aware Queue Management. In *Proceedings of ICNP 2003: The 11th IEEE International Conference on Network Protocols*, Atlanta, Georgia, November 2003. Poster.

[7] Liang Guo and Ibrahim Matta. Scheduling Flows with Unknown Sizes: An Approximate Analysis. In *Proceedings of ACM SIGMETRICS '2002*, Marina Del Rey, CA, June 2002. Poster.

[8] Ibrahim Matta and Daniel Ryan. Optimal Transmission of Data Over Multi-Hop Networks. In *Proceedings of ICCCN '96: The 5th International Conference on Computer Communications and Networks*, Rockville, MD, October 1996. Poster.

Invited Papers

[1] Liang Guo and Ibrahim Matta. Differentiated Control of Web Traffic: A Numerical Analysis. In *Proceedings of SPIE ITCOM'2002: Scalability and Traffic Control in IP Networks*, Boston, MA, August 2002.

[2] Selma Yilmaz and Ibrahim Matta. On the Scalability-Performance Tradeoffs in MPLS and IP Routing. In *Proceedings of SPIE ITCOM'2002: Scalability and Traffic Control in IP Networks*, Boston, MA, August 2002.

[3] Ibrahim Matta and Azer Bestavros. QoS Controllers for the Internet. In *Proceedings of the NSF Workshop on Information Technology*, Cairo, Egypt, March 2000.

[4] Karu Ratnam and Ibrahim Matta. Effect of Local Retransmission at Wireless Access Points on the Round Trip Time Estimation of TCP. In *Proceedings of IEEE 31st Annual Simulation Symposium*, April 1998.

Unrefereed Technical Contributions

[1] Gonca Gursun, Ibrahim Matta, and Karim Mattar. On the Performance and Robustness of Managing Reliable Transport Connections. Technical Report BUCS-TR-2009-014, CS Department, Boston University, April 17 2009.

[2] Sam Epstein, Karim Mattar, and Ibrahim Matta. Principles of Safe Policy Routing Dynamics. Technical Report BUCS-TR-2009-013, CS Department, Boston University, April 17 2009.

[3] Flavio Esposito and Ibrahim Matta. PreDA: Predicate Routing for DTN Architectures over MANET. Technical Report BUCS-TR-2009-012, CS Department, Boston University, April 3 2009.

[4] Hany Morcos, Azer Bestavros, and Ibrahim Matta. Preferential Field Coverage Through Detour-Based Mobility Coordination. Technical Report BUCS-TR-2009-010, CS Department, Boston University, March 30 2009.

[5] Karim Mattar, Sam Epstein, and Ibrahim Matta. Foundational Theory for Understanding Policy Routing Dynamics. Technical Report BUCS-TR-2009-001, CS Department, Boston University, January 30 2009.

[6] Karim Mattar, Ibrahim Matta, John Day, Vatche Ishakian, and Gonca Gursun. Declarative Transport: No more transport protocols to design, only policies to specify. Technical Report BUCS-TR-2008-014, CS Department, Boston University, July 12 2008.

[7] Hany Morcos, Azer Bestavros, and Ibrahim Matta. Detour-Based Mobility Coordination in DTNs. Technical Report BUCS-TR-2008-004, CS Department, Boston University, February 10 2008.

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[9] Yarom Gabay, Assaf Kfoury, Likai Liu, Azer Bestavros, Adam Bradley, and Ibrahim Matta. Type Systems for a Network Specification Language With Multiple-Choice Let. Technical Report BUCS-TR-2005-034, CS Department, Boston University, December 28 2005.

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[11] Nada Golmie and Ibrahim Matta. Guest Editorial. *Elsevier Computer Communications Journal—Special Issue on Applications and Services in Wireless Networks*, 28(14), September 2005.

[12] Likai Liu, Assaf Kfoury, Azer Bestavros, Adam Bradley, Yarom Gabay, and Ibrahim Matta. Safe Compositional Specification of Networking Systems: TRAFFIC The Language and Its Type Checking. Technical Report BUCS-TR-2005-015, CS Department, Boston University, May 2005.

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[15] Alberto Medina, Kave Salamatian, Nina Taft, Ibrahim Matta, Yolanda Tsang, and Christophe Diot. On the Convergence of Statistical Techniques for Inferring Network Traffic Demands. Technical Report BU-CS-2003-003, Boston University, Computer Science Department, Boston, MA 02215, February 2003.

[16] Selma Yilmaz and Ibrahim Matta. Unicast Routing: Cost-Performance Tradeoffs. Technical Report BU-CS-2002-018, Boston University, Computer Science Department, Boston, MA 02215, May 2002.

