

MALATHI VEERARAGHAVAN

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WORK EXPERIENCE

Professor, University of Virginia, Charlottesville, VA (Aug. 2007 - Present)

- Advised and graduated Ph.D. and Masters' students, led federally funded research projects in IP and optical (GMPLS) networks, published papers in leading IEEE journals and conferences, and taught graduate and undergraduate courses in Computer Networks, Internet Engineering, and Performance Analysis.
- Total federal research grants obtained through peer-reviewed competitive processes since joining the University of Virginia: \$4 million.

Associate Professor, University of Virginia, Charlottesville, VA (Jan. 2003 - July 2007)

- Director of Computer Engineering, Jan. 2003 - Jan. 2006: Led the creation of a new graduate program to offer masters and Ph.D. degrees in Computer Engineering, a joint program offered by the Computer Science and the Charles L. Brown Electrical and Computer Engineering departments.
- Joint position in the Depts. of Computer Science and Elec. & Computer Engineering (Jan. 2003-March 2006)

Associate Professor, Polytechnic University, Brooklyn, New York (Jan.1999 - Jan. 2003)

- *Research and Teaching* in the field of computer networking and telecommunications.
 - WiFi networks, SS7 system testing, optical networking, FPGA design
 - Won Jacobs Award for Excellence in Education, Polytechnic University, 2002.
 - Graduated four M.S. thesis students.
 - Total research grants obtained while at Polytechnic: ~\$1.5 million
 - Created first online course in the ECE department and taught courses on Wireless Networking, Internet Engineering, Data Networks.
 - Tenured in July 2001.

Distinguished Member of Technical Staff, Bell Labs., Holmdel, NJ (Aug.'94— Jan.'99)

- Research areas: Wireless networks, Mobility management, Optical networks, ATM, MPLS, SS7, VoIP, H.323, SIP, Quality-of-Service (QoS) guaranteed networking, WiFi, Cellular, 3G, Routing protocols and Network Management.

- Principal investigator in a three-year multi-million dollar NIST-funded project called “Mobile Information Infrastructure.”
- Managed teams of several hardware and software developers.

Member of Technical Staff, Bell Labs., Holmdel, NJ (May '92— Aug. '94)

- Applied distributed computing concepts to telecommunications software and created a Distributed Call Processing Architecture (DCPA) using object-oriented analysis. Uses parallel processing for significant performance gains. Recognized with the Distinguished Member of Technical Staff Award for this work.

Member of Technical Staff, AT&T Bell Labs., Columbus, OH (September '88 — May '92)

- Project leader for the implementation of a highly-reliable Signaling System No. 7 interface unit using state-of-the-art technology (FutureBus+ and object-oriented design). Team of 15.

Research Assistant, Duke University (Sept. '87 — Aug. '88)

- Joint projects with C. S. Draper Laboratories and NASA Langley Research Center to analyze the reliability and performance of a number of computer and control systems.

EDUCATION

Doctor of Philosophy (Ph.D.) in Electrical Engineering

Duke University, Durham, NC (September 1988)

Dissertation: Modeling and Evaluation of Fault-Tolerant Multiple Processor Systems

Advisor: Prof. Kishor S. Trivedi

Master of Science (M.S.) in Electrical Engineering

Duke University, Durham, NC (December 1985)

Dissertation: Simulation of the Point Classifier: A VLSI Processor for Displaying Complex Two- Dimensional Color Objects

Bachelor of Technology (B.Tech.) in Electrical Engineering

Indian Institute of Technology, Madras, India (May 1984)

SERVICE PERFORMANCE

- Associate Editor, IEEE/ACM Transactions on Networking.
- Research Advisory Panel, Internet2 HOPI (Hybrid Optical Packet Infrastructure).
- Technical Program Chair (TPC) Chair for Broadnets Applications/Services Symposium, 2005.
- TPC Chair for IEEE ICC2002, New York, April 28-May 2, 2002 (handled over 1500 submissions).
- General Chair, IEEE Computer Communications Workshop 2001.

