

Mostafa H. Ammar
Regents' Professor
School of Computer Science
Georgia Institute of Technology
ammar@cc.gatech.edu
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Educational Background

Ph.D.	1985	University of Waterloo	Electrical Engineering
S.M.	1980	Massachusetts Institute of Technology	Elec. Eng. and Comp. Sci.
S.B.	1978	Massachusetts Institute of Technology	Computer Science and Engineering

Employment History

Regents' Professor (Assistant Prof. 1985-1991 Associate Prof. 1991-1998 Professor 1998-2003)	School of Computer Science Georgia Institute of Technology Atlanta, GA	1985–present
Interim Chair	School of Computer Science	August 2019–August 2020
Associate Chair	School of Computer Science	2006-2012
Member of Scientific Staff Manager Data Network Planning	Bell-Northern Research Ottawa, Ontario, Canada	1980–1982

Visiting Positions

Distinguished Dean's Visiting Professor	School of CS, University of Waterloo	Fall 2022
Visiting Professor	Dept. of CS, University of Helsinki	June/July 2019
Visiting Professor	Dept. of ECE, University of Toronto	June/July 2017, July 2019
Visiting Professor	Laboratoire d'Informatique, University of Paris 6	Feb. 2015 - May 2015
Visiting Researcher	Thomson Research Lab Paris, France	June/July 2009 June/July 2006
Visiting Senior Member of Technical Staff (Sabbatical)	BellSouth Telecommunications, Inc. Advanced Data Networking Group Atlanta, GA	Jan. 1999– Dec. 1999
Visiting Professor	Dept. of Computer Science University of Waterloo Waterloo, Ontario, Canada	May-July 1998
Visiting Scientist	Rodeo Project, INRIA Sophia-Antipolis, France	June/July 1996

Current Fields of Interest

General Interest: Computer Network Architectures and Protocols:
Current Specific Interests: Mobile Cloud Computing, Overlay Networks, Network Virtualization, Video Streaming, Mobile Wireless Networks, Disruption Tolerant Networks.

Honors and Awards

Alumni Achievement Medal for Academic Excellence– University of Waterloo, Faculty of Engineering, November 2018.

Best Paper Award, 2018 IFIP/IEEE Network Traffic Measurement and Analysis (TMA) Conference. For paper entitled: “eMIMIC: Estimating HTTP-based Video QoE Metrics from Encrypted Network Traffic.” Coauthored with Mangla, Halepovic, and Zegura.

College of Computing Dean’s Award, College of Computing, Georgia Tech, April 2018.

College of Computing Faculty Mentor Award, College of Computing, Georgia Tech, April 2015.

Class of 1940 Course Survey Teaching Effectiveness Award, Georgia Tech, for 5 consecutive years (AYs 2012/13, 2013,14, 2014/15, 2015/16, 2016/17).

Best Paper Award, ACM Mobihoc Conference (2012). For paper entitled “Serendipity: Enabling Remote Computing among Intermittently Connected Mobile Devices,” co-authored with Shi, Lafakosis and Zegura.

Outstanding Service Award (2010), IEEE Technical Committee on Computer Communications, “For Outstanding service to the computer communications community over a long period of time.”

ACM Recognition of Service Award (2007) for Service as Program Co-Chair of ACM Sigmetrics 2007.

Outstanding Doctoral Thesis Advisor Award (2006), Georgia Tech Institute Award.

Appointed “Regents’ Professor” - one of only two such appointments made in 2003 at Georgia Tech.

Fellow, Association for Computing Machinery (ACM) (2003)

Citation:“For contributions to the design of systems and protocols for scalable network services.”

Fellow, Institute of Electrical and Electronics Engineers (IEEE) (2002)

Citation:“For contributions to the design of scalable multimedia services and their network support.”

Best Paper Award at the Conference on Parallel and Distributed Simulation (PADS), 2002, for paper entitled “Updateable Network Simulations”. (co-recipient, Ferenci, Riley, Fujimoto, Perumalla).

Best Paper Award at the 7th WWW Conference, Brisbane Australia, April 1998 for paper entitled “Interactive Multimedia Jukebox.” (co-recipient with Kevin Almeroth)

IBM Faculty Partnership Award, May 1996. (\$40,000 Award)

Edenfield Faculty Fellowship Award, College of Computing, June 1996. For project entitled: “Providing Entertainment Content with an Interactive Multimedia Jukebox”, (co-authored with Ann Chervenak). (\$10,000 Award)

Outstanding Faculty Research Award, College of Computing, 1993.

Natural Sciences and Engineering Research Council of Canada’s Postgraduate Scholarship, Sept. 1982 - Aug. 1985. \$10,000 per year.

Bell-Northern Research’s Postgraduate Award, Sept. 1982 - Aug. 1985. \$10,000 per year.

Second Place Paper Award in the Operations Research Society of America’s Nicholson Student Paper Competition for paper entitled “*Equivalence Relations in Queueing Models of Manufacturing Networks*,” May 1981. \$200

I. Teaching

A. Courses Taught (Last 10 years)

College of Computing, Georgia Institute of Technology, Atlanta, Georgia

Qrtr/Yr	Course	Title	Number of Students	Comment
Fall 13	CS6250	Computer Networks	69	
Spring 14	CS4251	Computer Networks II	18	
Fall 14	CS6250	Computer Networks	71	
Fall 14	CS8803	Computer Networks	35	ARAMCO-Hosted MS Program
Fall 15	CS6250	Computer Networks	73	
Spring 16	CS6250	Computer Networks	70	
Fall 16	CS6250	Computer Networks	83	
Spring 17	CS6250	Computer Networks	53	
Spring 17	CS8803	Computer Networks	30	ARAMCO-Hosted MS Program
Fall 17	CS6250	Computer Networks	67	
Spring 18	CS3251	Computer Networks I	90	
Fall 18	CS6250	Computer Networks	95	
Spring 19	CS3251	Computer Networks I	72	
Fall 19	CS6250/CS4251	Computer Networks II	124	First time 4251 is cross-listed with 6250
Fall 20	CS6250	Computer Networks	72	
Fall 20	CS8803	Computer Networks	30	ARAMCO-Hosted MS Program
Spring 21	CS6250/CS4251	Computer Networks	90	
Fall 21	CS6250/CS4251	Computer Networks	117	
Spring 22	CS8803	Networking for Multimedia	27	New Course, GT CIOS Award
Fall 22	CS798	Modern Network Protocols and Applications	24	Sabbatical at University of Waterloo
Spring 23	CS8803	Networking for Multimedia	31	
Fall 23	CS3251	Computer Networks 1	180	
Spring 24	CS8803MN	Modern Network Protocols and Services	25	New Course

B. Current Ph.D. Students

1. Jia He (with Zegura)
Thesis Research: *Video Conferencing Applications* Passed Qualifier, Spring 2023
2. Yifeng Cao (Advisor is Ashutosh Dhekne)

C. Ph.D. Students Supervised – Graduated

(Note: Current Position is last known position.)

1. Tarun Mangla (with Ellen Zegura)
Graduation Date: July 2020
Thesis Title: *Video QoE Estimation using Network Measurement Data*
Current Position: PostDoc, University of Chicago.