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

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[21] Azer Bestavros, John Byers, Mark Crovella, Paul Barford, Ibrahim Matta, and Michael Mitzenmacher. BU/NSF Workshop on Internet Measurement Instrumentation and Characterization. Technical Report BU-CS-1999-019, Boston University, Computer Science Department, Boston, MA 02215, December 1999.

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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.

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.

Selected Talks and Colloquia

"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 21st 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

- 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.
  http://www.cs.bu.edu/faculty/matta/Teaching/cs455

- I co-teach 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.
  http://www.cs.bu.edu/fac/reyzin/teaching/s07cs697/

- 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.
  http://www.cs.bu.edu/faculty/matta/Teaching/cs556/S09

- I developed an Internet Teaching Laboratory to provide hands-on experience as part of CS 556. The lab also provides support to other systems courses, including CS 553 (Experimental Operating Systems) and CS 670 (Performance Analysis).
  http://www.cs.bu.edu/faculty/matta/Teaching/ITL

- 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.
  http://www.cs.bu.edu/faculty/matta/Teaching/cs210

- 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.
  http://www.cs.bu.edu/faculty/best/courses/cs559

- 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).
  http://www.cs.bu.edu/faculty/matta/Teaching/CS552/F99

- 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 supervise and participate in reading and research groups aimed at introducing students to latest research results and developments:

  – Network Reading Group: http://www.cs.bu.edu/groups/nrg/

  - Topology Modeling Group: http://www.cs.bu.edu/groups/tmg/
  - Real-Time Computation and Communication Group: http://www.cs.bu.edu/groups/realtime/

- I supervised many projects that broaden the knowledge of students in networking and systems building. These student projects include 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. http://www.cs.bu.edu/faculty/matta/pre-courses.html

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.
  - 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 BBN Technologies, Cambridge, Massachusetts.
  - 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.
  - 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.
  - Niky Riga, Ph.D. candidate, in progress, started September 2003.
  - Karim Mattar, Ph.D. candidate, in progress, started January 2004.

- PhD Advising

  - Flavio Esposito, Ph.D. student, in progress, started January 2007.
  - Gonca Gursun, Ph.D. student, in progress, started September 2007.

- 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.

- Senior Independent Work

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

- Committee Member

  - Kyle Burke (PhD Thesis Defense, April 2009, Advisor: Dr. Shanghua Teng)
  - Kebin Wang (PhD Thesis Defense, June 2009, Chair, Advisor: Dr. Shanghua Teng)
  - Vijay Erramili (PhD Thesis Defense, December 2008, Advisor: Dr. Mark Crovella)
  - Nahur Fonseca (PhD Thesis Defense, November 2008, Chair, Advisor: Dr. Mark Crovella)
  - Nahur Fonseca (PhD Thesis Proposal, September 2008, Advisor: Dr. Mark Crovella)
  - George Smaragdakis (PhD Thesis Defense, August 2008, Advisor: Dr. Azer Bestavros)
  - Michael Ocean (PhD Thesis Defense, July 2008, 3rd Reader, Advisor: Dr. Azer Bestavros)
  - Hany Morcos (PhD Thesis Defense, July 2008, Co-advisor)
  - Hany Morcos (PhD Thesis Proposal, February 2008, Co-advisor)
  - Michael Ocean (PhD Thesis Proposal, Feb 2008, 3rd Reader and Chair, Advisor: Dr. Bestavros)
  - Niky Riga (PhD Oral Exam, January 2008, Advisor)
  - George Smaragdakis (PhD Oral Exam, October 2007, Advisor: Dr. Azer Bestavros)
  - Michael Ocean (PhD Oral Exam, June 2007, Advisor: Dr. Azer Bestavros)
  - Jorge Londono (PhD Oral Exam, June 2007, Advisor: Dr. Azer Bestavros)
  - Gerald Fry (PhD Oral Exam, May 2007, Advisor: Dr. Rich West)
  - Karim Mattar (PhD Oral Exam, December 2006, Advisor)
  - Hany Morcos (PhD Oral Exam, December 2006, Co-advisor)
  - Nahur Fonseca (PhD Oral Exam, December 2006, 3rd Reader, Advisor: Dr. Mark Crovella)
  - Yuting Zhang (PhD Thesis Defense, August 2006, 3rd Reader, Advisor: Dr. Rich West)
  - Mina Guirguis (PhD Thesis Defense, August 2006, Co-advisor)
  - Selma Yilmaz (PhD Thesis Defense, August 2005, Major Advisor)
  - Yuting Zhang (PhD Thesis Proposal, June 2006, 3rd Reader, Advisor: Dr. Rich West)
  - Mina Guirguis (PhD Thesis Proposal, May 2006, Co-advisor)
  - Yuting Zhang (PhD Oral Exam, October 2004, 3rd Reader, Advisor: Dr. Rich West)
  - Mina Guirguis (PhD Oral Exam, June 2004, Co-advisor)
  - Gu-In Kwon (PhD Thesis Defense, May 2004, 2nd Reader, Advisor: Dr. John Byers)
  - Tao Wang (M.A. Thesis Defense, April 2004, Co-Advisor)
  - Gu-In Kwon (PhD Proposal Defense, November 2003, 2nd Reader, Advisor: Dr. John Byers)
  - Adam Bradley (PhD Thesis Defense, September 2003, 4th Reader, Advisor: Dr. Azer Bestavros)
  - Adam Bradley (PhD Proposal Defense, May 2003, 4th Reader, Advisor: Dr. Azer Bestavros)