- Strategic Planning Committee, IEEE Communications Society.
- IEEE ComSoc. e-News Editor, IEEE Communications Surveys Area Editor, Dec. 1999-Dec. 2001.
- General Co-Chair, 9th IEEE Workshop on Local & Metropolitan Area Networks. Banff, Alberta, May 17-20, 1998.
- Associate Editor for IEEE Transactions on Reliability from 1992-1994.
- Served on program and organizing committees of several conferences/workshops, and NSF panels.
- Senior Member of IEEE.
- Newsletter Editor for the IEEE Columbus Chapter, 1991-1992.

HONORS

- Over 80 publications, including five Best Paper Awards ('93, '95, '96, '99, '03).
- Twenty-nine issued and three pending patents.
- Jacobs Award for Excellence in Education, Polytechnic University, 2002.
- James B. Duke Fellowship, Duke Univ., Durham (1984 - 1987)
- National Talent Search Scholarship, NCERT, New Delhi, India (1979 - 1984)
- Eta Kappa Nu society

RESEARCH GRANTS (AWARDED)

- NSF, *End-To-End Provisioned Optical Network Testbed for Large-Scale eScience Applications*, \$3.5M, 2004-2008, my role: PI (co-PIs at CUNY, NCSU, Oakridge Natl. Lab); UVA (sole PI) portion: \$2,113,000.
- DOE, *Enabling Supernova Computations by Integrated Transport & Provisioning Methods Optimized for Dedicated Channels*, \$240,000, 2004-2006, my role: PI (co-PI: ORNL); UVA (sole PI) portion: \$240,000.
- NSF, *Fast File Transfers Across Optical Circuit-Switched Networks*, \$325,000, 2003-2006, my role: PI (Co-PIs at CUNY, Polytechnic University); UVA (sole PI) portion: \$159,304.
- Internet2/Cisco, Equipment grant of two Cisco 12008 high-end IP routers, Dec. 2002; rough estimate: \$100,000 (UVA; sole PI).
- NSF, *Towards enabling a 2-3 orders of magnitude improvement in call handling capacities of switches*, \$450,000, plus \$60,000 in cost-share support from Polytechnic University, 2001-2006, my role: PI; my portion: \$405,000 of which \$165,285 was moved to UVA (Sole PI) in 2004.
- Village Networks, *A study of different optical metropolitan-area network architectures*, \$116,166, 2001-2002, my role: PI; Sole PI.
- Verizon, *Automation of SS7 testing*, \$262,697, Sept. 2000 - Aug. 2001, my role: PI.

Sole PI.

- Verizon, *SS7 testing methodology development*, \$170,000, Sept. 99-Aug. 00, my role: PI. Sole PI.
- NYSTAR (New York Office of Science, Technology and Academic Research) through the Center of Advanced Technology in Telecommunications (CATT), approx. \$548,863. Sole PI.
- NIST, *Mobile Information Infrastructure*, 1994-1997, \$12 Million, Bell Labs, my role: co-PI. Large team.

PUBLICATIONS

• Best paper awards

- (1) M. Veeraraghavan, X. Zheng, H. Lee, M. Gardner, W. Feng, CHEETAH: Circuit-switched High-speed End-to-End Transport Architecture, *Proc. of Opticomm 2003*, Oct. 13-17, 2003. Dallas, TX (was selected as Best Student Paper).
- (2) M. Veeraraghavan and M. Karol, "Internetworking connectionless and connection-oriented networks," *Proc. of IEEE BSS'99*, Kingston, Ontario, Canada, June 1-3, '99 (published as a Selected paper in *IEEE Communications Magazine*, Dec. 1999).
- (3) M. Veeraraghavan, T. F. La Porta, and R. Ramjee, "User Signaling Servers for ATM-Based PCS Networks," *Proc. of ISSLS'96*, Melbourne, Australia, February 4-9, 1996 (won Best Paper Award for Network and Technology Theme).
- (4) M. Veeraraghavan, T. F. La Porta, and W. S. Lai, "An Alternative Approach to Call/Connection Control in Broadband Switching Systems," *Proc. of IEEE BSS'95*, Poznan, Poland, April 19-21, 1995 (won Best Paper Award), appeared as selected paper in *IEEE Communications Magazine*, Vol. 33, No. 11, November 1995, pp. 90-96.
- (5) M. Veeraraghavan and T. F. La Porta, "Signaling Models for Control of B-ISDN and IN-Supported Services," *Proc. of ISSLS'93*, Vancouver, Canada, Sept. 27-Oct. 1, 1993 (won Best Paper Award for Architectures and Technology Theme).

