Curriculum Vitae

Ahmed A-G Helmy
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CONTENTS

I. EDUCATION

- **Doctor of Philosophy (Ph.D.)**, Aug 1999. Advisor: Deborah Estrin, co-advisor: Sandeep Gupta
  University of Southern California, Los Angeles**,** Department of Computer Science. GPA:3.97
  Title: *Systematic Test Synthesis for Multipoint Protocol Design*
- **Master of Science**, December 1995, (Non-thesis), Advisor: John Silvester
  University of Southern California, Department of Electrical Engineering. GPA: 4.0
  Major: Master of Science in Electrical Engineering - Computer Networks (MSEECN)
- **Master of Science**, July 1994, (Non-thesis), Engineering Mathematics, Cairo University, Egypt
- **Bachelor of Science**, July 1992, with highest honors, *summa cum laude*
  Electronics and Communications Major, Electrical Engineering, Cairo University, Egypt

II. PROFESSIONAL APPOINTMENTS

- 8/06-present: *Associate Professor*, Computer and Information Science and Engineering
  University of Florida, Gainesville, FL
- 9/99 – 8/06: *Assistant Professor,* Department of Electrical Engineering - Systems,
  University of Southern California (USC), Los Angeles, CA
- 5/05 - present: *co-Founder and co-Director*, Wireless and Sensor Networks Laboratory
  University of Southern California (USC), Los Angeles, CA
- 7/00 - present: *Founder and Director*, Computer Networks Design and Testing Laboratory,
  Electrical Engineering Department, USC
- 9/98 – 8/99: *Graduate Research Assistant*, Computer Science Department, USC
  Project: *STRESS*. Supervisors: Prof. Deborah Estrin, Prof. Sandeep Gupta.
- 9/96 – 9/98: *Graduate Research Assistant,* Information Sciences Institute (*ISI*), USC
  Project: *VINT* and the Network Simulator (*NS*). Supervisor: Prof. Deborah Estrin.
- 6/95–8/95&6/96–8/96: *Intern*, Network Systems Division, Silicon Graphics, Mountain View, CA
  Developed and implemented the Protocol Independent Multicast (*PIM-SM*)
- 9/95 – 6/96: *Graduate Research Assistant,* Computer Science Department, USC
  Project: Protocol Independent Multicast (*PIM*). Advisor: Prof. Deborah Estrin.
- 10/92 – 7/94: *Teaching Assistant*, Engineering Mathematics Department, Cairo University, Egypt
- 4/93 – 7/94: *Software Design & Development Engineer*, Telecomp. Int'l Co, Cairo, Egypt.
- 9/92 – 9/93: *Graduate Research Assistant,* Electrical Engineering Dept, Cairo University, Egypt
- 9/92 – 1/94: *Teaching Assistant*, Electronics Department, American University in Cairo, Egypt

III. AWARDS AND ACHIEVEMENTS

- National Science Foundation (NSF) *CAREER* Award, June 2002 - May 2007.
- National Science Foundation (NSF) *NETS NOSS* Grant/Award, Sept 2004 - Sept 2007.
- Nominated for the Alfred P. Sloan Fellowship, September 2003.
- Nominated for the USC School of Engineering Junior Faculty Research Award 2003-2004.
- Top *0.43%* most cited authors in Computer Science, Aug '06 (citeseer.ist.psu.edu/allcitedn.html)
- Over 1270 citations (excluding self-citations), Dec '05 (http://scholar.google.com)
- Zumberge Award for Individual Research, USC, June 2000.
- Best Paper Award, *IEEE Int'l Conf on Mgmt of Multimedia Networks & Services (MMNS)*, Oct02
- Rank **1st** (of 39 faculty) in the merit review for USC EE Dept (Research:5/5, Teaching:5/5) 2004
- Grants summary: Three NSF grants, NASA(4yrs), DARPA(4yrs), Intel(2yrs), P&W(3yrs), Nortel
- Total research funding $3.87M (A. Helmy's share: $1.97M)
- Teaching honors (above 4.5/5) for 15 courses since '00 ['00(3), '01, '02(2), '03(3), '04(3), '05(3)]
- Academic excellence fellowship for graduate studies from Kuwait for all semesters '94 through '99
- Top 10 (top 1%) in class of over 1000 graduating engineers '92, Cairo University, Egypt.
- Rank 2nd of 20,000 graduating high school students nationwide, with score of 99.5%, Kuwait '87.

IV. PUBLICATIONS

A. Refereed Articles in Journals (Published or Accepted)

1. F. Bai, N. Sadagopan, B. Krishnamachari, A. Helmy, "Modeling Path Duration Distributions in MANETs and their Impact on Routing Performance", *IEEE Journal on Selected Areas in Communications (**JSAC**)*, Vol. 22, No. 7, pp. 1357-1373, Sept 2004. [Acceptance rate: 18% of 82]
2. F. Bai, N. Sadagopan, A. Helmy, "The ***IMPORTANT*** Framework for Analyzing the Impact of Mobility on Performance of Routing for Ad Hoc Networks", *Ad Hoc Networks Journal - Elsevier*, Vol. 1, Issue 4, pp. 383 - 403, November 2003. [Acceptance rate: 12%]
   On the top 25 most requested articles (*Ad Hoc Networks Journal*) for Jan-Dec'03 & Jan– Mar'04.
3. A. Helmy, M. Jaseemuddin, Ganesha Bhaskara, "Multicast-based Mobility: A Novel Architecture for Efficient Micro-Mobility", *IEEE Journal on Selected Areas in Communications (**JSAC**)*, Vol. 22, No. 4, pp. 677-690, May 2004. [Acceptance rate: 25% of 60 submissions]
4. N. Sadagopan, B. Krishnamachari, A. Helmy, "Active Query Forwarding in Sensor Networks (***ACQUIRE***)", *Ad Hoc Networks Journal - Elsevier*, Vol. 3, Issue 1, pp. 91-113, January 2005. [Acceptance rate: 12%]
5. A. Helmy, "Small Worlds in Wireless Networks", *IEEE Communications Letters*, pp. 490-492, Vol. 7, No. 10, October 2003.
6. A. Helmy, S. Gupta, D. Estrin, "The *STRESS* Method for Boundary-point Performance Analysis of End-to-end Multicast Timer-Suppression Mechanisms", *IEEE/ACM **Transactions on Networking***, Volume 12, Issue 1, pp. 44-58, February 2004. [Acceptance rate '03: 18% of 439]
7. A. Helmy, S. Garg, P. Pamu, N. Nahata, "*CARD*: A Contact-based Architecture for Resource Discovery in Ad Hoc Networks", *ACM Mobile Networks and Applications (**MONET**) Journal*, Vol. 10, Issue 1, pp. 99-113, February 2005. [Acceptance rate: 22% of 60 submissions]
8. K. Seada, A. Helmy, S. Gupta, "A Framework for Systematic Evaluation of Multicast Congestion Control Protocols", *IEEE Journal on Selected Areas in Communications (**JSAC**)*, Volume 22, Issue 10, pp. 2048- 2061, December 2004.
9. D. Son, A. Helmy, B. Krishnamachari, "The Effect of Mobility-induced Location Errors on Geographic Routing in Mobile Ad Hoc and Sensor Networks: Analysis and Improvement using Mobility Prediction", *IEEE **Transactions on Mobile Computing** (TMC), Special issue on Mission-Oriented Sensor Networks*, Vol. 3, No. 3, pp. 233-245, July 2004 [Acceptance rate: 25%]
10. K. Seada, A. Helmy, "Efficient and Robust Geocasting Protocols for Sensor Networks", *Computer Communications Journal – Elsevier, Special Issue on Dependable Wireless Sensor Networks*, Vol. 29, Issue 2, pp. 151-161, January 2006.
11. A. Das, D. Dutta, A. Helmy, "A Low-state Packet Marking Framework for Approximate Fair Bandwidth Allocation", *IEEE Communications Letters*, Vol. 8, No. 9, pp. 588-590, Sept 2004.
12. A. Helmy, S. Gupta, "*FOTG*: Fault Oriented Stress Testing of Multicast Routing", *IEEE Communications Letters*, Vol. 9, No. 4, pp. 375-377, April 2005.
13. A. Helmy, "Contact-extended Zone-based Routing for Transactions in Ad Hoc Networks", *IEEE Transactions on Vehicular Technology*, Vol. 54, No. 1, pp. 307-319, January 2005.
14. A. Helmy, "Mobility-Assisted Resolution of Queries in Large-Scale Mobile Sensor Networks (*MARQ*)", *Computer Networks Journal - Elsevier, Special issue on Wireless Sensor Networks*, Vol. 43, Issue 4, pp. 437-458, November 2003. [Acceptance rate: 24% of 25 submissions].
15. L. Breslau, D. Estrin, K. Fall, S. Floyd, J. Heidemann, A. Helmy, P. Huang, S. McCanne, K. Varadhan, Y. Xu, H. Yu, "Advances in Network Simulation", *IEEE Computer*, vol.33, No.5, pp. 59-67, May 2000. [Top 65 most cited papers in computer science in 2000 (Citeseer Jul '03)]
16. F. Bai, G. Bhaskara, A. Helmy, "Building the Blocks of Protocol Design and Analysis — Challenges and Lessons Learned from Case Studies on Mobile Ad hoc Routing and Micro-Mobility Protocols", *ACM Computer Communications Review (CCR), Special issue on Science of*

Networking Design, Volume 34, Number 3, pp. 57 – 69, July 2004. [Acceptance rate: 15% of 40].