- Liang Guo (PhD Thesis Defense, April 2003, Major Advisor)
- Shudong Jin (PhD Thesis Defense, April 2003, 2nd Reader, Advisor: Dr. Azer Bestavros)
- Trevor MacDowell (B.A. Work for Distinction Defense, April 2003, Major Advisor)
- Ryan Mahon (B.A. Work for Distinction Defense, Apr 2003, 3rd Reader, Advisor: Dr. J. Byers)
- Marwan Fayed (M.A. Thesis Defense, April 2003, 3rd Reader, Advisor: Dr. John Byers)
- Dhiman Barman (M.A. Thesis Defense, April 2003, Major Advisor)
- Alberto Medina (PhD Thesis Defense, March 2003, Major Advisor)
- Jun Liu (PhD Defense, May 2002, 2nd Reader, Advisor: Dr. Mark Crovella)
- Selma Yilmaz (PhD Oral Exam, May 2002, Major Advisor)
- Liang Guo (PhD Proposal Defense, May 2002, Major Advisor)
- Alberto Medina (PhD Proposal Defense, May 2002, Major Advisor)
- Shudong Jin (PhD Proposal Defense, April 2002, 2nd Reader, Advisor: Dr. Azer Bestavros)
- Jun Liu (PhD Proposal Defense, March 2002, 2nd Reader, Advisor: Dr. Mark Crovella)
- Raj Ashar (BA Project Defense, December 2001, Advisor: Dr. Rich West)
- Khaled Harfoush (PhD Defense, November 2001, 3rd Reader, Advisor: Dr. Azer Bestavros)
- Sumit Mehrotra (MA Thesis Defense, June 2001, Advisor: Dr. Azer Bestavros)
- Shudong Jin (PhD Oral Exam, Spring 2001, 2nd Reader, Advisor: Dr. Azer Bestavros)
- Khaled Harfoush (PhD Proposal Defense, Feb 2001, 3rd Reader, Advisor: Dr. Azer Bestavros)
- Paul Barford (PhD Defense, December 2000, Advisor: Dr. Mark Crovella)
- Liang Guo (PhD Oral Exam, Fall 2000, Major Advisor)
- Alberto Medina (PhD Oral Exam, Fall 2000, Major Advisor)
- Jaehee Yoon (PhD Oral Exam, Fall 2000, Major Advisor)
- Khaled Harfoush (M.A. Thesis Defense, Fall 2000, 3rd Reader, Advisor: Dr. Azer Bestavros)
- Stanislav Rost (Work for Distinction Defense, April 2000, Advisor: Dr. John Byers)
- Karu Ratnam (PhD Thesis Defense, Northeastern U., Oct 1999, Major Advisor)
- Muxiang Zhang (PhD Thesis Proposal, Northeastern U., June 1999, Advisor: Dr. Agnes Chan)

• External Committee Member

- Gabriele Ferrari Aggradi (M.Eng., U. of Florence, July 08, Co-advisor: Dr. Romano Fantacci)
- Dhananjay Raghunathan (PhD Proposal Defense, BU, May 08, Advisor: Dr. John Baillieul)
- Lin Wing Kai (MS Thesis, Chinese U. of Hong Kong, Aug 05, Advisor: Dr. Dah Ming Chiu)
- Chi Zhang (PhD Thesis Defense, Northeastern U., May 2003, Advisor: Dr. V. Tsaoussidis)
- Adrian Lahanas (PhD Thesis Defense, Northeastern U., May 2003, Advisor: Dr. Tsaoussidis)
- Keqin Zhu (PhD Thesis Defense, U. of Ottawa, Canada, March 2003, Advisor: Dr. Hasan Ural)
- Manav Khanna (MS Thesis Defense, Northeastern U., Jun 2002, Advisor: Dr. V. Tsaoussidis)
- Muxiang Zhang (PhD Thesis Defense, Northeastern U., May 2000, Advisor: Dr. Agnes Chan)
- Tamer Dag (PhD Thesis Defense, Northeastern U., Mar 1999, Advisor: Dr. Ioannis Stavrakakis)