2. Yimeng Zhao (with Ellen Zegura)
Graduation Date: July 2020
Thesis Title: *Mitigating Interconnect and End Host Congestion in Modern Networks*
Current Position: Facebook.
3. Ahmed Saeed (with Ellen Zegura)
Graduation Date: December 2019
Thesis Title: *Scalable Network Scheduling in Software*
Current Position: Assistant Professor, School of Computer Science, Georgia Tech.
4. Karim Habak (with Ellen Zegura)
Graduation Date: December 2018
Thesis Title: *Mobile Device Clusters As Edge Compute Resources: Design, Deployment and Role in the Computing Ecosystem*
Current Position: Google, Mountain View, CA.
5. AliReza Monfared (ECE) (with Ellen Zegura)
Graduation Date: May 2016
Thesis Title: *Tactical HPC: Scheduling High Performance Computers in a Geographical Region*
Current Position: Microsoft, Redmond, WA.
6. Samantha Lo (with Ellen Zegura)
Graduation Date: December 2015
Thesis Title: *Design and Evaluation of Virtual Network Migration Mechanisms on Shared Substrate*
Current Position: AT&T Research, NJ.
7. Ahmed Mansy
Graduation Date: May 2014
Thesis Title: *Network and End-Host Support for HTTP Adaptive Video Streaming*
Current Position: Google, Mountain View, CA.
8. Cong Shi (with Ellen Zegura)
Graduation Date: August 2014
Thesis Title: *Addressing Connectivity Challenges for Mobile Computing and Communications*
Current Position: Square Inc., Atlanta, GA.
9. Yang Chen (with Ellen Zegura)
Graduation Date: May 2014 (thesis submitted January 2014)
Thesis Title: *Characterizing and mitigating communication challenges in wireless and mobile network*
Current Position: Schlumberger, Texas.
10. Mehmet Demirci
Graduation Date: May 2013
Thesis Title: *Facilitating the provision of auxiliary support services for overlay networks*
Current Position: Assistant professor, Gazi University, Ankara, Turkey.
11. Mukkaram Bin Tariq (with Nick Feamster)
Graduation Date: May 2010
Thesis Title: *Modeling Performance of Networked Services Using Causal Reasoning*
Current Position: Google, Mountain View, CA.

12. Srini Seetharaman
Graduation Date: December 2007
Thesis Title: *Analyzing Cross-layer Interaction in Overlay Networks*
Current Position: Infinera, Sunnyvale, CA.
13. Hyewon Jun (with Ellen Zegura)
Graduation Date: December 2007
Thesis Title: *Power Management in Disruption Tolerant Networks*
Current Position: Google, New York
14. Yong Zhu
Graduation Date: December 2006
Thesis Title: *The Design and Analysis of Overlay Networks and Network Virtualization*
Current Position: Baidu.
15. Wenrui Zhao (with Ellen Zegura)
Graduation Date: December 2006
Thesis Title: *Routing and Network Design in Delay Tolerant Networks*
Current Position: Facebook.
16. Donghua Xu (with Richard Fujimoto)
Graduation Date: May 2006
Thesis Title: *Scalability and Composability Techniques for Network Simulation*
Current Position: Google, Mountain View, CA.
17. Jinliang Fan
Graduation Date: December 2005
Thesis Title: *Enabling Performance Tradeoffs Through Dynamic Configuration of Advanced Network Services*
Current Position: Microsoft, Redmond, WA.
18. Taehyun Kim (ECE)
Graduation Date: May 2005
Thesis Title: *Scalable Video Streaming over the Internet*
Position upon graduation: Senior Engineer, Freescale Semiconductor, Austin, TX,
Current position: Principal Engineer, Samsung, Korea.
19. Qi He
Graduation Date: August 2005
Thesis Title: *The Design and Evaluation of Advanced TCP-based Services over an Evolving Internet*
Current Position: Apple, Cupertino, CA.
20. Pradnya Karbhari (with Ellen Zegura)
Graduation Date: December 2005
Thesis Title: *Throughput and Fairness Considerations in Overlay Networks for Content Distribution*
Current Position: Google Research, India.
21. Meng Guo (with Ellen Zegura)
Graduation Date: December 2005
Thesis Title: *Supporting Scalable and Resilient Video Streaming Applications in Evolving Networks*
Current Position: Google Research, Mountain View, CA.

22. Minaxi Gupta
Graduation Date: December 2004
Thesis Title: *Large-Scale Quality Conscious Content Distribution in the Internet*
Current Position: Associate Professor Department of Computer Science,
Indiana University, Bloomington, IN.
23. Li Zou
Graduation Date: May 2004
Thesis Title: *State and File-Sharing in Peer-to-Peer Systems*
Position upon graduation: Software Engineer, Brion technologies, Santa Clara, CA.
Current Position: Google, Mountain view, CA.
24. Paul Judge
Graduation Date: December 2002
Thesis Title: *Security and Protection Architectures for Large-Scale Content Distribution*
Current Position: Chief Research Office, Baracuda Networks.
Georgia Corporate CIO of the year – 2009.
25. Lenitra Clay
Graduation Date: December 2002
Thesis Title: *Replication Techniques for Scalable Content Distribution in the Internet*
Current Position: Intel, Hillsboro, OR.
26. George Riley (with Richard Fujimoto)
Graduation Date: Summer 2001
Thesis Title: *Parallel and Scalable Network Simulation*
Current Position: Professor, School of Electrical and Computer Engineering,
Georgia Tech, Atlanta, GA
27. Tianji Jiang (with Ellen Zegura)
Graduation Date: Summer 2000
Thesis Title: *Accommodating Scalability and Heterogeneity for Multicast Communication*
Current Position: Cisco Systems, San Jose, California
28. Zongming Fei
Graduation Date: Summer 2000
Thesis Title: *Techniques for Supporting Service Scalability over the Internet*
Current Position: Professor, Dept. of Computer Science, University of Kentucky, Lexington, KY
29. Xue Li
Graduation Date: Summer 1998
Thesis Title: *Scalable and Adaptive Video Multicast*
Current position: Verizon Corporate Network and Technology, NJ.
30. M. Jeff Donahoo (Ammar is GRA advisor, Official thesis advisor: Zegura)
Graduation Date: Summer 1998
Thesis Title: *Application-based Enhancements to Network Layer Multicast*
Current Position: Professor, Dept. of Computer Science, Baylor University, Waco, Texas.

31. Kevin Almeroth
Graduation Date: Spring 1997
Thesis Title: *Support for Efficient Scalable Delivery of Interactive Multimedia Services*
Current Position: Professor, Dept. of Computer Science, University of California, Santa Barbara.
(NSF CAREER AWARD, 2000), IEEE Fellow
32. Rajesh Talpade
Graduation Date: Summer 1997
Thesis Title: *Towards Ubiquitous Internet Multicast: Convergence Mechanisms and Data Transfer Reliability*
Current Position: Chief Scientist, Advanced Technology Solutions, Telcordia, Morristown, NJ.
33. Robert Krupczak (with Ken Calvert)
Graduation Date: Summer 1997
Thesis Title: *Protocol Subsystem Support for Efficient and Flexible Communication Services*
Current Position: Co-founder, The Krupczak Organization, LLC.
34. Russ Clark
Graduation Date: Spring 1995
Thesis Title: *Solutions for Ubiquitous Information Services: Multiple Protocols and Scalable Servers*
Current Position: Senior Research Scientist, School of Computer Science, Georgia Tech.
35. George Rouskas
Graduation Date: Spring 1994
Thesis Title: *Protocols for Lightwave WDM Networks with Applications to Distributed Computing*
Current Position: Professor, Dept. of Computer Science, North Carolina State University, Raleigh, NC.
(NSF CAREER AWARD, 1997), IEEE Fellow
36. Chung-Ki Lee (with Jim Burns)
Graduation Date: Spring 1992
Thesis Title: *Protocols in Multi-Hop Radio Networks*
Current Position: Professor, Dept. of Computer Science, Myungji University, Youngju, Korea.
37. David Stevens
Graduation Date: Winter 1992
Thesis Title: *TDMA Slot Allocation Strategies for Mobile Packet Radio Networks*
Current Position: Group Manager, Booz, Allen and Hamilton.
38. Shun Yan Cheung (with Mustaque Ahamad)
Graduation Date: Summer 1988
Thesis Title: *Optimizing the Performance of Quorum Consensus Replica Control Protocols*
Current Position: Associate Professor, Dept. of Math and Computer Science, Emory University, Atlanta, GA.