17. A. Helmy, S. Gupta, "Automated Scenario Generation for Multicast Routing Simulation", *Computer Communications Journal – Elsevier Science*. Accepted with revision Feb '05.
18. A. Helmy, "*CAPTURE*: location-free Contact-Assisted Power-efficienT qUery REsolution for Sensor Networks", *ACM Mobile Computer and Communications Rev. (MC2R), Sp. issue on Wireless PAN/Sensor Networks*, vol. 8, No. 1, pp. 27-47, Jan '04. [Acceptance rate: 22% of 35]
19. Y. Kim, J. Lee, A. Helmy, "Impact of Location Inconsistencies on Geographic Routing in Wireless Networks", *ACM Mobile Computer and Communications Rev (MC2R), Sp. issue on Wireless PAN/Sensor Networks*, vol. 8, No. 1, pp. 48-60, Jan '04. [Acceptance rate: 22% of 35]
20. A. Helmy, M. Jaseemuddin, G. Bhaskara, "Efficient Micro-Mobility using Intra-domain Multicast-based Mechanisms (*M&M*)", *ACM SIGCOMM Computer Communications Review (CCR)*, Volume 32, Number 5, pp. 61-72, November 2002.

Refereed Extended Abstracts in Periodicals

21. W. Hsu, K. Merchant, H. Shu, C. Hsu, A. Helmy, "Weighted Way Mobility Model and its Impact on Ad Hoc Networks", *ACM Mobile Computer and Communications Review (MC2R)*, Vol. 9, No. 1, pp. 59-63, January 2005.
22. J. Faruque, A. Helmy, "Gradient-Based Routing in Sensor Networks", *ACM Mobile Computer and Communications Review (MC2R)*, Vol. 7, No. 4, pp. 50-52, October 2003.
23. K. Seada, A. Helmy, R. Govindan, "On the Effect of Location Inaccuracy on Geographic Face Routing in Wireless Networks", *ACM MC2R*, Vol. 7, No. 4, pp. 61-63, October 2003.
24. N. Nahata, P. Pamu, S. Garg, A. Helmy, "Efficient Resource Discovery for Large Scale Ad hoc Networks using Contacts", *ACM SIGCOMM CCR*, Vol. 32, No. 3, pp. 32, July 2002.
25. K. Dantu, S. Kapadia, R. Sinha, A. Helmy, "Modeling of Mobility-Induced Losses in MANETs (MILMAN)", *ACM SIGCOMM CCR* Vol. 32, No. 3, pp. 30, July 2002.

B. Refereed Journal Articles (In Submission)

1. K. Seada, A. Helmy, R. Govindan, "Modeling and Analyzing the Correctness of Geographic Face Routing under Realistic Conditions", *ACM Transactions on Sensor Networks*. Submitted.
2. K. Seada, A. Helmy, "*R2D2*: Rendezvous Regions for Data Discovery", *IEEE Transactions on Mobile Computing.* Submitted.
3. K. Seada, M. Zuniga, A. Helmy, B. Krishnamachari, "Energy-Efficient Forwarding Strategies for Geographic Routing in Lossy Wireless Sensor Networks", *ACM Transactions on Sensor Networks*. To be submitted Spring 2006.

C. Book Chapters

1. A. Helmy, "Efficient Resource Discovery in Wireless AdHoc Networks: Contacts Do Help", Book Chapter in "Resource Management in Wireless Networking", Springer, Series: Network Theory and Applications Vol. 16, 2005 (Eds: M. Cardei, I. Cardei, D. Zhu),ISBN:0-387-23807-7.
2. F. Bai, A. Helmy, "The *IMPORTANT* Framework for Analyzing and Modeling the Impact of Mobility in Wireless Adhoc Networks", Book Chapter in the upcoming book on "Wireless Ad Hoc and Sensor Networks" to be published by Kluwer Academic Publishers. Accepted June 2004 (Book in Press, to appear Spring 2006).
3. F. Bai, A. Helmy, "A Survey of Mobility Modeling and Analysis in Wireless Adhoc Networks", Book Chapter in the upcoming book on "Wireless Ad Hoc and Sensor Networks" to be published by Kluwer Academic Publishers. Accepted June 2004 (Book in Press, to appear Spring 2006).
4. K. Seada, A. Helmy, "Geographic Services for Wireless Networks", Book Chapter in the "Handbook of Algorithms for Wireless Networking and Mobile Computing" published by Chapman & Hall/CRC, pp. 343-364, January 2006, ISBN: 1-58488-465-7.
5. K. Seada, A. Helmy, "Geographic Routing in Sensor Networks", Review Chapter in the

Encyclopedia of Sensors, American Scientific Publishers, May 2005, ISBN: 1-58883-056-X.

6. S. Ghandeharizadeh, A. Helmy, B. Krishnamachari, F. Bar, T. Richmond, "Data Management Techniques for Continuous Media In Ad-Hoc Networks of Wireless Devices", In Encyclopedia of Multimedia, Furht, Borko (Ed.), Springer 2006, XXVIII, Hardcover, ISBN: 0-387-24395-X.
7. S. Ghandeharizadeh, A. Helmy, B. Krishnamachari, F. Bar, T. Richmond, "Data Discovery, Routing and Traffic Patterns", In Encyclopedia of Multimedia, Furht, Borko (Ed.), Springer 2006, XXVIII, Hardcover, ISBN: 0-387-24395-X.
8. S. Ghandeharizadeh, A. Helmy, B. Krishnamachari, F. Bar, T. Richmond, "Placement of Continuous Media in Ad-Hoc Networks of Devices", In Encyclopedia of Multimedia, Furht, Borko (Ed.), Springer 2006, XXVIII, Hardcover, ISBN: 0-387-24395-X.
9. S. Ghandeharizadeh, A. Helmy, B. Krishnamachari, F. Bar, T. Richmond, "Mobility Modeling and Design for Mobility", Encyclopedia of Multimedia, B. Furht (Ed.) Springer 2006. (Accepted)

D. Refereed Conference Papers

Selected Refereed Conference Papers

1. K. Nahm, A. Helmy, C.-C. Kuo, "TCP over Multihop 802.11 Networks: Issues and Performance Enhancement", *ACM **MobiHoc** (6th ACM International Symposium on Mobile Ad Hoc Networking and Computing)*, pp. 277-287, May 2005. [Acceptance rate: 14% of 281 submissions]

2. S. Ebrahimi, A. Helmy, S. Gupta, "TCP vs. TCP: a Systematic Study of Adverse Impact of Short-lived TCP Flows on Long-lived TCP Flows", *IEEE **INFOCOM***, pp. 926-937, March 2005. [Acceptance rate: 17% of 1419 submissions].

3. A. Das, D. Dutta, A. Helmy, A. Goel, J. Heidemann, "Low State Fairness: Lower Bounds and Practical Enforcement", *IEEE **INFOCOM***, pp. 2436-2446, March 2005 [Acceptance rate: 17%].

4. K. Seada, M. Zuniga, A. Helmy, B. Krishnamachari, "Energy-Efficient Forwarding Strategies for Geographic Routing in Lossy Wireless Sensor Networks", *2nd ACM Conference on Embedded Networked Sensor Systems (**SenSys**)*, pp. 108-121, November 2004. [Acceptance: 14% of 145].

5. K. Seada, A. Helmy, R. Govindan, "On the Effect of Localization Errors on Geographic Face Routing in Sensor Networks", *3rd IEEE/ACM International Symposium on Information Processing in Sensor Networks (**IPSN**)*, pp. 71-80, April 2004. [Acceptance rate: 33% of 150].

6. N. Sadagopan, F. Bai, B. Krishnamachari, A. Helmy, "*PATHS*: analysis of PATH duration Statistics and their impact on reactive MANET routing protocols", *ACM **MobiHoc***, pp. 245-256, June 2003. [Acceptance rate: 15% of 189 submissions].

7. F. Bai, N. Sadagopan, A. Helmy, "***IMPORTANT***: A framework to systematically analyze the Impact of Mobility on Performance of RouTing protocols for Adhoc NeTworks", *IEEE **INFOCOM***, pp. 825-835, San Francisco, CA, April 2003. [Acceptance rate: 20% of 1078 submissions] [Paper selected to the *Ad Hoc Networks Journal* for fast-track publication]

8. W. Hsu, A. Helmy, "On Nodal Encounter Patterns in Wireless LAN Traces", *The 2nd IEEE Int'l Workshop on Wireless Network Measurement (WiNMee)*, April 2006.

9. W. Hsu, A. Helmy, "On Modeling User Associations in Wireless LAN Traces on University Campuses, *2nd IEEE Int'l Workshop on Wireless Network Measurement (WiNMee)*, April 2006.