• Refereed journal and magazine papers

- (1) X. Fang and M. Veeraraghavan, "A Hybrid Network Architecture for File Transfers," accepted for publication in *IEEE Transactions of Parallel and Distributed Systems*.
- (2) X. Zhu, M. Veeraraghavan, "Analysis and design of a book-ahead bandwidth-sharing mechanism," *IEEE Trans. on Communications*, vol. 56, no. 12, Dec. 2008, pp. 2156-2165.
- (3) X. Zhu, X. Zheng, M. Veeraraghavan, "Experiences in implementing an experimental wide-area GMPLS network," *IEEE Journal on Selected Areas in Communication*, vol. 25, issue 3, part supplement, April 2007, pp. 82-92.
- (4) T. Li, D. Logothetis, M. Veeraraghavan, "Analysis of a polling system for telephony traffic with application to wireless LANs," *IEEE Transactions on Wireless Communications*, June 2006, vol. 5, issue 6, June 2006, pp. 1284- 1293.
- (5) M. Veeraraghavan, X. Zheng and Z. Huang, "On the use of connection-oriented networks to support Grid computing," *IEEE Communications Magazine*, vol. 44, no. 3, March 2006, pp. 118-123.

- (6) H. Wang, M. Veeraraghavan, R. Karri, T. Li, "Design of a High-Performance RSVP-TE Signaling Hardware Accelerator," *IEEE Journal on Selected Areas in Communication*, vol. 23, issue 8, Aug. 2005, Page(s):1588 - 1595.
- (7) X. Zheng, M. Veeraraghavan, N. Rao, Q. Wu and M. Zhu, "CHEETAH: Circuit-switched High-speed End-to-End Transport Architecture testbed," *IEEE Communications Magazine*, vol. 43, issue 8, Aug. 2005, Page(s): s11- s17.
- (8) M. Veeraraghavan and X. Zheng, "A Reconfigurable Ethernet/SONET Circuit Based Metro Network Architecture," *IEEE Journal on Selected Areas in Communication*, vol. 22, issue 8, pp. 1406-1418, Oct. 2004.
- (9) M. Veeraraghavan, X. Zheng, W. Feng, H. Lee, E. K. P. Chong & H. Li, "Scheduling and transport for file transfers on high-speed optical circuits," *Journal of Grid Computing*, vol. 1, issue 4, 2003, pp. 395-405.
- (10) M. Veeraraghavan, D. Logothetis and X. Zheng, "Using dynamic optical networking for high-speed access," *SPIE/Kluwer Optical Networks Magazine*, vol. 4, no. 5, Sept./Oct. 2003, pp. 30-40.
- (11) M. Veeraraghavan, M. Karol, R. Karri, R. Grobler, T. Moors, "Architectures and protocols that enable new applications on optical networks," *IEEE Communications Magazine*, March 2001, pp. 118-127.
- (12) M. Veeraraghavan and M. Karol, "Internetworking connectionless and connection-oriented networks," *IEEE Communications Magazine*, Vol. 37, No. 12, December 1999, pp. 130-138.
- (13) J. Anderson, J. S. Manchester, A. Rodriguez-Moral and M. Veeraraghavan, "Protocols and Architectures for IP Optical Networking," *Bell Labs Technical Journal*, Vol. 4, No. 1, Jan.-Mar. 1999, pp. 105-124.
- (14) G. Dommety, M. Veeraraghavan, and M. Singhal, "A Route Optimization Algorithm and its Application to Mobile Location Management in ATM Networks," *IEEE Journal on Selected Areas of Communication*, Vol. 16, No. 6, August 1998, pp. 890-908.
- (15) Z. Liu, M. Veeraraghavan, and K. Y. Eng, "A Scalable Wireless Virtual LAN," *ACM/Baltzer Mobile Networks and Applications Journal*, Vol. III, No. 3, 1998, pp. 261-273.
- (16) G. Dommety, M. Veeraraghavan, and M. Singhal, "Route Optimization in Mobile ATM Networks and its Application to Handoff Management," *ACM/Baltzer Mobile Networks and Applications Journal*, Vol. III, No. 2, August 1998, pp. 203-220.
- (17) M. Veeraraghavan and G. Dommety, "Mobile Location Management in ATM Networks," *IEEE Journal on Selected Areas in Communications*, Vol. 15, No. 8, October 1997, pp. 1437-1454.
- (18) M. Veeraraghavan, M. Karol, and K. Y. Eng, "Mobility and Connection Management in a Wireless ATM LAN," *IEEE Journal on Selected Areas of Communication*, Vol. 15, No. 1, January 1997, pp. 50-68.
- (19) M. Veeraraghavan, "Connection Control in ATM Networks," *Bell Labs Technical Journal*, Vol. 2, No. 1, Winter 1997, pp. 48-64.
- (20) T. F. La Porta, M. Veeraraghavan, and R. Buskens, "Comparison of Signaling Loads for PCS Systems," *IEEE/ACM Transactions on Networking*, Vol. 4, No. 6, December 1996, pp. 840-856.
- (21) E. Ayanoglu, K. Y. Eng, M. Karol, Z. Liu, P. Pancha, M. Veeraraghavan, and C. Woodworth, "Mobile Information Infrastructure," *Bell Labs Technical Journal*, Vol. 1, No. 2, Autumn