39. Jose Bernabeu (with Mustaque Ahamad)
Graduation Date: Fall 1987
Thesis Title: *Location Finding Algorithms for Distributed Systems*
Current Position: Architect, Microsoft.

II. Research and Creative Scholarship

A. Thesis

Ph.D. Thesis Title: *Performance Analysis of Information Systems Using Broadcast Delivery*
Date Completed: Summer 1985
Advisor: Johnny Wong
College: University of Waterloo

M.S. Thesis Title: *Modeling and Analysis of Unreliable Manufacturing Systems with Finite Storages.*
Date Completed: Spring 1980
Advisor: Stanley Gershwin
College: Massachusetts Institute of Technology

B. Published/Accepted Journal Papers (refereed)

1. Nguyen, N.T., Zubair, M., Zuniga, A., Tarkoma, S., Hui, P., Lee, H., Perrault, S.T., Ammar, M.H., Flores, H. and Nurmi, P., "The Price is Right? The Economic Value of Sharing Sensors," IEEE transactions on computational social systems, 2023.
2. Flores, H., Zuniga, A., Tonetto, L., Braud, T., Hui, P., Li, Y., Tarkoma, S., Ammar, M. and Nurmi, P., "Collaboration Stability: Quantifying the Success and Failure of Opportunistic Collaboration," Computer: a publication of the IEEE Computer Society, 2022.
3. Mangla, T., Halepovic, E., Ammar, M., Zegura, E., "Using Session Modeling to Estimate HTTP-based Video QoE Metrics from Encrypted Network Traffic," in IEEE Transactions on Network and Service Management, 2019.
4. Baron, B., Spathis, P., de Amorim, M., Viniotis, Y., Ammar, M., "Mobility as an Alternative Communication Channel: A Survey," IEEE Communications Surveys and Tutorials. May 2018.
5. Eramo, V., Ammar, M., Lavacca, F., "Migration Energy Aware Reconfiguration of Virtual Network Function Instances in NFV Architectures," IEEE Access, Vol. 5, 2017.
6. Baron, B., Spathis, P., Rivano, H., de Amorim, M. D., Viniotis, Y., Ammar, M., "Centrally-Controlled Mass Data Offloading Using Vehicular Traffic," IEEE Transactions on Network and Service Management, Vol. 14, no. 2, June 2017.
7. Eramo, V., Miucci, E., Ammar, M., Lavacca, F.G., "An approach for service function chain routing and virtual function network instance migration in network function virtualization architectures," IEEE/ACM Transactions on Networking, Vol. 25, no. 4, March 2017.
8. Eramo, V., Miucci, E., Ammar, M., "Study of Reconfiguration Cost and Energy Aware VNE Policies in Cycle-Stationary Traffic Scenarios." IEEE Journal on Selected Areas in Communications, Vol. 34, no. 5, January 2016.
9. Hoseini, S., Fotouhnia, A., Hassan, M., Choua, C., Ammar, M., "Efficient and Transparent Use of Personal Device Storage in Opportunistic Data Forwarding," Elsevier Computer Communications Journal, January 2016, pp 47-55.
10. V. Eramo, E. Miucci, M. Ammar, "Proposal and Evaluation of a Virtual Router Migration Policy in IP Networks equipped with Adaptive Link Rate Line Cards," Information Journal, vol. 18, no. 8, August 2015, pp. 3507-3522.

11. Eramo, V., Miucci, E., Ammar, M., "Study of Migration Policies in Energy-Aware Virtual Router Networks," *IEEE Communications Letters*, vol. 18, no. 11, November 2014.
12. Gilani, F., Al-Shaer, E., Demirci, M., Ammar, M., "Problem Localization and Quantification Using Formal Evidential Reasoning for Virtual Networks," *IEEE Transactions on Network and Systems Management*, Vol. 11, #3, September 2014.
13. Demirci, M., Ammar, M.H., "Design and Analysis of Techniques for Mapping Virtual Networks to Software-Defined Network Substrates," *Elsevier Computer Communications Journal*, Vol. 45, June 2014.
14. Shi, C., Luo, C., Traynor, P., Ammar, M., Zegura, E., "ARDEN: Anonymous networking in Delay tolERant Networks," *Elsevier Ad-Hoc Networks Journal*, Vol. 10, pp918-930, 2012.
15. Tariq, M., Zeitoun, A., Valancius, V., Feamster, N., Ammar, M., "Answering What-If Deployment and Configuration Questions with WISE: Techniques and Deployment Experience," *IEEE/ACM Transactions on Networking*, Vol 21(1), February 2013.
16. Whitbeck, J., de Amorim, M., Conan, V., Ammar, M., Zegura, E., "From Encounters to Plausible Mobility," *Elsevier Journal on Pervasive and Mobile Computing*, 7(2): 206-222 (2011).
17. Polat, B., Sachdeva, P., Ammar, M., Zegura, E., "Message ferries as generalized dominating sets in intermittently connected mobile networks," *Elsevier Journal on Pervasive and Mobile Computing*, 7(2): 189-205 (2011).
18. Chen, Y., Borrell, V., Ammar, M., Zegura, E., "A Framework for Characterizing the Wireless and Mobile Network Continuum," *ACM Computer Communications Review*, Vol. 41, #1, January 2011.
19. Jun, H., Ammar, M., Corner, M., Zegura, E., "Hierarchical Power Management in Disruption Tolerant Networks Using Traffic Aware Optimization," *Computer Communications*, Volume 32, # 16, 2009.
20. Seetharaman, S., Ammar, M., " Inter-domain policy violations in multi-hop overlay routes: Analysis and mitigation," *Elsevier Computer Networks Journal* 53(1): 60-80 (2009)
21. Srinivasan Seetharaman, Volker Hilt, Markus Hofmann, Mostafa H. Ammar, "Resolving cross-layer conflict between overlay routing and traffic engineering," *IEEE/ACM Trans. Netw.* 17(6): 1964-1977 (2009)
22. He, Q., Dovrolis, C., Ammar, M., "On the Predictability of Large Transfer TCP Throughput," *Elsevier Computer Networks Journal*, Volume 51, Issue 14, 10 October 2007, Pages 3959-3977.
23. Jun, H., Zhao, W., Ammar, M., Zegura, E., Lee, C., "Trading Latency for Energy in Densely Deployed Wireless Ad Hoc Networks using Message Ferrying" *Journal of Ad-Hoc Networks (Elsevier)*, Volume 5, Issue 4, May 2007, Pages 444-461
24. He, Q., Dovrolis, C., Ammar, M., "A Methodology for the Optimal Configuration of TCP Traffic in Network Simulations under Link Load Constraints," *Special Issue of SIMULATION: Transactions of the Society for Modeling and Simulation Journal*, Vol. 82, No. 5, 279-293, 2006.
25. Gupta, M., Ammar, M., Ahamad, M., "Trade-offs between reliability and overhead in peer-to-peer reputation tracking," *Elsevier Computer Networks*, Volume 50 , Issue 4, March 2006.
26. Zhu, Y., Dovrolis, C., Ammar, M., "Dynamic overlay routing based on available bandwidth estimation: A simulation study," *Elsevier Computer Networks*, Volume 50 , Issue 6, April 2006.
27. Chen, Z., Bu, T., Ammar, M., Towsley, D., "Comments on "Modeling TCP Reno Performance: A Simple Model and Its Empirical Validation,"" *IEEE/ACM Transactions on Networking*, vol. 14, no. 2, April 2006.