10. C. Li, W. Hsu, B. Krishnamachari, A. Helmy, "A Local Metric for Geographic Routing with Power Control in Wireless Networks", *IEEE Conference on Sensor and Ad Hoc Communications and Networks (**SECON**)*, September 2005 [Acceptance rate: 27% of 202 submissions]

11. Y. Kim, A. Helmy, "*SWAT*: *S*mall *W*orld-based *A*ttacker *T*raceback in Ad-hoc Networks",

IEEE/ACM Mobiquitous Conference, pp. 85-96, Jul 2005. [Acceptance rate: 35% of 127]

12. S. Tanachaiwiwat, A. Helmy, "Correlation analysis for alleviating effects of inserted data in wireless sensor networks", *IEEE/ACM Mobiquitous Conference*, pp.97-108, Jul 2005 [Rate: 35%]
13. J. Faruque, K. Psounis, A. Helmy, "Analysis of Gradient-based Routing Protocols in Sensor Networks", *IEEE/ACM Int'l Conference on Distributed Computing in Sensor Systems (**DCOSS**)*, pp. 258 - 275, June 2005. [Acceptance rate: 28% of 85 submissions]
14. J. Faruque, A. Helmy, "*RUGGED*: RoUting on finGerprint Gradients in sEnsor Networks", *IEEE Int'l Conf on Pervasive Services (ICPS)*, pp.167-177, July 2004. [Acceptance rate: 36%].
15. F. Bai, N. Sadagopan, A. Helmy, "*BRICS*: A Building-block approach for analyzing RoutIng protoCols in Ad Hoc Networks - A Case Study of Reactive Routing Protocols", *IEEE Int'l Conf on Communications (ICC)*, Vol. 6, pp. 3618-3622, June 2004. [Acceptance rate: 29%].
16. K. Seada, A. Helmy, " *Rendezvous Regions*: A Scalable Architecture for Service Location and Data-Centric Storage in Large-Scale Wireless Networks", *IEEE/ACM **IPDPS** Int'l Workshop on Algorithms for Wireless, Mobile, Ad Hoc and Sensor Networks (WMAN)*, pp. 218 – 225, Apr '04. [Acceptance: 32% of 60] Recommended for a journal by the referees as one of the best papers.
17. G. Bhaskara, A. Helmy, "TCP over Micro-mobility Protocols: Systematic Ripple Effect Analysis", *IEEE Vehicular Technology Conference (VTC)*, Vol. 5, pp. 3095 - 3099, Sept 2004.
18. K. Seada, A. Helmy, "Efficient Geocasting with Perfect Delivery in Wireless Networks", *IEEE Wireless Communications and Networking Conference (WCNC)*, pp. 2551 - 2556, March 2004.
19. D. Son, A. Helmy, B. Krishnamachari, "The Effect of Mobility-induced Location Errors on Geographic Routing in Ad Hoc Networks: Analysis and Improvement using Mobility Prediction", *IEEE Wireless Communications and Networking Conference (WCNC)*, pp. 189-194 March 2004.
20. A. Helmy, "*TRANSFER:* Transactions Routing for Ad-hoc Networks with eFficient EneRgy", *IEEE GLOBECOM (Global Telecom. Conf)*, pp. 398-404, December 2003. [Acceptance: 27%].
21. G. Bhaskara, A. Helmy, S. Gupta, "Micro Mobility Protocol Design and Evaluation: A Parameterized Building Block Approach", *IEEE Vehicular Technology Conference (VTC), Symposium on IP Mobility*, pp. 2019 – 2024 October 2003. [Acceptance rate: 19% of 76].
22. Y. Kim, J. Lee, A. Helmy, "Impact of Location Inconsistencies on Geographic Routing in Wireless Networks", *ACM Wkshp on Modeling, Analysis, Simulation of Wireless Mobile Systems (MSWIM), with ACM MOBICOM*, pp.124-127, Sept '03. [Acceptance rate: 15% of 103]
23. N. Sadagopan, B. Krishnamachari, A. Helmy, "The ***ACQUIRE*** Mechanism for Efficient Querying in Sensor Networks", *First IEEE International Workshop on Sensor Network Protocols and Applications (SNPA), in conjunction with IEEE ICC*, pp. 149-155, May 2003. [Acceptance: 37%].
24. A. Helmy, S. Garg, P. Pamu, N. Nahata, "Contact Based Architecture for Resource Discovery (*CARD*) in Large Scale MANets", *IEEE/ACM **IPDPS** In'l Workshop on Wireless, Mobile and Ad Hoc Networks (WMAN)*, pp. 219-227, Apr 2003. [Acceptance: 29%] [Paper further selected for forwarding to the *ACM MONET Journal* for publication]
25. A. Das, D. Dutta, A. Helmy, "Fair Stateless Aggregate Marking using Active Queue Management Techniques", *5th IEEE Int'l Conference on Management of Multimedia Networks and Services (MMNS)*, pp. 211-223, Santa Barbara, CA, October 2002. (***Winner of The Best Paper Award***) [Ranked **1st** of 76 submissions, review scores '5.0/5.0, 5.0/5.0, 5.0/5.0'. Acceptance rate: 33%].
26. A. Helmy, "Architectural Framework for Large-Scale Multicast in Mobile Ad Hoc Networks", *IEEE International Conference on Communications (ICC)*, Vol. 4, pp. 2036-2042, April 2002.

27. A. Helmy, " State Analysis and Aggregation Study for Multicast-based Micro Mobility", *IEEE International Conference on Communications (ICC)*, Vol. 5, pp. 3301-3306, April/May 2002.

28. K. Seada, A. Helmy, "Fairness Evaluation Experiments for Multicast Congestion Control Protocols", *IEEE GLOBECOM*, Vol. 3, pp. 2614-2618, November 2002. [Acceptance rate: 30%].

29. K. Seada, S. Gupta, A. Helmy, "Systematic Evaluation of Multicast Congestion Control Protocols", *SCS SPECTS Performance Evaluation of Computer and Telecom*, pp. 857-867, Jul 02

30. A. Helmy, "A Multicast-based Protocol for IP Mobility Support", *ACM SIGCOMM Second International Workshop on Networked Group Communication (**NGC**)*, Palo Alto, CA, ACM press, pp. 49-58, November 2000. [Acceptance rate: 24% of 49 submissions].

31. A. Helmy, S. Gupta, D. Estrin, A. Cerpa, Y. Yu, "Systematic Performance Evaluation of Multipoint Protocols", *IFIP Formal Description Techniques & Protocol Specification, Testing, and Verification (FORTE/PSTV)*, pp. 187-202, October 2000. [Acceptance: 34% of 63].

32. A. Helmy, D. Estrin, S. Gupta, "Systematic Testing of Multicast Routing Protocols: Analysis of Forward and Backward Search Techniques", *IEEE ICCCN (IC3N)*, pp. 590-597, October 2000.

33. D. Estrin, M. Handley, A. Helmy, P. Huang, D. Thaler, "A Dynamic Bootstrap Mechanism for Rendezvous-based Multicast Routing", *IEEE **INFOCOM***, Vol. 3, pp. 1090-1098, March 1999. [Acceptance rate: 30% of 600 submissions].

34. A. Helmy, D. Estrin, S. Gupta, "Fault-oriented Test Generation for Multicast Routing Protocol Design", *IFIP FORTE/PSTV*, Paris, pp. 93-109, November 1998. [Acceptance rate: 30% of 85].

35. A. Helmy, D. Estrin, "Simulation-based `STRESS' Testing Case Study: A Multicast Routing Protocol", *IEEE Sixth Int'l Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS)*, Montreal, Canada, pp. 36-43, July 1998.

Other Refereed Conference Papers (Semester projects or with MS students)

36. S. Wang, Y. Chen, T. Lee, A. Helmy, "Performance Evaluations for Hybrid IEEE 802.11b and 802.11g Wireless Networks", 24th *IEEE International Performance Computing and Communications Conference (IPCCC)*, April 2005. [Acceptance rate: 32% of 115 submissions].

37. S. Begum, S. Wang, B. Krishnamachari, A. Helmy, "*ELECTION*: Energy-efficient and Low-latEncy sCheduling scheme for wIreless sensOr NeTworks", *The 29th IEEE Conference on Local Computer Networks (LCN)*, November 2004. [Acceptance rate: 29% of 141 submissions].

38. Y. Lu, H. Lin, Y. Gu, A. Helmy, "Towards Mobility-Rich Performance Analysis of Routing Protocols in Ad Hoc Networks: Using Contraction, Expansion and Hybrid Models", *IEEE Int'l Conf on Communications (ICC)*, Vol. 7, pp. 4346-4352, June 2004. [Acceptance rate: 29%].

39. C. Shete, S. Sawhney, S. Herwadka, V. Mehandru, A. Helmy, "Analysis of the Effects of Mobility on the Grid Location Service in Ad Hoc Networks", *IEEE International Conference on Communications (ICC)*, Vol. 7, pp. 4341-4345, Paris, France, June 2004. [Acceptance rate: 29%].

40. Y. Kim, V. Sankhla, A. Helmy, "Efficient Traceback of DoS Attacks using Small Worlds in MANET", *IEEE Vehicular Technology Conference (VTC)*, Vol. 6, pp. 3979-3983, Sept 2004.

41. W. Hsu, K. Merchant, H. Shu, C. Hsu, A. Helmy, "Preference-based Mobility Model and the Case for Congestion Relief in WLANs using Adhoc Networks", *IEEE VTC*,pp.2962-2966, Sep04

42. S. Sharma, V. Alatzeth, G. Grewal, S. Pradhan, A. Helmy, "A Comparative Study of Mobility Prediction Schemes for GLS Location Service", *IEEE VTC*, Vol. 5, pp. 3125-3129, Sept 2004.

43. D. Bhattacharjee, A. Rao, C. Shah, M. Shah, A. Helmy, "Empirical Modeling of Campus-wide

Pedestrian Mobility: Observations on the USC Campus", *IEEE VTC*, pp. 2887 - 2891, Sept 2004.