- Zoe Antoniou (PhD Thesis Defense, Northeastern U., Mar 1999, Advisor: Dr. Ioannis Stavrakakis)
- Cesar Santivanez (MS Thesis Defense, Northeastern U., Aug 98, Advisor: Dr. Ioannis Stavrakakis)
- Firass Abi-Nassif (MS Thesis Defense, Northeastern U., Aug 98, Advisor: Dr. Ioannis Stavrakakis)
- Jeff Capone (PhD Thesis Defense, Northeastern U., May 1997, Advisor: Dr. Ioannis Stavrakakis)
- Jeff Capone (PhD Thesis Proposal, Northeastern U., Mar 1997, Advisor: Dr. Ioannis Stavrakakis)
- Tamer Dag (MS Thesis Defense, Northeastern U., Feb 1997, Advisor: Dr. Ioannis Stavrakakis)
- Steve Iatrou (MS Thesis Defense, Northeastern U., Feb 1997, Advisor: Dr. Ioannis Stavrakakis)
- Karu Ratnam (PhD Thesis Proposal, Northeastern, Sep 96, Advisor: Dr. Sampath Rangarajan)
- Vanitha Aravamudhan (MS Thesis Defense, Northeastern, May 96, Advisor: Dr. S. Rangarajan)
- Jianyu Zeng (PhD Thesis Defense, Northeastern U., May 96, Advisor: Dr. 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.

- Director of Graduate Studies *2007 – present*
- 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*
- Director of Laboratory Operations *2003 – 2005*
- Member of the Faculty Annual Review Committee *2003 – 2004*
- Member of the Graduate Research Excellence Award Committee *2004*
- 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*
- Co-organizer of the WING (Web and InterNetworking Group) Workshop *2000 – present*
- Director of QoS Networking Laboratory *1999 – present*
- 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

- 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.
- Member of the Steering Committee of the International Conference on Wired/Wireless Internet Communications (WWIC), February 2005 - present.
- General Chair, the 4th International Symposium on Modeling and Optimization in Mobile, Ad-hoc, and Wireless Networks (WiOpt 2006), Boston, MA.
- Technical Program Co-chair, the 3rd Workshop on Measurement, Modeling, and Performance Analysis of Wireless Sensor Networks (SenMetrics 2005), San Diego, CA.
- Co-organizer and Technical Program Co-chair, the 13th 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 4th Workshop on Applications and Services in Wireless Networks (ASWN 2004), Boston, MA.
- Technical Program Co-chair, the 1st International Workshop on Wired/Wireless Internet Communications (WWIC 2002), in conjunction with the 3rd International Conference on Internet Computing.
- Co-organizer, Student Poster Session, the 11th IEEE International Conference on Network Protocols (ICNP 2003), Atlanta, Georgia.
- Executive Committee Member:
  - 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.

- Guest Co-Editor:
  - Report on NeXtworking 2003, COST-IST (EU) / NSF-ANIR (USA) workshop, Crete, Greece.
  - Special Issue on "Applications and Services in Wireless Networks", Elsevier Computer Communications Journal, September 2005.
  - Special Issue on "Reliable Transport Protocols for Mobile Computing", the Journal of Wireless Communications and Mobile Computing, February 2002.
  - Special Issue on "Quality of Service Routing", the IEEE Communications Magazine, June 2002.

- Program Committee Member:
  - ICNP (IEEE International Conference on Network Protocols), 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2006, 2007, 2009.
  - CoNEXT (Conference on Future Networking Technologies), 2006, 2007, 2009.
  - IFIP MedHocNet (The 8th IFIP Annual Mediterranean Ad Hoc Networking Workshop Med-Hoc-Net), 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.
  - LANMAN (IEEE Workshop on Local and Metropolitan Area Networks), 2007.
  - IFIP-TC6 Networking, 2004, 2007.
  - ICDCS (IEEE International Conference on Distributed Computing Systems), 2002, 2007.
  - IEEE Infocom, 1999, 2003, 2004, 2005, 2006.
  - WWIC (International Workshop on Wired/Wireless Internet Communications), 2002, 2004, 2005.
  - IFIP-TC6 WAC (International Workshop on Autonomic Communication), 2004, 2005.
  - Mobiquitous (International Conference on Mobile and Ubiquitous Systems: Networking and Services), 2005.
  - 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 Next Generation Wireless Networks, 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.
  - 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.
- 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, and Research Resources.
- Senior Member of both the ACM and the IEEE.
- Served as a referee for the National Science Foundation, and the GENI Project Office (2008, 2009)
- 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.
- 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.