28. Kim, T., Ammar, M., "A Comparison of Heterogeneous Video Multicast Schemes: Layered Encoding or Stream Replication?" *IEEE Transactions on Multimedia* Vol 7, 6, Dec. 2005, pp 1123- 1130.
29. Riley, G., Jaafar, T., Fujimoto, R., Ammar, M., "Using Ghosts for Global Topology Knowledge in Space-Parallel Distributed Network Simulations," *Simulation Journal*, Vol. 81, no. 4, April 2005.
30. Kim, T., Ammar, M., "Optimal Quality Adaptation for Scalable Encoded Video," *IEEE Journal on Selected Areas in Communication, Special Issue on Intelligent Services and Applications in Next-Generation Networks*, vol. 23, no. 2, February 2005.
31. Fan, J., Xu, J., Ammar, M., Moon, S., "Prefix-Preserving IP Address Anonymization: Measurement-based Security and a New Cryptography-based Scheme," *Elsevier Computer Networks*, 46(2): 253-272 (2004).
32. He, Q., Ammar, M., "Dynamic Host-Group/Multi-Destination Routing for Multicast Sessions," *Journal of Telecommunication Systems*, Vol. 28, pp. 409-433, 2005.
33. He, Q., Ammar, M., Riley, G., Fujimoto, R., "Exploiting the Predictability of TCP's Steady-State Behavior to Speed Up Network Simulation," *Performance Evaluation Journal*, Vol 58,2-3, pp 163-187, 2004.
34. Riley, G., Ammar, M., Fujimoto, R., Park, A., Perumalla, K., Xu, D., "A Federated Approach to Distributed Network Simulation," *ACM Transactions on Modeling and Computer Simulation (TOMACS)*, Vol. 14 (2), pp 116-148, April 2004.
35. Fei, Z., Ammar, M., Kamel, I., Mukherjee, S., "An Active Buffer Management Technique for Providing Interactive Functions in Broadcast Video-on-Demand Systems," *IEEE Transactions on Multimedia*, Vol 7(5), Oct. 2005, pp942 - 950.
36. Judge, P., Ammar, M., "Security Issues and Solutions in Multicast Content Distribution," *IEEE Network*, Vol. 17(1), January/February 2003, pp30-36.
37. Zongming Fei, Mangkun Yang, Mostafa Ammar, Ellen Zegura, "A framework for allocating clients to rate-constrained multicast servers," *Computer Communications*, vol. 26, 2003, p1255.
38. Fei, Z., Ammar, M. Zegura, E., "Multicast Server Selection: Problems, Complexity and Solutions," *IEEE Journal on Selected Areas in Communications*, Vol. 20, #7, pp1399-1413, September 2002.
39. Judge, P., Ammar, M., "WHIM: Watermarking Multicast Video with a Hierarchy of Intermediaries," *Elsevier Computer Networks*, Vol. 29, #6, pp699-712, 2002.
40. Hao, F., Zegura, E., Ammar, M., "QoS Routing for Anycast Communications: Motivation and an Architecture for DiffServ Networks," *IEEE Communications Magazine*, Vol. 40, #6, June 2002, pp48-56.
41. Zegura, E., Ammar, M., Fei, Z., Bhattacharjee, S. "Application-Layer Anycasting: A Server Selection Architecture and Use in a Replicated Web Service," *IEEE/ACM Transactions on Networking*, Vol. 8, No. 4, August 2000, pp 467-498.
42. Li, X., Ammar, M., Paul, S., "Video Multicast over the Internet," *IEEE Network Magazine*, Vol. 13. No. 2, March/April 1999, pp46-60.
43. Almeroth, K., Ammar, M. H., "An Alternative Paradigm for Scalable On-Demand Applications: Evaluating and Deploying the Interactive Multimedia Jukebox," *IEEE Transactions on Knowledge and Data Engineering*, Vol. 11, No. 4, July/August 1999, pp658-672.
44. Krupczak, R., Calvert, K., Ammar, M. H., "Protocol Programming in Java," *IEEE Communications Magazine*, Vol. 36, No. 10, pp93-99, October 1998.

45. Clark, R. J., Ammar, M. H., "Providing Scalable Web Service Using Multicast Communication," *Computer Networks and ISDN Systems*, Vol. 29, pp841-858, 1997.
46. Clark, R. J., Ammar, M. H., Calvert, K., "Protocol Discovery in Multiprotocol Networks," *Mobile Networks and Applications*, Vol. 2, pp271-284, 1997.
47. Krupczak, R., Calvert, K., Ammar, M. H., "Increasing the Portability and Re-Usability of Protocol Code," *ACM/IEEE Transactions on Networking*, Vol. 5 (4), pp 445-459, August 1997.
48. Almeroth, K. C., Ammar, M. H., "Multicast Group Behavior in the Internet's Multicast Backbone," *IEEE Communications Magazine*, 35(6), June 1997, pp124-129.
49. Rouskas, G., Ammar, M. H., "Multidestination Communication over Tunable-Receiver Single-Hop WDM Networks", *IEEE Journal on Selected Areas in Communications*, 15(3), April 1997, pp501-511.
50. Rouskas, G., Ammar, M. H., "Minimizing Delay and Packet Loss in Single-Hop Lightwave WDM Networks Using TDM Schedules," *Journal of High Speed Networks*, 5(4), 1996, pp304-328.
51. Almeroth, K., Ammar, M. H., "On the Use of Multicast Delivery to Provide a Scalable and Interactive Video-on-Demand Service," *IEEE Journal on Selected Areas in Communications*, Special issue on Integrated Video-Based Services for the Home, 14(6), August 1996, pp1110-1122
52. Cheung, S. Y., Ammar, M. H., "Using Destination Set Grouping to Improve the Performance of Window-Controlled Multi-Point Connections," *Computer Communications*, 19, 1996, pp723-736.
53. Bernabeu, J., Ammar, M. H., Ahamad, M., "Optimizing a Generalized Polling Protocol for Resource Finding over a Multiple Access Channel," *Computer Networks and ISDN Systems*, 27, 1995, pp412-420.
54. Rouskas, G., Ammar, M. H., "Reconfigurability in Multihop WDM Networks," *Journal of High Speed Networks*, 4(3), 1995, pp221-238.
55. Rouskas, G., Ammar, M. H., "Analysis and Optimization of Transmission Schedules for Single-Hop WDM Networks," *IEEE/ACM Transactions on Networking*, 3(2), April 1995, pp211-221.
56. Ammar, M. H., Rouskas, G., "On the Performance of Protocols for Collecting Responses over a Multiple Access Channel," *IEEE Transactions on Communications*, 43(2), February 1995, pp412-420.
57. Kamalakar, K., Navathe, S. B., Ammar, M. H., "Optimal Redesign Policies to Support Processing of Applications on a Distributed Relational Database," *Information Systems*, 19(4), pp33-54, 1994.
58. Cheung, S. Y., Ammar, M. H., Ahamad, M., "The Grid Protocol: A High Performance Scheme for Maintaining Replicated Data," *IEEE Transactions on Knowledge and Data Engineering*, 4(6), December 1992, pp 582-592.
59. Ahamad, M., Ammar, M. H., Cheung, S. Y., "Multi-Dimensional Voting," *ACM Transactions on Computer Systems*, 9(4), November 1991, pp 399-431.
60. Bernabeu-Auban, J., Ahamad, M., Ammar, M. H., "Resource Finding in Store-and-Forward Networks," *Acta Informatica*, 28(7), October 1991, pp 657-680.
61. Ammar, M. H., Gershwin, S. B., "Equivalence Relations in Queueing Models of Fork/Join Networks with Blocking," *Performance Evaluation Journal*, 10(12), December 1989, pp 233-245.
62. Cheung, S.Y., Ahamad, M., Ammar, M.H., "Optimizing Vote and Quorum Assignments for Reading and Writing Replicated Data," *IEEE Transactions on Knowledge and Data Engineering*, 1(3), September 1989, pp 387-397.