44. K. Nahm, A. Helmy, C.-C. J. Kuo, "On the Interaction between MAC and Transport Layers for Media Streaming in 802.11 Ad-hoc Networks", *SPIE ITCOM*, October 2004.
45. R. Chitradurga, A. Helmy, "Analysis of Wired Short Cuts in Wireless Sensor Networks", *IEEE Int'l Conference on Pervasive Services (ICPS)*, pp. 179-188, July 2004. [Acceptance rate: 36%].
46. S. Tanachaiwiwat, P. Dave, R. Bhindwale, A. Helmy, "Location-centric Isolation of Misbehavior and Trust Routing in Energy-constrained Sensor Networks", *IEEE Workshop on Energy-Efficient Wireless Communications and Networks (EWCN), IEEE IPCCC*, pp. 463-470, April 2004.
47. F. Bai, A. Helmy, "Comparative Analysis of Algorithms for Tree Structure Restoration in Sensor Network", *IEEE EWCN Workshop with the IEEE IPCCC Conference*, pp. 385-392, April 2004.
48. S. Begum, M. Sharma, A. Helmy, S. Gupta, "Systematic Testing of Protocol Robustness: Case Studies on Mobile IP and MARS", *IEEE LCN*, Florida, pp. 369-380, November 2000.

Conference Posters with Refereed Extended Abstracts

49. W. Hsu, A. Helmy, "Principal Component Analysis of User Association Patterns in Wireless LAN Traces", *IEEE INFOCOM*, April 2006.
50. W. Hsu, A. Helmy, "Capturing User Friendship in WLAN Traces", *IEEE INFOCOM*, April 2006.
51. Y. Kim, A. Helmy, "Attacker Traceback and Countermeasure with Cross-layer Monitoring in Wireless Multi-hop Networks", *IEEE INFOCOM*, April 2006.
52. S. Tanachaiwiwat, A. Helmy, "VACCINE: War of the Worms in Wired and Wireless Networks", *IEEE INFOCOM*, April 2006.
53. S. Begum, A. Helmy, S. Gupta, "A Framework for Modeling, Test Generation and Performance Evaluation of Wireless AdHoc and Sensor MAC Protocols", *IEEE INFOCOM*, April 2006.
54. W. Hsu, A. Helmy, "Encounter-based message broadcasting in ad hoc networks with intermittent connectivity", *ACM MOBIHOC*, May 2005.
55. K. Nahm, A. Helmy, C. Kuo, "Improving Stability and Performance of Multihop 802.11 Networks", *ACM MOBIHOC*, May 2005.
56. K. Merchant, W. Hsu, H. Shu, C. Hsu, A. Helmy, "Weighted Way Mobility Model and its Impact on Ad Hoc Networks", *ACM MOBICOM*, Sept 2004 [Among the **best posters** at *MOBICOM* 04.]
57. F. Bai, A. Helmy, "The Impact of Mobility on the Mobility-Assisted Information Diffusion Protocol", *IEEE INFOCOM Conference*, March 2005.
58. Y. Kim, A. Helmy, "*SWAT*: Small World-based Attacker Traceback in Ad-hoc Networks", *IEEE INFOCOM Conference*, March 2005.
59. K. Nahm, A. Helmy, C. Kuo, "The impact of probe traffic scale on the stability of multihop 802.11 networks", *IEEE INFOCOM Conference*, March 2005.
60. S. Ebrahimi, A. Helmy, S. Gupta, "A Systematic Simulation-based Study of Adverse Impact of Short-lived TCP Flows on Long-lived TCP Flows", *ACM SIGCOMM Conference*, August 2004.
61. J. Faruque, K. Psounis, A. Helmy, "Analysis of Gradient-based Routing Protocols in Sensor Networks", *ACM SIGCOMM Conference*, August 2004.
62. D. Bhattacharjee, A. Rao, C. Shah, M. Shah, A. Helmy, "Trace-based Mobility Modeling for Campus-wide Mobile Ad-hoc Networks", *ACM SIGCOMM Conference*, August 2004.
63. G. Grewal, S. Pradhan, S. Sharma, V. Alatzeth, A. Helmy, "A Comparative Study of Mobility Prediction Schemes for Grid Location Service", *ACM SIGCOMM Conference*, August 2004.
64. A. Das, D. Dutta, A. Goel, J. Heidemann, A. Helmy, "Lower Bounds for Approximate Fairness", *ACM SIGCOMM Conference*, August 2004.

65. J. Faruque, A. Helmy, "Gradient-Based Routing in Sensor Networks", *ACM MOBICOM*, Sept 2003. [Selected among the **best poster papers** at *MOBICOM* 2003. Selection rate: 20% of 39]
66. K. Seada, A. Helmy, R. Govindan, "On the Effect of Location Inaccuracy on Geographic Face Routing in Wireless Networks", *ACM MOBICOM*, Sept 2003. [Selected among the **best poster papers** at *MOBICOM* 2003. Selection rate: 20% of 39].
67. K. Seada, A. Helmy, "Rendezvous Regions: A Scalable Architecture for Service Location and Data-Centric Storage in Large-Scale Wireless Networks", *ACM MOBICOM*, Sept 2003.
68. S. Wang, A. Helmy, "Effects of Small Transfers and Traffic Patterns on Performance and Cache Efficacy of Ad Hoc Routing", *ACM MOBICOM*, September 2003.
69. D. Son, J. Park, A. Helmy, "Mobility-Induced Location Errors and its Effect on Geographic Routing in Ad Hoc Networks", *ACM MOBICOM*, September 2003.
70. K. Seada, A. Helmy, "An Overview of Geographic Protocols in Ad Hoc and Sensor Networks", *IEEE Int'l Conf on Computer Systems and Applications (AICCSA)*, January 2005.
71. A. Das, D. Dutta, A. Helmy, "A Low-state Packet Marking Framework for Approximate Fair Bandwidth Allocation", *IEEE ICNP (Int'l Conf on Network Protocols)*, Atlanta, GA, Nov 2003.
72. S. Begum, S. Gupta, A. Helmy, "An Error Oriented Test Generation (*EOTG*) Framework for Wireless Adhoc MAC Protocols", *IEEE ICNP*, November 2003.
73. S. Tanachaiwiwat, P. Dave, R. Bhindwale, A. Helmy, "Insecure Location Avoidance and Routing on Trust in Location-aware Sensor Networks", *IEEE ICNP*, November 2003.
74. J. Faruque, A. Helmy, "Routing on Information Gradients in Sensor Networks", *IEEE ICNP*, Nov03
75. S. Wang, A. Helmy, "Effects of Small Transfers and Traffic Patterns on Performance and Cache Efficacy of On-Demand Ad Hoc Routing", *IEEE ICNP*, November 2003.
76. K. Seada, A. Helmy, R. Govindan, "On the Effect of Localization Errors on Geographic Face Routing in Sensor Networks", *ACM SenSys*, pp. 312-313, Los Angeles, CA, November 2003.
77. S. Tanachaiwiwat, P. Dave, R. Bhindwale, A. Helmy, "Secure Locations: routing on trust and isolating compromised sensors in location-aware sensor networks", *ACM SenSys*, pp.324-5, Nov'03
78. K. Seada, A. Helmy, "Rendezvous Regions: A Scalable Architecture for Service Provisioning in Large-Scale Mobile Ad Hoc Networks", *ACM SIGCOMM Conference*, August 2003.
79. N. Nahata, P. Pamu, S. Garg, A. Helmy, "Efficient Resource Discovery for Large Scale Ad hoc Networks using Contacts", *ACM SIGCOMM Conf*, Aug 2002. [Acceptance rate: 30% of 79]. *ACM Computer Communication Review (CCR)*, Vol. 32, No. 3, pp. 32, July 2002.
80. K. Dantu, S. Kapadia, R. Sinha, A. Helmy, "Modeling of Mobility-Induced Losses in MANETs (MILMAN)", *ACM SIGCOMM* 2002 [Acceptance: 30%] *ACM CCR* Vol. 32, No. 3, pp. 30, Jul '02

Conference Papers Submitted for Review

1. W. Hsu, A. Helmy, "Analyzing Principal Characteristics of User Association Patterns and Eigen-behavior in Wireless LAN Traces", November 2005. [Submitted]
2. W. Hsu, A. Helmy, "***IMPACT***: *I*nvestigation of *M*obile-user *P*atterns *A*cross University *C*ampuses using WLAN *T*race Analysis", USC CS Tech Report 05-858, July 2005. [Submitted]
3. F. Bai, A. Helmy, "Impact of Mobility on Mobility-Assisted Information Diffusion (***MAID***) Protocols", USC CS Technical Report 05-856, July 2005. [Submitted]
4. S. Tanachaiwiwat, A. Helmy, "*VACCINE*: War of the Worms in Wired and Wireless Networks", USC CS Technical Report 05-859, July 2005. [Submitted]
5. Y. Kim, A. Helmy, "*ATTENTION:* ATTackEr Traceback using MAC Layer AbNormality DetecTION", USC CS Technical Report 05-857, July 2005. [Submitted]
6. S. Begum, S. Gupta, A. Helmy, "A Test Generation Framework for Performance Evaluation of Wireless AdHoc MAC Protocols", USC Technical Report 05-860, July 2005. [Submitted]

E. Internet Protocol Standards - IETF RFCs and Drafts

IETF RFCs and Proposed RFCs:

1. D. Estrin, D. Farinacci, A. Helmy, D. Thaler, S. Deering, V. Jacobson, M. Handley, C. Liu, P. Sharma, L. Wei, "Protocol Independent Multicast - Sparse Mode (***PIM-SM***): Protocol Specification", *RFCs 2362 & 2117 of the Internet Engineering Task Force (IETF), Inter-Domain Multicast Routing (IDMR)*, June 1998.
2. D. Estrin, D. Farinacci, A. Helmy, D. Thaler, S. Deering, V. Jacobson, M. Handley, C. Liu, P. Sharma, L. Wei, "Protocol Independent Multicast (***PIM***): Motivation and Architecture", *Proposed RFC of the IETF, Inter-Domain Multicast Routing (IDMR)*, October 1996.
3. D. Estrin, D. Farinacci, A. Helmy, V. Jacobson, L. Wei, "Protocol Independent Multicast - Dense Mode (***PIM-DM***): Protocol Specification", *Proposed IETF RFC for IDMR Internet Engineering Task Force (IETF), Inter-Domain Multicast Routing (IDMR)*, September 1996.