63. Ahamad, M., Ammar, M. H., "Performance Characterization of Quorum-Consensus Algorithms for Replicated Data," *IEEE Transactions on Software Engineering*, 15(4), April 1989, pp492-496.
64. Ammar, M. H., "Response Time in a Teletext System: An Individual User's Perspective," *IEEE Transactions on Communications*, 35(11), November 1987, pp1159-1170.
65. Ammar, M. H., "Performance of a Two-Stage Manufacturing System with Control and Communication Overhead," *IEEE Transactions on Systems, Man, and Cybernetics*, 17(4), July/August 1987, pp661-665.
66. Ammar, M. H., "Teletext-Like Information Delivery Using Broadcast Polling," *Computer Networks and ISDN Systems*, 12(2), March 1987, pp107-115.
67. Ammar, M. H., Wong, J. W., "On the Optimality of Cyclic Transmission in Teletext Systems," *IEEE Transactions on Communications*, 35(1), January 1987, pp68-73.
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F. Patents

1. "Method and apparatus for estimating quality of experience from network data." (Authors: Halepovic, Mangla, Zegura, Ammar) US Patent 11,431,780, Filed: October 2020, Awarded: August 2022.
2. "Estimating video quality of experience metrics from encrypted network traffic," (Authors: Halepovic, Mangla, Ammar, and Zegura) US Patent 10,757,220, Filed: December 2018, Awarded: August 2020.
3. "Systems and methods for network routing," (Authors: Hilt, Hoffman, Seetharaman, and Ammar) U.S. Patent 8,565,117, Filed: January 2008, Awarded: October 2013.
4. "Hierarchical Rate Control of Receivers in a Communication System Transmitting Layered Video Multicast Data with Retransmission (LVMR)," (Authors: Ammar, Li, Pancha and Paul). U.S. Patent 6,215,766, Filed: January 1998, Awarded: April 2001.

5. "Database Synchronization and Organization System and Method," (Authors: Donahoo, Mahajan, Navathe, Ammar and Malik). U.S. Patent 6,226,650, Filed: September 1998, Awarded: May 2001.

G. Software and Systems Developed in Research Group

1. **NANO (Network Access Neutrality Observatory):** NANO identifies performance degradations that result from network neutrality violation by an Internet service provider (ISP), such as, differential treatment of specific classes of applications, users, or destinations by the ISP.
(<http://www.gtnoise.net/nano/>)
2. **NetFinder:** A tool for assigning virtual networks to Planet Lab Resources.
(<http://www.cc.gatech.edu/computing/Networking/projects/netfinder/>)
3. **Autopart:** A tool to automatically partition a large network simulation into smaller simulation instances, so that they can be run on a number of machines with PDNS (see below), a parallel and distributed network simulation tool based on ns2. By distributing a simulation onto a number of machines, we can achieve the simulation scale that the original ns2 cannot achieve on a single workstation.
No longer available on-line.
4. **GnutellaSim:** An extensible and scalable simulation system for peer-to-peer file sharing systems built on top of the popular ns-2 network simulation system. (<http://www.cc.gatech.edu/computing/compass/gnutella>)
5. **CryptoPan:** A cryptography-based sanitization tool that allows prefix-preserving anonymization of IP addresses in traffic traces.
(<http://www.cc.gatech.edu/computing/Telecomm/projects/cryptopan/>)
6. **pdns:** A system for parallel and distributed simulation based on the popular ns simulation package.
Student: George Riley, Faculty Collaborator: Richard Fujimoto
(<http://www.cc.gatech.edu/computing/compass/pdns>)
(Also incorporated in main ns release at <http://www.isi.edu/nsnam/ns>)
7. **ns with NIX Vector Routing:** An enhancement to routing module of the ns simulator to improve its scalability to large networks.
Student: George Riley, Faculty Collaborator: Richard Fujimoto
(<http://www.cc.gatech.edu/computing/compass/nvns>)
8. **PicPat:** A system for VCR-style interaction with multicast video/audio streams.
Student: Sameer Merchant
(<http://www.cc.gatech.edu/fac/Mostafa.Ammar/picpat/>)
9. **Hotlava:** An exploration of Java protocol programming.
Student: Bobby Krupczack
(<http://www.cc.gatech.edu/computing/Networking/projects/playground/hotlava/>)
Code no longer available for download.
Winner of 2nd Prize in IBM/ACM Quest for Java Contest, 1997.
10. **The Interactive Multimedia Jukebox:** A system for delivering multimedia content over the Internet and the Multicast Backbone.
Student: Kevin Almeroth
(<http://www.cc.gatech.edu/computing/Telecomm/projects/IMJ/>)

11. **MARS-based IP multicast over ATM:** Implementations of client and server for the IETF adopted solution for multicasting over ATM networks.
Student: Rajesh Talpade
(<http://www.cc.gatech.edu/computing/Telecomm/playground/MCS/>)
12. **The SCE reliable multicast protocol:** A reliable multicast transport protocol with both a kernel and user-space implementation.
Student: Rajesh Talpade
(<http://www.cc.gatech.edu/computing/Networking/projects/playground/MCS/>)
13. **Multicast Web Touring:** A system using reliable multicast communication for guided tours of the web.
Student: Tianji Jiang
No longer available on-line.
14. **Mlisten:** A tool for collecting mbone multicast session dynamics.
Student: Kevin Almeroth
(<http://www.cc.gatech.edu/computing/Telecomm/projects/mbone/>)

H. Published Papers (non-refereed)

1. Ammar, M., "ex uno pluria: The Service-Infrastructure Cycle, Ossification and the Fragmentation of the Internet," ACM SIGCOMM Computer Communicatins Review, January 2018.
2. Ammar, M., "10 Recommended Readings: A blast from the past," ACM SIGCOMM Computer Communication Review, January 2007.
3. Fei, Z., Ammar, M., Zegura, E., "Efficient Server Replication and Client Re-Direction for Multicast Services," Proceedings of SPIE/ITCOM Conference on "Scalability and Traffic Control in IP Networks," Denver, Colorado, August 2001.
4. Almeroth, K. C., Ammar, M. H., "Delivering Popular Web pages using Cyclic Multicast," Proceedings of SPIE (Vol. 3231) (The International Society for Optical Engineering), November 1997.
5. Talpade, R., Ammar, M. H., "Multicast Server Architectures for MARS-based ATM Multicasting," Internet Engineering Task Force, Request for Comments (RFC) 2149, May 1997.
6. Ammar, M.H., Polyzos, G., Tripathi, S., "Guest Editorial, Special Issue on Network Support for Multipoint Applications," *IEEE Journal on Selected Areas in Communications*, 15(3), pp273-276, April 1997.
7. Ammar, M. H., Li, V. O. K., Ulema, M., "Guest Editorial, Special Issue on Broadband ISDN: Standards, switches and traffic management," *Computer Networks and ISDN Systems*, 27(1), pp 1-3, November 1994.
8. Clark, R. J., Ammar, M. H., and Calvert, K. L., "Multiprotocol Interoperability In IPng", Internet Engineering Task Force, Request for Comments (RFC) 1683, August 1994.

I. Keynotes and Distinguished Lectures (Since 2001)

- Distinguished Dean's Visiting Professor Seminar, University of Waterloo, November 2022.
- Panel Speaker on Future of Networking (Hosted by IBM), October 2021.
- Keynote, ACM PerCrowd Workshop, March 2020, Online.
- Keynote, ACM CoNext Conference, December 2019, Orlando, Florida.

- Keynote, Third ITU Workshop on Network 2030, London UK, February 2019
- Distinguished Lecture, University of Helsinki, Finland, June 2018
- Distinguished Lecture, KTH, Stockholm, Sweden, June 2018
- Keynote Speaker, IEEE International Conference on Network Protocols (ICNP), Toronto, Canada, October 2017
- Distinguished Lecture, Information Science and Technology Center, Colorado State University, September 2017
- Distinguished Lecture, Department of Computer Science, Simon Fraser University, Vancouver, British Columbia, Canada, October 2016
- Keynote, IEEE Wireless Communications and Networking Conference, Doha, Qatar, April 2016
- Dean's Lecture, Carnegie Mellon University, Qatar Campus, Doha, Qatar, April 2016
- Keynote, IEEE MASCOTS (Int'l Symposium of Modeling, Analysis and Simulation of Computer and Telecom Systems), Atlanta, GA, October 2015
- Distinguished Lecture Series, School of Computing, University of Utah, October 2012
- Distinguished Lecture, Dept. of Computer Science, University of California, Irvine, January 2012
- Speaker in Access Distinguished Lecture Series, KTH Royal Institute of Technology, Stockholm, Sweden, June 2011
- Keynote Speaker, The 7th International Conference on Innovations in Information Technology, Abu Dhabi, UAE, April 2011
- Keynote Speaker, IEEE Computer Communications Workshop, Lake Arrowhead, CA, October 2010
- Keynote Talk at IEEE Mobile and Sensor Systems Conference, October 2007, Pisa, Italy
- Distinguished Lecture Series, Emerging Communications Technology Institute, University of Toronto, October 2006
- Distinguished Lecture Series, Dept. of Computer Science, University of Texas, Dallas, February 2006
- Distinguished Lecture Series, Dept. of Electrical Engineering, University of Southern California, January 2006
- Keynote at Co-Next 2005, Toulouse, France, October 2005
- Keynote at IEEE MASCOTS conference, Atlanta, GA, October 2005
- Keynote at 38th Annual Simulation Symposium Hilton Mission Valley Hotel San Diego, CA, April 2005
- Distinguished Lecture Series, Institute for Computing, Information and Cognitive Systems, University of British Columbia, Vancouver, BC, Canada, February 2004
- Keynote Speaker at NSF-sponsored International Workshop on Theoretical and Algorithmic Aspects of Sensor, Ad Hoc Wireless and Peer-to-Peer Networks, Ft. Lauderdale, FL., February 2004
- Keynote Speaker at the ACM NOSSDAV Conference, Monterey, CA, June 2003
- Florida Atlantic University, Distinguished Lecture Series, September 2003

- University of California, Davis, Distinguished Lecturer Series, February 2003
- University of Minnesota Cray Distinguished Lecture Series, April 2001

J. Funded Research Proposals and Grants (Principal Investigator)

VIQI: Video Quality of Experience Inference Using Network Measurements (PIs Zegura, Ammar)
National Science Foundation.
Amount:\$500,000, October 2019 - September 2022.

Eiffel: Efficient and Flexible Packet Scheduling in Software (PIs Zegura, Ammar)
National Science Foundation.
Amount:\$500,000, July 2018 - June 2021.

Stratus Clouds: Mobile Computing with Tactical HPC in the Field (PIs Zegura, Ammar)
Army Research Lab - Aberdeen, MD.
Amount:\$250,000, July 2014 - June 2016.

NeTS: Medium: Collaborative Research: Tango: Performance and Fault Management in Cellular Networks through Device-Network Cooperation (PI: Ammar – In collaboration with Bagchi, Qi (Purdue), Joshi, Panta (ATT Research))
National Science Foundation
Amount:\$375,000 (GT Share), August 2014 - July 2018.

NeTS: Small: Collaborative Proposal: Enabling Network Agility through Virtualized Infrastructure Migration (PIs: Ammar, Zegura – In collaboration With E. Al-Shaer UNC Charlotte)
National Science Foundation
Amount: \$250,000 (GT Share), August 2013 - July 2016.

NeTS: Medium: Mobile Computing over Intermittently Connected Networks (PIs: Ammar, Zegura, naik , Essa)
National Science Foundation
Amount: \$695,000, August 2012 - July 2015.

NeTS: Small: Recovery and Transformation of Human Mobility Traces for Mobile Wireless Experimentation
Amount: \$399,000, August 2011 - July 2014.
Mostafa Ammar, Ellen Zegura PIs

Towards Collaborative Overlay Problem Diagnosis Using Evidential Reasoning and Adaptive Monitoring
NSF, \$500,000 (GT share \$250K), August 2010-August 2013. PIs: Ammar and Al-Shaer (UNCC).

The WAM Continuum: Unified Design and Operation for Wireless and Mobile Networks, NSF, \$450K, Aug. 2008 - Aug. 2011. PIs: Ammar and Zegura.

Routing in Multi-Layered Networks, NSF, \$350K, September 2007- September 2010. PI: Ammar.

Distributed performance monitoring, problem diagnosis and problem localization, PIs: Dovrolis, Ammar, Telchery (Duluth, GA), \$40,000 foundation grant.

DOMe: DTN Outdoor Mobile Environment, DARPA DTN project phase 2, PIs: Zegura, Ammar, Levine (UMASS), Corner(UMASS)

\$600,000, September 2006 - March 2008

\$600,000, Fall 2008 - April 2010

Disruption Tolerant Networks, Cisco Systems University Research Program Award, \$80K, Aug. 2006. PIs: Ammar, Zegura.

Design of Disruption Tolerant Networks, NSF, co-PIs: Ammar, Zegura, Levine (Umass), Corner (UMass), \$1.5 Million, August 2005 -August 2009.

Intelligent Route Control, NSF, PIs: Dovrolis, Zegura and Ammar, \$200K, September 2005- September 2007.

ALERT: Adaptive Learning and Routing Technologies for Disruption Tolerant Networks, DARPA, PIs: Zegura, Ammar, Levine (UMASS), Corner(UMASS), Amount: \$275,000, Feb. 2005- April 2006.

Mobility-Assisted Data Delivery in Wireless Networks, GT Broadband Institute, PIs: Ammar, Zegura, 1-student GRA support, 8/1/2004 - 7/30/2005.

Message Ferrying: Mobility-Assisted Data Delivery in Highly Partitioned N Networks, NSF, PIs: Ammar, Zegura, Amount: \$325,000, 9/15/03 - 9/14/06.