IETF Internet Drafts:

4. A. Helmy, "Protocol Independent Multicast-Sparse Mode (PIM-SM): Implementation Document", *Internet-Draft (I-D) of the IDMR/MBone Deployment (Mboned)*, December 1996.
5. A. Helmy, D. Thaler, D. Estrin, L. Wei, "Protocol Independent Multicast-Sparse Mode (PIM-SM): Deployment Guidelines", *Internet-Draft of the IETF/Mboned*, December 1996.
6. A. Helmy, D. Thaler, D. Estrin, "PIM Multicast Border Router (PMBR) specification for connecting PIM-SM domains to a DVMRP Backbone", *Internet-Draft of IDMR*, September 1996.
7. S. Deering, W. Fenner, D. Estrin, A. Helmy, D. Farinacci, L. Wei, M. Handley, V. Jacobson, D. Thaler, "Hierarchical PIM for Inter-Domain Multicast Routing", *Internet-Draft of IDMR*, Dec 95.
8. S. Deering, W. Fenner, D. Estrin, A. Helmy, D. Farinacci, L. Wei, M. Handley, V. Jacobson, D. Thaler, "Interoperability Mechanisms for PIM and DVMRP", *Internet-Draft of IDMR*, Dec 1995.

F. Other Publications

i. Independent News Journals and News Commentaries

1. A. Helmy, "Small Large-Scale Wireless Networks: Mobility-Assisted Resource Discovery", *LLC Technology Research News Journal (TRN)*, trnmag.com. Article title "Shortcuts lighten wireless load", Iss 86, Aug 02. (Featured Article). Also, *ACM TechNews*, Vol 4, Iss 391, August 26, 2002.
2. A. Helmy, "Multicast-based Architecture for IP Mobility: Simulation Analysis and Comparison with Basic Mobile IP", *LLC Technology Research News Journal (TRN)*, trnmag.com. Article title "Multicast promises lighter wireless Internet", Issue 1, June 21, 2000. (Featured Article)
3. TRN News Jrnl. Article title "Does heavy volume smooth Net traffic?", Aug 2001 (Commentary)
4. TRN News Journal. "Multicast in large, mobile ad hoc networks", Sept 2001 (Commentary)

ii. Unrefereed Technical Reports and Posters/Abstracts

1. N. Sadagopan, B. Krishnamachari, A. Helmy, "The Acquire Mechanism for Efficient Querying in Sensor Networks", Poster at the Annual Research Review at the CENS Center, October 2003.
2. A. Helmy, "Resource Discovery, Query Resolution and Rendezvous in Large-Scale Wireless Networks", Poster at NSF ECS Workshop on Sensor Networks and Systems, CENS, Sept 2003.
3. A. Helmy, D. Estrin, S. Gupta, "STRESS Testing using Reduced Reachability Analysis: A Case Study for a Multicast Routing Protocol", *USC-CS-TR-98-690*, December 1998.
4. S. Bajaj, L. Breslau, D. Estrin, K. Fall, S. Floyd, P. Haldar, M. Handley, A. Helmy, J. Heidemann, P. Huang, S. Kumar, S. McCanne, R. Rejaie, P. Sharma, S. Shenker, K. Varadhan, H. Yu, Y. Xu, D. Zappala, "Virtual InterNetwork Testbed (*VINT*): Status and Research Agenda", *USC-CS-TR-98-678*, June 1998.

G. Main Tool Development and Software Contributions

- The ***MobiLib*** library of mobile wireless networks traces: [URL http://nile.usc.edu/MobiLib]
  I am currently establishing this community-wide library of wireless networks measurements, simulation modules and test-suite benchmarks, that aims to serve as a main reference for future research on wireless networks. The measurements are collected from university campuses, and are used for realistic mobility and traffic modeling in wireless mobile networks. Current library participants include over 20 top universities; e.g., Georgia Tech, UIUC, MIT, USC, Purdue, UCLA, Columbia, Dartmouth, UCSD, among others, with great potential for future growth.

- The ***IMPORTANT*** mobility modeling and analysis tool: [URL http://nile.usc.edu/important]
  This package provides a tool for simulating various mobility models for mobile ad hoc networks, currently supporting group (RPGM), freeway (FW), Manhattan (MH), and Random (RWP) mobility models. It also provides a suite of tools to facilitate analysis of mobility characteristics, link statistics and protocol simulation traces. It is as part of my NSF CAREER project.
  The tool is currently integrated with the network simulator (*NS-2*) (released in Jan '04 and Aug '05) and contributed to the *NS-2* simulation package. The *IMPORTANT* mobility tool has been heavily cited (over 80 times) in recent literature published in leading conferences and journals by well-known research groups at US universities and Europe.

- The ***STRESS*** systematic testing method: [URL http://netweb.usc.edu/stress]
  This work constitutes part of my Ph.D. dissertation contribution and provides a tool for automatic test synthesis for networking protocols, implementing novel topology synthesis and fault-oriented test generation algorithms. The method has been used in over 10 published case studies on various networking protocols, and currently supports testing of multicast routing protocols, multicast congestion control, reliable multicast protocols, Mobile IP, micro-mobility protocols, geographic routing in wireless networks and MAC protocols for ad hoc networks. I provided the basic concepts for the method, developed the test synthesis algorithms and implemented the initial version for the tool. I currently lead the *STRESS* project.

- The Network Simulator (***NS-2***): [URL http://www.isi.edu/nsnam/vint]
  Network Simulator (***NS-2***) is one of the most commonly used simulation packages in networking research. *NS-2* has been (and is being) used by hundreds of universities and research institutes around the world for protocol evaluation and analysis, and has been cited in hundreds of publications and studies.
  I was part of the original *VINT* project that developed and implemented the *NS-2* simulator (in collaboration mainly with D. Estrin, S. Floyd, S. McCanne, L. Breslau, K. Fall, J. Heidemann). I was the main developer of (and contributor to) the multicast protocols implementation (including PIM-SM, PIM-DM and DVMRP), development of LAN models, selective loss models, the scenario generation modules, and the multicast stress testing scripts (STRESS).

- PIM-SM Daemon (***pimd***): [URL http://netweb.usc.edu/pim]
  I was the original designer, developer and tester of the *pimd*, implementing the Internet multicast routing protocol, the Protocol Independent Multicast - Sparse Mode (***PIM-SM***), according to the PIM-SM-v2 specification RFCs 2117 and 2362. The code was the first to implement PIM-SM-v2, and is considered a reference implementation for the SGI Irix and SunOS implementations, and was/is used by various vendors (e.g., Silicon Graphics (SGI), Cisco, Sun, among others) and for interoperability testing. It was also used by numerous researchers to study multicast routing.

V. RESEARCH GRANTS AND CONTRACTS

1. National Science Foundation (*NSF*) – ***NeTS NOSS*** (co-PI with B. Krishnamachari, USC)
   "*ACQUIRE*: Data Centric Active Querying in Sensor Networks"
   Award Amount: $750,000. Duration: 9/04 – 9/07 (A. Helmy's share 50%).
   (Acceptance rate: 9% of 161 proposal submissions)
2. National Science Foundation (*NSF*) – ***CAREER*** (sole PI)
   "*Adaptive Architecture for Multicast Service Support in Large-Scale Mobile Ad Hoc Networks: Design and Evaluation Framework*"
   Award Amount: $375,000. Duration: 6/2002 – 5/2007.
   [*Highly Recommended*. Award rate: ~17% of over 2300. Highly recommended rate: below 10%]
3. National Science Foundation (*NSF*) - CISE, HDCCSR program (co-PI with S. Gupta, USC) (Joint with *NASA* - HDCP) "*Obtaining Highly Dependable Communication Protocols*"
   Award Amount: $640,000. Duration: 9/2002 – 8/2006 (A. Helmy's share 50%).
4. Intel research Grant/Award (sole PI)
   "*Efficient Provisioning for Services in Large-scale Wireless-Wired Networks*"
   Award amount: $191,000. Duration: 12/2002 – 12/2004. (*Excellent* Reviews for the two years)
5. Pratt & Whitney UTC Institute for Collaborative Engineering – PWICE (co-PI)
   "*Networked Wireless Multimedia and Gaming for Aircraft Diagnosis and Repair*"
   Award Amount: $750,000. Duration: 12/2002 – 12/2005 (A. Helmy's share ~20%)
   Co-PIs: S. Narayanan, R. Zimmerman, A. Ortega, C. Papadopoulos, USC
6. *DARPA* – Next Generation Internet (NGI)
   "*STRESS: Systematic Testing of protocol Robustness by Evaluation of Synthesized Scenarios*"
   Award Amount: $745,000. Duration: 6/1998 – 6/2002 (A. Helmy's share 33.33%).
   Co-PIs: Sandeep Gupta, Deborah Estrin, USC
7. Zumberge Award for Individual Research - USC (sole PI)
   "*Power-aware Wireless Routing (PoWeR) Protocols*"
   Award Amount: $15,000. Duration: 6/2000 – 6/2001
8. Nortel Networks (sole PI)
   "*M&M: Multicast-based Mobility*"
   Award Amount: $50,000. Duration: 2/2000 – 2/2001
9. Hewlett-Packard Equipment Grant (sole PI)
   "*Computer Networks Design and Testing (ProTest) Laboratory*"
   Award Amount $63,000. Date: 7/2000 (Award rate: 20% of submitted proposals)
10. Siemens AG - Germany (sole PI)
    "*Testing and Verification of Network Security Protocols*"
    Award Amount: $12,000. Duration: 4/2004 – 12/2004
11. Intel Equipment Grant (with C.S. Raghavendra, to the networking group)
    "*Computer networks eduction and research*"
    Award Amount: ~$200,000 (20 PCs, 20 IXP boards). Date: 7/2002 (A. Helmy's share 50%)
12. Intel Equipment (with B. Krishnamachari) + Engineering Dean's Grant (with R. Govindan)
    "Wireless and Sensor Networks Laboratory"
    Award Amount: ~$22,000 (130 sensors+15 stargate nodes) Date: 5/2005 (Helmy's share ~40%)
13. USC Electrical Engineering – Systems (sole PI)
    "*Computer Networks Design and Testing (ProTest) Laboratory*"
    Award Amount: $60,000. Date 9/1999

VI. TEACHING

Doctoral (Ph.D.) Students and Dissertations Supervised

1. **Karim Seada:** (Fall ‘00-Summer ‘05)
   Topic: "Robustness of Geographic Protocols in Wireless Ad Hoc and Sensor Networks".
   Passed Ph.D. defense May 2005. Currently at Nokia Research Labs, Mountain View, CA.
2. **Fan Bai:** (Spring ‘00-Summer ‘05)
   Topic: "Mobility Modeling and Analysis in Wireless Ad Hoc and Sensor Networks".
   Passed Ph.D. defense June 2005. Currently at General Motors research Labs, Detroit, MI.
3. **Narayanan Sadagopan:** (Fall ‘01-Summer ‘05) [co-chair with B. Krishnamachari]
   Topic: "Mathematical Techniques for Optimizing Data Gathering in Sensor Networks".
   Passed Ph.D. defense May 2005. Currently at Yahoo! research, Sunnyvale, CA.
4. **Kitae Nahm:** Graduated Spring ‘05 [co-advisor for last ~18 months of Ph.D with C-C. Jay Kuo]
   Topic: "On the Scale of Probe Traffic for Transport Protocols".
   Passed Ph.D. defense Spring 2005. Currently at Samsung, Irvine, CA.
5. **Debojyoti Dutta:** (Fall '01- Summer '04) [co-advisor with A. Goel and J. Heideman]
   Topic: "Low-state Mechanisms to Protect the Network from Greedy and Malicious Agents".
   Passed Ph.D. defense May 2004. Currently: Post Doctoral researcher, USC.
6. **Yongjin Kim:** In progress (Fall ’02-Summer ‘06).
   Topic: “Traceback for DoS Attack Detection using Small Worlds in Mobile Adhoc Networks”
   Passed Ph.D. defense July 2006. Currently at QualComm, Security Division, San Diego, CA.
7. **Jabed Faruque:** In progress (Fall '01-).
   Topic: "Gradient-based Routing in Sensor Networks".
   Passed screening examination Spring 2003. Passed PhD qualifying examination January 2006.
8. **Shamim Begum:** In progress [co-advised by Sandeep Gupta] (Spring '01-).
   Topic: "Error-oriented Test Generation for Wireless MAC Protocols".
   Passed screening examination Fall 2002. Passed qualifying examination Fall 2006.
9. **Ganesha Bhaskara:** In progress [co-advised by Sandeep Gupta] (Spring '03-).
   Topic: "Systematic Testing of Protocols using Mechanistic Building Blocks".
   Passed screening examination Spring 2003. Expected qualifying examination Spring 2006.
10. **Shao-Cheng Wang:** In progress (Fall '02-)
    Topic: "Effects of Traffic Patterns and Mobility on Performance and Caching in MANETs”.
    Passed screening examination Spring 2003. Currently Intern at Intel, OR.
11. **Shirin Ebrahimi:** In progress [co-advised by Sandeep Gupta] (Fall '02-).
    Topic: "Systematic Analysis of the Adverse Impact of Short TCP Flows on Long TCP Flows".
    Passed screening examination Fall 2003. Expected qualifying examination Spring 2006.
12. **Sapon Tanachaiwiwat:** In progress (Spring ‘03-)
    Topic: “Secure Locations and Associations for False Report Detection in Sensor Networks”
    Passed screening examination Fall 2003. Passed qualifying examination Summer 2006.
13. **Wei-jen Hsu:** In progress (Spring ’04-)
    Topic: “Trace-based Mobility Modeling for Wireless Networks”
    Passed screening examination Spring 2004. Expected qualifying examination Spring 2006.

Master Students and Theses Supervised

- **Ganesha Bhaskara:** Graduation date: June 2002
  Topic: "Multicast based Micro-Mobility Protocol: Design and Evaluation"
- **Rohan Chitradurga:** Graduation date: September 2004
  Topic: "Analysis of Wired Short Cuts in Wireless Sensor Networks"
- **Vishal Sankhla:** Graduation date: November 2004 [co-advised by Clifford Neuman]
  Topic: "Establishing Security Associations using Small Worlds of Trust in Ad Hoc Networks"

Examination Committees

- *Current Ph.D. Students at U Florida:* Wei-Jen Hsu, Shao-Cheng Wang.
- *Ph.D. Dissertation Defense Committees* - as advisor or co-advisor - to 6 students at USC:
  Karim Seada (May ’05), Fan Bai (June ’05), Narayanan Sadagopan (May '05, co-chair with Bhaskar Krishnamachari), Yongjin Kim (July ’06), Debojyoti Dutta (May '04, co-advisor with Ashish Goel (advisor) and John Heidemann), Kitae Nahm (Jan ’05, co-advisor with C.-C. Jay Kuo (advisor)).

- *Ph.D. Dissertation Proposal (Qualification) Committees* - as advisor or co-advisor - to 8 students:
  Sapon Tanachaiwiwat (Jul ’06), Jabed Faruque (Jan ’06), Yongjin Kim (Dec ’05), Karim Seada (April '04), Fan Bai (November ’04), Narayanan Sadagopan (Dec '03, co-chair with Bhaskar Krishnamachari), Debojyoti Dutta (May '03, co-advisor with Ashish Goel (advisor) and John Heidemann), Kitae Nahm (June ‘03, co-advisor with C.-C. J. Kuo).

- *Ph.D. Dissertation Defense Committee Member* to 13 students at USC:
  Hongsuda Tangmunarunkit (6/02, advisor: Ramesh Govindan), Ya Xu (8/02, advisors: Deborah Estrin and John Heidemann), Amy Hughes (9/02, advisor: Joe Touch), S. Hwang (12/02, advisor: K. Kesselman), Lei Huang (12/02, advisor: C.-C. Jay Kuo), Kun-chan Lan (12/03, advisor: J. Heidemann), Xuan Chen (4/04, advisor: J. Heidemann), Hui Zhang (3/05, advisors: R. Govindan, A. Goel), Khushboo Shah (3/05, advisor: E. Jonkheere), Di-Fa Chang (3/05, advisors: R. Govindan, J. Heidemann), Yu He (5/05, advisor: C. Raghavendra), Mitali Singh (11/05, advisor: V. Prasanna), N. Vanitchanant (11/05, advisor: J. Silvester), Xin Li (5/06, advisor: R. Govindan).
- *Ph.D. Dissertation Proposal (Qualification) Committee Member* to 34 students at USC:
  A Chankhunthod (8/00, advisor: P Danzig), J Jeong (9/00, adv: M Dubois), H Tangmunarunkit (3/01, adv: R Govindan), L. Huang (5/01, adv: C Kuo), K Shah (8/01, adv: E Jonkheere), Y Xu (9/01, adv: D Estrin, J Heidemann), D Kang (11/01, adv: J Gaudiot), S Hwang (12/01, adv: K Kesselman), N Vanitchanant (1/02, adv: J Silvester), K Lan (5/02, adv: J Heidemann), X Chen (8/02, adv: J Heidemann), S Kumarasamy (9/02, adv: S Gupta, M Breuer), J Kim (1/03, adv: D Lee), S Cho (3/03, adv: A Goel), H Zhang (4/03, adv: A Goel, R Govindan), M Mikic-Rakic (8/03, adv: N Medvidovic), A Bakshi (9/03, adv: V. Prasanna), MS Quasem (10/03, adv: S Gupta), M Singh (11/03, adv: V Prasanna), D Chang (11/03, adv: R Govindan, J Heidemann), R Roshandel (12/03, adv: N Medvidovic), Y He (12/03, adv: C Raghavendra), X Li (5/04, adv: R Govindan), Y Wang (5/04, adv: J Silvester, J Touch), F Stann (10/04, adv: J Heidemann), G Lu (1/05, adv: B Krishnamachari), T Spyropoulos (5/05, adv: K Psounis) , L Huang (5/05, adv: B Boehm), M Zuniga (8/05, adv: B Krishnamachari), S Kapadia (9/05, adv: B Krishnamachari), Y Kim (10/05, adv: R Govindan), S Yoon (11/05, adv: C Shahabi), A Pathak (2/06, adv: V Prasanna), K Yedavali (3/06, adv: B. Krish).
- *M.S. Thesis Defense Committee* - as advisor - to 3 students at USC:
  Vishal Sankhla (Nov ’04), Rohan Chitradurga (Sept ’04), Ganesha Bhaskara (June ’02).
- *M.S. Thesis Defense Committee Member* to: Divya Devaguptapu (Oct03, advisor: B Krishnamachari).
- *M.S. Advisor* to 44 students at USC: [*Description*: Each of these students has taken at least one course and one directed research with me. Most have published papers with me. Many continued for Ph.D.]
  M. Sharma (F'99-F'00), T. Khan (Sp'00-Sp'01), Oji Udezue (Sp'00-Sp'01), H Shah (F'00-F'01), P Jain (F'00-F'01), V Asthana (Sp'01-Sp'02), P Pamu (F'01-F'02), N Nahata (Sp'02-F'02), S Garg (F'02-Sp'03), K Dantu (F'01-F'02), S Kapadia (F'01-F'02), J Train (Sp'02-Sp'03), B Shademan (Sp'02-F'02), A Das (F'01-F'02), S Sawhney (F'02-S'03), V Mehandru (Sp'03), S Herwadkar (Sp'03), C Shete (Sp'03), Y Gu (Sp'03), H Lin (S'03), Y Lu (Sp'03), P Dave (Sp'03), R Bhindwale (Sp'03), J Lee (Sp'03), D Son (Sp'03), J Park (Sp'03), S Sharma (Sp'03-Sp'04), C Shah (Sp’04), V Alatzeth (F’03–S’04), G Grewal (F’03–S’04), D Bhattacharjee (F’03–Sp’04), A Rao (F’03–Sp’04), K Merchant (Sp‘04-Sp’05), M Shah [Eng. Degree S‘05], M Zuniga (F’01-F’04) [now PhD at USC]...