Design and Evaluation of Retrieval Functions in Peer-to-peer File-Sharing Systems, NSF, December 2001, PIs: Ammar, Zegura, Amount:\$300,000 , 10/1/03 -9/30/06.

A Simulation Testbed for Networked Sensors in Surface Transportation Systems, NSF, PIs, Fujimoto, Ammar, Guensler, Williams, Amount funded: \$150,000, 9/11/2002 - 8/10/2004.

Peer-to-Peer Content Distribution Services and Architectures, GT Broadband Institute, PIs: Ammar, Zegura, 1-student GRA support, 8/1/2002 - 7/30/2003.

End-to-end All-Optical Service Provisioning, Sprint, PIs: Ammar and Jukan, Amount funded: \$25,000, 9/18/2002 - 6/30/2003.

Large Scale Computer Network Experimentation through Simulation, NSF, PIs: Fujimoto, Ammar and Riley, Amount funded: approx. \$520K, 9/1/02 - 8/31/05.

Research in Optical Networking. Funded by Yamacraw

- ('01-'02), (1 GRA + 1.5 months salary).
- ('02-'03), (1 GRA + 1 month salary).

Collaborative Technology Research Alliance in Communications and Networking, Army Research Lab Research Consortium (Telcordia, U. of Maryland, U. of Delaware, CCNY, Johns Hopkins U., Georgia Tech), approx. \$60K (Sept 01 - Sept 02).

Protocols and Architectures for Scalable Content Distribution Networks, Georgia Tech Broadband Institute, \$60K, July 2001 (Ammar and Zegura Co-PIs).

Differentiated Services Testbed for the Internet2, BellSouth Foundation Grant \$75K, July 2000. PI: Ammar.

Fault-Tolerant Real-Time Networks

A Multi-University Research Initiative Award, funded by the Air Force Office of Scientific Research, Team includes: UC-Berkeley (prime contractor), Georgia Tech, MIT, Duke, Michigan.

Total Award: \$2.9M (3 years), \$2.1M (2 year option)

Georgia Tech Portion: \$358K (3 years), \$289K (2 year option) Duration: April 2000 - April 2005).

MURI Fellowship – supplement to above grant
Fellowship awarded to Paul Judge, Sept. 2000-August 2003.
\$40K/ year.

COMPASS: Composable and Parallel Simulations for Internetworks, PIs: Ammar, Fujimoto National Science Foundation, \$660K, October 1999 - September 2002.

Server Selection in Emerging Networked Service Environments, PIs: Ammar and Zegura, NSF, \$399K, October 1999 - September 2002.

Scalable Internet Services Using Multicast Communication,
Sprint Advanced Technology Labs,
\$60K Foundation Grant, awarded Summer 1999,
\$30K Foundation Grant, awarded Spring 2001.

Evaluating the Scalability of Aggregation techniques for Database Replication in Intermittently Connected Database Systems, PIs: Ammar and Navathe,
Georgia Research Alliance and Synchrologic, Inc.,
\$108K, June 97- September 98.
(GRAs portion \$49K, Synchrologic's portion: \$58K).

Scalable Web Service Using Multicast delivery Intel Corporation, PI: Ammar. \$32,000 grant (including \$7K in Equipment), June 1997.

Video Multicast Research, Lucent Bell Labs, PI: Ammar. \$5,700 (Foundation Grant), January 1997.

Investigating the Individuality/Scalability Tradeoff in the Provision of Networked Services, PI: Ammar, NSF, \$260,000 (9/30/96 - 9/30/99).

Interactive Multimedia Jukebox Broadband Telecom Center, PI: Ammar, \$15,000, January 1996

Interactive Multimedia Jukebox(PIs: Ammar and Chervenak) Edenfield Fellowship (College of Computing) \$10,000, June 1996

Remote Collaboration and Teaching Facility(Co-PIs: Calvert, Enslow, Limb, Zegura), AT&T Special Purpose Grant Program \$20,000. October 1996.

Improving the Scalability and Cost Effectiveness of Database Access for Applications Involving Intermittently-Connected Users, PIs: Ammar and Navathe,
Georgia Research Alliance and Synchrologic, Inc., \$109,190, June 96- September 97.
(GRAs portion \$51K, Synchrologic's portion: \$58K).

Prototyping an Integrated Web/Telephony Distributed Collaboration Systems, IBM Faculty Partnership Award, PI: Ammar \$70,000 (\$40K Foundation Grant and \$30K equipment) August 1996- August 1997.

An Integrated Database/Networking Research Testbed, PIs: Ammar, Navathe, Georgia Research Alliance, \$85,000, Equipment only.

Multicast IP over ATM Networks, Bellcore, PI: Ammar, \$30,000. Jan 1, 1996 - Dec. 31, 1996.

Application-Based Traffic Management for ATM Networks, (Co-PIs: Limb, Aaron, Evans, Zegura, Mukherjee) Hitachi Telecom, USA, Approx \$250,000 in Contract and Foundation Grants, October 95-September 96.

Equipment in support of Multimedia Networking Research and Education, Intel Corporation, \$13,850, (equipment donation) February 1996.

Networking Instructional Lab Enhancements, (Co-PIs: Calvert, Enslow, Limb, Mukherjee, Zegura) AT&T Special Purpose Grant, \$30,000. October 1995.

A Testbed for Multimedia Communication Protocols,(Co-PIs: Calvert, Enslow, Mukherjee, Zegura) AT&T Special Purpose Grant, \$20,000, October 1994.

Instructional and Educational Network Management Laboratory, CoPIs: Enslow, Kappel, Calvert, AT&T Special Purpose Grant, \$12,000, October 1993.

TransOpen: Transitioning to the Open Systems Environment- FY93, Co-PIs: Eidbo, Navathe, Mark, Calvert, Rugaber, MacCracken, Army Research Lab, \$450,000. 8/15/93 - 8/14/94.

Using Replication to Build High Performance Distributed Systems, PIs: Ahamad and Ammar, Defense Advanced Research Projects Agency (DARPA), Approx \$230,000. 9/1/93-8/31/95.

Multi-Protocol Architectures as Paradigm for Achieving Inter-Operability, PIs: Ammar and Calvert, National Science Foundation \$171,000. 8/1/93 - 7/30/95.

Transitioning to the Open Environment, Co-PIs: Putnam, Eidbo, Rugaber, MacCracken, Army Research Lab \$250,000. 6/92-3/93,

ISA 97 - Compliant Architecture Testbed, Co-PIs: Putnam, Eidbo, Rugaber, McCracken, US Army Research Lab, \$150,000. 8/18/91-12/31/92,

AT&T Mentor Program, (Co-PI Enslow), \$25,000. AY 1988/89.

Prototyping a Broadcast Delivery Information System, National Science Foundation supported Center for Information Management Research. \$40,000. 10/1/90 - 9/30/92. PI: Ammar.

Performance Analysis of Large Scale Information Systems, National Science Foundation, \$99,360. 12/1/87 to 11/30/90. PI: Ammar.

K. Funded Research Proposals and Grants (Contributor)

Distributed Laboratories, (PIs: Fujimoto, Schwan, Limb, Ahamad)
National Science Foundation
Research Infrastructure, \$1,000,000. June 1995.

Georgia Tech Telecommunications Program Proposal
Bell South Foundation,
\$674,236. June 1989.