Teaching Record

I have taught the following courses at USC (new courses introduced and developed marked with '*'):

- EE-555 Broadband Networks Architecture (F'99,S/F'00,F'00,F'01,F'02,S/F'03,S/F'04,S/F'05,S'06)
- * EE-599: Special Topics 'Internet Protocol Design, Simulation and Testing' (Fall '00).
- * EE-499: Introductory Computer and Wireless Networking Laboratory (Spring '02)
- * EE-599: Wireless Networking, Design & Analysis Laboratory (Spring '03, Spring '04).
- * EE-579: Wireless and Mobile Networks Design and Laboratory (Spring '05, Spring '06). [This is the regular version of the 499 and 599 earlier Labs.]

I was the sole founder and director of the 'Wireless Networking Design and Analysis Laboratory'; the first and only instructional wireless networking laboratory at USC. I have established the laboratory using individual funding grants from HP (equipment grant), USC Zumberge award, and Intel (equipment grant), among others. This laboratory supports the instruction of the EE499, EE599 and EE579 courses.

I received 'Faculty Honor Roll on Teaching' (evaluation above 4.5/5) for the courses: EE-555:Sp'00,F'00, F'01,F'02,Sp'03,F'03,Sp'04,F'04,Sp'05,F'05. EE-599: F'00, Sp'03, Sp'04. EE-499: Sp'02. EE-579: Sp'05.

Teaching Evaluations

	Course Number	Course Title	Semester	Number of Students	Evaluation (out of 5)
16	EE-555	Broadband Networks Architecture	Fall 2005	31	4.82
15	EE-579	Wireless and Mobile Networks Design and Laboratory	Spring 2005	15	4.75
14	EE-555	Broadband Networks Architecture	Spring 2005	41	4.6
13	EE-555	Broadband Networks Architecture	Fall 2004	26	4.7
12	EE-599	Wireless and Mobile Networks Design and Laboratory	Spring 2004	25	4.75
11	EE-555	Broadband Networks Architecture	Spring 2004	83	4.76
10	EE-555	Broadband Networks Architecture	Fall 2003	30	4.73
9	EE-555	Broadband Networks Architecture	Spring 2003	29	4.66
8	EE-599	Wireless Networking Design and Analysis Laboratory	Spring 2003	24	4.63
7	EE-555	Broadband Networks Architecture	Fall 2002	17	4.71
6	EE-499	Introductory Computer and Wireless Networking Laboratory	Spring 2002	20	4.89
5	EE-555	Broadband Networks Architecture	Fall 2001	58	4.59
4	EE-599	Special Topics on Internet Protocol Design, Simulation and Testing	Fall 2000	18	4.65
3	EE-555	Broadband Networks Architecture	Fall 2000	80	4.62
2	EE-555	Broadband Networks Architecture	Spring 2000	56	4.53
1	EE-555	Broadband Networks Architecture	Fall 1999	89	4.2

Teaching Statistics: Total number of students for the 16 courses: 642

- Course average (with courses weighted equally):
  - 4.662 [for all 16 evaluated courses]
  - 4.693 [for the last 15 evaluated courses]
- Course average (with courses weighted by student count):
  - 4.607 [for all 16 evaluated courses]
  - 4.674 [for the last 15 evaluated courses]

VII. SERVICES

University and Departmental Services

1. co-Founder and co-Director of the Wireless and Sensor Networks Laboratory since May 2005.
2. Founder and director of the Wireless Networks Design and Testing Laboratory since July 2000.
3. Course developer: EE-579 'Wireless and Mobile Networks Design and Laboratory' since Fall '01
4. Head of the CENG PhD screening exam reform committee, Fall '04, Spring '05.
5. CENG PhD screening exam coordinator since Fall '03.
6. Examiner for EE-555 'Broadband Networks Architecture' CENG screening exam since Fall '02.
7. Networks Curriculum Committee (Spring '04, Fall '04).
8. CENG MS degree committee (F '04, S '05). Electrical Engineering retreat (Dec '05).
9. CENG curricular issues committee for Networks courses (Spring '04, Fall '04, Spring '05).
10. Computer Engineering placement exam committee (Spring '02, Fall '02, Spring '03, Fall '03)
11. USC Zumberge Research Awards Committee (Spring '04, Fall '04 reviewer).
12. USC Networking Faculty Recruitment Committee since Spring '01.
13. USC Mobile Media Institute (MMI) meetings Summer '04, Fall '04, Spring '05.
14. ITP Advisory Committee, Spring '03, Fall '03.
15. USC Networks Planning Committee: Research directions and strategic planning. (Fall '00, Spring '01, Fall '01, Spring '02, Fall '02, Spring '03)
16. Computer Engineering Screening and Electrical Engineering Screening Committees since Sp '00.
17. USC Networking Curricular Committee (Spring '00, Spring '01, Fall '01, Spring '02, Spring '03)
18. Research retreats, strategic planning of School of Engineering, EE, CENG (Sp '00, Sp '01).
19. Strategic Planning Subcommittee for the Computer Engineering Division (Fall '00, Spring '01).
20. Networks, Operating Systems, and Security Committee (Fall '00, Spring '01, Fall '01).
21. School of Engineering (SoE) Computer Committee (Fall '00, Spring '01, Fall '01).
22. Merit reviews for the EE Dept (3 yr window): rank 1st of 39 faculty '04, 9th/39 '03, 3rd/37 '02

NSF Review Panels and Workshops

- NSF networking research (NR), May 2001. (panelist, reviewer).
- NSF special engineering projects on sensor networks and systems, June 2002 (panelist, reviewer).
- NSF ECS Workshop on Wireless Networked Sensor Systems, Sept '03 & Oct '04 (*NETS NOSS*)
- NSF ECS Workshop on Integrative Hybrid Complex Systems (*IHCS*), April 2005.
- NSF NETS NOSS workshop on Sensor Networks, Harvard University, Boston, MA, Oct 2005.

Conference Committees and Services (TPC member unless otherwise stated)

1. Program Vice-Chair for Wireless, Mobile, Sensor Networks and Computing tracks of IEEE Int'l Conference on Parallel and Distributed Systems (*ICPADS*), July 2006.
2. Chair of the 9th IEEE Int'l Conf. on Management of Multimedia Networks and Services (*MMNS*), October '2006.
3. IEEE Int'l Conference on Network Protocols (*ICNP*), 2005 and 2006.
4. TPC & session chair 2nd IEEE Int'l Wkshp on Wireless Networks Measurements *WiNMee* Apr 06
5. Invited tutorial presenter, *IASTED Int'l Conf on Communications and Computer Networks*, Oct 05
6. Invited lead panelist, IEEE/ACM Conf on Mobile & Ubiquitous Systems (*Mobiquitous*), Jul 05
7. Invited keynote speaker, ACM Int'l Workshop on Wireless Sensor Networks (*SenMetrics*), Jul 05
8. Session chair at IEEE INFOCOM, March 2005. Session chair at IEEE/ACM DCOSS, July 2005.
9. TPC and Special session organizer/chair for the IEEE/ACM 2nd Int'l Workshop on Sensor and Actor Network Protocols and Applications (*SANPA*), August 2004.
10. ACM MOBICOM workshop on Vehicular AdHoc Networks (*VANet*), Oct 2004.
11. IEEE Broadband Wireless Networking Symposium, *BroadNets*, San Jose, CA, Oct 2004.
12. First IEEE Workshop on Broadband Advanced Sensor Networks, *BASENETS*, CA, October 2004.

13. IEEE Wireless Communications and Networking Conference (*IEEE WCNC*), GA, March 2004.
14. The IEEE Workshop on Applications and Services in Wireless Networks (*IEEE ASWN*), July '04
15. IEEE Int'l Conf on Mobile and Wireless Communication Networks, (*MWCN*) October 2004.
16. Third Annual Mediterranean Ad Hoc Networking Workshop (*Med-Hoc-Net*), Turkey, June 2004.
17. IEEE/ACM Int'l Workshop on Algorithms for Wireless, Mobile, Ad Hoc and Sensor Networks (*WMAN*), part of Int'l Parallel & Distributed Processing Symposium (*IPDPS*), 2002, '03, '04.
18. IEEE Wkshp on Energy-Efficient Wireless Comm and Networks (*EWCN*), with *IPCCC* Apr'04
19. IEEE/ACM International Conference on High Performance Computing (*HiPC*), India, 2004.
20. IEEE Int'l Wkshp on Sensor Network Protocols and Applications (*SNPA*) with IEEE ICC May 03
21. IEEE Vehicular Technology Conf (*VTC*) symposium on IP Mobility, Fall 2003.
22. IEEE Int'l Conf on Management of Multimedia Networks and Services (*MMNS*) 2001, 02, 03, 04
23. IEEE Symposium on Ad Hoc Wireless Networks (*SAWN*), with IEEE *GLOBECOM*, 2001.

Reviewing and Editing

- Member of the Editorial Board for the Ad Hoc Networks Journal – Elsevier, starting Nov. 2004.
- co-Guest Editor IEEE JSAC, sp. Issue 'Advances in Wireless Sensor Networks' proposed for '05
- IEEE/ACM Transactions on Networking (ToN) 1997, 1998, 2003, 2004, 2005, 2006.
- IEEE INFOCOM '97, 1999, 2002, 2003, 2004, '05.
- ACM SIGCOMM '97, '98, '99, '04, '05.
- IEEE ICC '01, '02, '03, '04. IEEE GLOBECOM '01. IEEE VTC '03. IEEE MILCOM '03.
- ACM SIGMETRICS 2003. ACM SIGCOMM CCR 2004.
- ACM Baltzer Mobile Networks and Applications (MONET) Journal 2003, 2004, 2005.
- ACM Baltzer Wireless Networking (WINET) Journal 2003, 2004, 2005.
- ACM SIGMOBILE Mobile Computing and Communications Review (MC2R) 2003, 2004.
- IEEE Communications Letters Journal 2003, 2004.
- Computer Networks Journal - ElSevier 2003, 2004, 2005.
- Ad Hoc Networks Journal – ElSevier, 2004, 2005, 2006.
- IEEE Transactions on Vehicular Technology 2003, 2004. ACM SOSP 2003
- IEEE Journal on Selected Areas in Communication (JSAC) '03, '04, '05. JSAC-Wireless '01.
- IEEE Wireless Communications Magazine 2003. IEEE Transactions on CAD (TCAD) 2000.
- IEEE/ACM IPDPS (Ad hoc networks workshop, *WMAN*) 2002, 2003, 2004. IEEE IC3N 2000.
- IEEE Jrnl of High Speed Networking (JHSN), Sp. Issue on Mgmt of Multimedia Networking '00.
- IEEE Wireless Communications and Networking Conference (WCNC) 2004
- IEEE Wkshp on Energy-Efficient Wireless Comm and Networks (EWCN), with IEEE IPCCC 04.
- IEEE International Conference on Parallel and Distributed Systems (ICPADS) 2004.
- IEEE Transactions on Parallel and Distributed Systems (TPDS) 2004, 2005, 2006.
- Journal on Parallel and Distributed Computing – El Sevier (JPDC), 2004, 2005.
- IEEE Computer Magazine 2004. Med-Hoc-Net Conference 2004.
- IEEE MMNS '01-'04. IEEE Wkshp on Apps and Services in Wireless Networks (*ASWN*) 04.
- IEEE Conf Mobile and Wireless Comm Networks (*MWCN*) 2004.
- IEEE Broadband Wireless Networking Symposium, *BroadNets* 2004.
- IEEE Wkshp on Broadband Advanced Sensor Networks, *BASENETS* '04.
- IEEE Transactions on Mobile Computing 2004, 2005.
- NSF ANIR proposal reviewer 2003. USC Zumberge Award proposal reviewer 2004, 2005.

Membership

- Member of the IEEE (Institute of Electrical and Electronics Engineers):
  - Member of the IEEE Computer Society and the IEEE Communications Society
- Member of the ACM (Association for Computing Machinery):
  - Member of the ACM SIGCOMM and the ACM SIGMOBILE

VIII. SELECTED TALKS and PRESENTATIONS

Invited Talks

1. “Towards Building Robust Mobile Networks: Robust Geographic Routing and Mobility Modeling”, Invited seminar talk at the following universities:
   i. Massachusetts Institute of Technology (*MIT*) (host: Prof. Dina Katabi), MA, June 2005.
   ii. University of California at Santa Barbara (host: Prof. Kevin Almeroth), CA, June 2005.
   iii. Boston University (hosts: Prof. Ibrahim Matta, Prof. Azer Bestavros), MA, June 2005.
   iv. University of California at Riverside (hosts: Profs. S. Krishnamurthy, M. Faloutsos), Nov 2005.
2. "Research Directions in Wireless Ad Hoc and Sensor Networks: Mobility Modeling and Robust Geographic Routing", Invited seminar talk at the following universities:
   i. University of Illinois at Urbana – Champaign (host: Prof. Nitin Vaidya), IL, June 2004.
   ii. University of Maryland, College Park (host: Prof. Samrat (Bobby) Bhattacharjee), June 2004.
   iii. Center for Embedded Networked Sensing (CENS) UCLA (host: Prof. Deborah Estrin) May 04
   iv. Georgia Institute of Technology (host: Prof. Mostafa Ammar), Atlanta, GA, March 2004.
   v. University of California at Irvine (*UCI*) (host: Prof. A. El-Tawil), May 2005.
3. “Mobility Modeling for Wireless Networks” Invited tutorial at the *IASTED Int'l Conference on Communications and Computer Networks*, Marina Del Ray, October 2005.
4. “Security, Cooperation and Safety in Mobile Ubiquitous Networks”, Invited panel talk at the *IEEE/ACM Int’l Conf. on Mobile and Ubiquitous Systems (Mobiquitous)*, San Diego, July 2005.
5. “Understanding and Utilizing Multi-Dimensional Correlations in Sensor Networks: A Protocol Design Perspective”, Invited Keynote talk at the *3rd ACM Int’l Workshop on Measurement, Modelling, and Performance Analysis of Wireless Sensor Networks (Senmetrics)*, July 2005.
6. "Multicast-based Architecture for IP Mobility: Analysis and Comparison with Mobile IP", invited presentation at Nortel Networks Wireless Forum Oct ’00 and IEC Forum Oct ‘00.
7. 'IP Multicast', invited tutorial, IP-mobility group, Nortel Networks, in Dallas, TX, March 2000.
8. "*STRESS*: Systematic Testing of Robustness by Examination of Synthesized Scenarios", invited talk at University of California - Irvine (*UCI*) and University of Southern California, April 1999.

Selected Paper, Poster and Project Presentations

9. “ACQUIRE: Active Querying in Sensor Networks”, Project and poster presentation at the *NSF NETS NOSS* PI meeting, Harvard, October 2005. [Also, Project and poster presentation at the NSF CENS center annual research review, UCLA, October 2005.]
10. “Low State Fairness: Lower Bounds and Practical Enforcement”, paper presentation at *IEEE INFOCOM*, March 2005.
11. Five poster presentations at *ACM SIGCOMM*, Aug 2004.
12. Three paper presentations at IEEE ICC, June 2004.
13. “A Plan for Empirical Evaluation of Dependability Using the *STRESS* Approach”, Project presentation, NSF/NASA PI meeting on dependable computing/communications, June 2004.
14. "On the Effect of Localization Errors on Geographic Face Routing in Sensor Networks", Presentation at the IEEE/ACM *IPSN*, Berkeley, CA, April 2004.
15. "The Effect of Mobility-induced Location Errors on Geographic Routing Analysis and Improvement using Mobility Prediction", Paper presentation at IEEE WCNC, March 2004.
16. "Transactions Routing for Ad-hoc NetworkS with eFficient EneRgy", IEEE GlobeCom Dec ‘03.
17. Two poster presentations at ACM SenSys, UCLA, Nov 2003.
18. "Impact of Location Inconsistencies on Geographic Routing in Wireless Networks", Paper presentation at the *ACM MOBICOM MSWIM* Workshop, San Diego, Sept 2003.
19. Five poster presentations at *ACM MOBICOM*, San Diego, Sept 2003.
20. "Resource Discovery, Query Resolution & Rendezvous in Large-Scale Wireless Networks: Architectural Design & Analysis", presentation at NSF ECS Workshop on Wireless Networked Sensor Systems, at the Center for Embedded Networked Sensing (CENS) at UCLA, Sept 8, 2003.

"*PATHS*: Analysis of PATH Duration Statistics and their impact on reactive MANET routing protocols", Paper presentation at ACM *MobiHoc*, Annapolis, MD, June 3, 2003.

21. "Contact Based Architecture for Resource Discovery (*CARD*) in Large Scale MANets", Paper presentation at the IEEE/ACM IPDPS *WMAN* workshop, April 26, 2003.
22. "Highly Dependable Communication Protocols", NSF/NASA PI meeting, Mountain View, Feb03
23. "Service Provisioning in Large-scale Infrastructure-less Wireless Networks", project presentation to Intel research during a visit to the wireless networking laboratory at USC, Nov. 2002.
24. "Sensor Networks for On-board Information Technology", project presentation to Pratt&Whitney visit to IMSC, USC, Nov. 2002.
25. "STRESS: Ad hoc Wireless MAC and Multicast Congestion Control", project presentation at the DARPA NMS PI meeting, Atlanta, GA, October 22, 2001 and San Diego, CA, April 2, 2001.
26. "A Multicast-based Protocol for IP Mobility Support", paper presentation at ACM Sigcomm-Networked Group Communication (NGC) 2000 workshop, Stanford University, Nov 9, 2000.
27. "STRESS: Systematic Testing of Robustness by Examination of Synthesized Scenarios", project presentation at DARPA Next Generation Internet (NGI) PI meeting, Oct 1998 and Dec 1999.