III. Service

A. Professional Activities

1. Professional Memberships

P. Eng., Professional Engineers of Ontario, Canada – Since 1981

2. Society Memberships

Fellow, Institute of Electrical and Electronics Engineers, Communications Society

Fellow, Association for Computing Machinery, also Special Interest Group on Computer Communications

Member, Academia Europea

3. Editorial and Review Work for Technical Journals and Publishers

Member Steering Committee: *IEEE Transactions on Mobile Computing*, 2016-2018.

Member of Steering Committee: *IEEE/ACM Transactions on Networking*, 2005-2010.

Editor-in-Chief: *IEEE/ACM Transactions on Networking*, (1999- 2003)

Member Editorial Board: *IEEE/ACM Transactions on Networking*, (1996-1999), *Computer Networks and ISDN Systems*, (1992-1999).

co-Guest Editor: *IEEE Journal on Selected Areas in Communications*, special issue on “Network Support for Multipoint Communication,” April 1996. (Co-guest editors: Satish Tripathi (U. of Md, College Park) and George Polyzos (UCSD).)

co-Guest Editor: Special Issue on “Broadband ISDN: Standards, switches and traffic management,” *Computer Networks and ISDN Systems*, 27(1), November 1994. (Co-guest Editors: Victor Li (U. of Southern California), Mehmet Ulema (Bellcore).)

Reviewer for: National Science Foundation, Addison-Wesley Publishing Company, Journal of the ACM, IEEE Computer Magazine, IEEE Transactions on Automatic Control, IEEE Transactions on Reliability, The Computer Journal (UK), Operations Research, IEEE Network Magazine, International Journal of Performance Evaluation, IEEE Transactions on Knowledge and Data Engineering, IEEE Transactions on Communications, IEEE Transactions on Software Engineering, Journal of Computer Networks and ISDN Systems, IEEE Communications Magazine, IEEE/ACM Transactions on Networking, IEEE Journal on Selected Areas in Communications, and numerous conferences.

Proposal Review Panel: National Science Foundation – on numerous occasions.

4. Conference Committee Activities

Member Steering Committee, *ACM CoNext Conference*, 2009- 2013.

Member Steering Committee: *IEEE/ACM Transactions on Networking*, 2005-2012, Committee Chair: 2007/08.

Program co-Chair, *ACM SIGMETRICS 2007*, San Diego, CA.

Program co-Chair, *Co-Next 2006*, Lisbon Portugal.

Program co-Chair, *Networked Group Communications Workshop*, 2002.

Member Steering Committee, IEEE International Conference on Network Protocols, 1998-2008.

Co-General Chair: 2000 IEEE International Conference on Network Protocols, Osaka, Japan, November 2000.

Program Co-Chair- International Conference on Network Protocols, ICNP 97, Atlanta, GA, October 1997.
(Conference is sponsored by the IEEE Computer Society.)

Member of the Program Committee

ACM MMSys Conference 2024

IFIP networking 2022 Conference

ACM Mobisys Workshop on Do-It-Yourself Networking 2015,2017

ACM Multimedia Systems 2015, 2016, 2018

ACM Multimedia 2014

SIGCOMM CHANTS (Challenged Networks Workshop) 2006,2007,2012,2014,2015

WCNC 2006

WoWMoM 2006

Co-Next 2005,2007

Networking 2005

IEEE WIAPP 2003

ACM NOSSDAV 2003

NETGAMES 2003

ACM International Measurement Workshop: 2002

IEEE International Conference on Distributed Computing Systems: 2003

ACM SIGCOMM Conference: 2000, 2001, 2012,

IEEE International Workshop on Distributed Simulation and Real-Time Systems, '99, '00,

IEEE International Conference on Network Protocols '98, '99, '01, '02, 03, 04, 05, 06, 07, 14,

ACM SIGMETRICS Conference: 1999, 2001, 2004, 2005

IEEE INFOCOM '88, '89, '94, '95, '96, '98, '99, '00, '01, '02, '03, '04, '05, '06, '08(Area Chair),

International Conference on Computer and Communication Networks, 1994, 1995, 1996, 1997, 1998,

6th IFIP Conference on High Performance Networking, 1997,

World Wide Web Consortium Workshop on "Real Time Multimedia on the Web", 1996,

ACM Computer Science Conference, 1988,

1986 IEEE International Conference on Systems, Man, and Cybernetics.

5. Other Notable External Service

Member CoC Regents' Professor Nominee Selection Committee, Fall 2023.

Chair, Search Committee for Division Director, Computer Networks and Systems Division, CISE Directorate, NSF, April-May 2019.

B. Georgia Tech: College and School Service

Chair, Faculty Recruiting Committee, School of Computer Science 2021/22 and 2022/23, 2023/24.

Chair, School of CSE Chair 5-year Review Committee, Fall 18 - Spring 19.

Chair RPT Committee, School of Computer Science, August 2017 - August 2019.

Member CoC Regents' Professor Nominee Selection Committee, Spring 2017.

Co-Chair, CoC Strategic Planning Steering Committee, 2016/2017.

Chair, SCS Ad-HoC Committee on Recruiting Effectiveness, Fall 2016.

Member, School of Computer Science Faculty Recruiting Committee (2012/13, 2013/14, 2015/16)

Member, College of Computing, RPT Committee, 2015/16, 2016/2017.

Chair, College of Computing RPT Committee, Aug 2010 - May 2012

Chair, Review Committee for School of Interactive Computing Chair (2009)

CS RPT Chair (2008/2009)

CS Recruiting Committee Chair (2005/06, 2006/07, 2007/08)

CoC Executive Committee (2004 – 2006)

CCD Steering Committee (2003 – 2005)

CoC RPT Executive Committee (2003 – 2005)

Co-Chair, Graduate Committee (2002/03).

Graduate Area Coordinator for NTG (2000 - 2004).

Graduate Area Advisor (1998/99).

Member Graduate Admissions Committee (1998/99).

Chair, Faculty Search Committee, September 1996 - June 1998.

Chair, College of Computing Honors Committee, August 1994 - August 1996.

Member, Advanced Telecom Chair Search Committee (GCATT/GRA) (1991/92, 1992/93, 1993/94)

Member, CoC Faculty Recruiting Committee (1991/92-1992/93)

Member, Graduate Committee, College of Computing (1991/92, 1992/93, 1993/94)

Chairman, Computing Policy Committee (1991/92)

Acting Director of Computer and Networking Systems (CNS)- June 1991 - October 1991.

Graduate Assistantship Coordinator, Spring 1991 - Fall 1991.

ICS and CoC representative to the General Faculty Assembly and the Faculty Senate (ELECTED) 1989-1994.

ICS Director Advisory Committee -1987/88, 1989/90. (ELECTED)

ICS Ph.D. General Exam Committee - Fall 1987, Spring 1988.

ICS Director Search Committee - 1987/88.

ICS Faculty Search Committee - 1986/87.

Ad Hoc ICS Lab Committee - 1986/87.

C. Georgia Tech Institute Committees

Member, CoC Dean Search Committee (2023/24)

Member: Georgia Tech Regents' Professor Selection Committee, Spring 2018.

Member GT RPT committee (2010-2012)

Member College of Engineering Dean Search Committee (2010/2011)

Member Georgia Tech Provost Search Committee (2009/2010)

Member of Regents' Professor Selection Committee (2003/04, 2004/05, 2005/06, 2010/11)

Member of GT Academic Honor Committee (2002/03)

Member, Georgia Tech Executive Board (ELECTED) (September 1991 - August 1994)

Chair, Georgia Tech Nominations Committee (1993, 1994)

Member, Georgia Tech Nominations Committee (1992)