1996, pp. 143-164.

- (22) M. Veeraraghavan, T. F. La Porta, and R. Ramjee, "A Distributed Control Strategy for Wireless ATM Networks," *ACM/Baltzer Wireless Networks Journal*, Vol. 1, No. III, 1995, pp. 323-339.
- (23) K. Y. Eng, M. J. Karol, M. Veeraraghavan, E. Ayanoglu, C. B. Woodworth, P. Pancha, and R. A. Valenzuela, "A Wireless Broadband Ad-Hoc ATM Local-Area Network," *ACM/Baltzer Wireless Networks Journal*, Vol. 1, No. II, 1995, pp. 161-174.
- (24) R. Ramjee, T. F. La Porta, and M. Veeraraghavan, "The Use of Network-Based Migrating User Agents for Personal Communication Services," *IEEE Personal Communications Magazine*, December 1995, pp. 62-68.
- (25) M. Veeraraghavan, T. F. La Porta, and W. S. Lai, "An Alternative Approach to Call/Connection Control in Broadband Switching Systems," Appeared as selected paper from IEEE BSS'95 in *IEEE Communications Magazine*, Vol. 33, No. 11, November 1995, pp. 90-96.
- (26) T. F. La Porta, M. Veeraraghavan, P. Treventi, and R. Ramjee, "Distributed Call Processing for Personal Communication Services," *IEEE Communications Magazine*, Vol. 33, No. 6, June 1995, pp. 66-75.
- (27) S. Rai, M. Veeraraghavan, and K. S. Trivedi, "A Survey of Efficient Reliability Computation Using Disjoint Products Approach," *Networks Journal*, Vol. 25, No. 3, May 1995, pp. 147-163.
- (28) T. F. La Porta, M. Veeraraghavan, E. Ayanoglu, M. J. Karol, and R. D. Gitlin, "B-ISDN: A Technological Discontinuity," *IEEE Communications Magazine*, Vol. 32, No. 10, October 1994, pp. 84-97.
- (29) M. Veeraraghavan and K. S. Trivedi, "A Combinatorial Algorithm for Performance and Reliability Analysis Using Multistate Models," *IEEE Transactions on Computers*, Vol. 43, No. 2, February 1994, pp. 229-233.
- (30) M. Veeraraghavan and T. F. La Porta, "Object Oriented Analysis of Signaling and Control in Broadband Networks," *International Journal of Communication Systems*, Vol. 7, No. 2, April-June 1994, pp. 131-147.
- (31) T. F. La Porta and M. Veeraraghavan, "Evaluation of Broadband UNI Signaling Protocol Techniques," *Journal of High Speed Networks*, Vol. 2, No. 3, 1993, pp. 209-238.
- (32) M. Veeraraghavan and K. S. Trivedi, "An Improved Algorithm for the Symbolic Reliability Analysis," *IEEE Transactions on Reliability*, Vol. 40, No. 3, August 1991, pp. 347-358.
- (33) A. L. Reibman and M. Veeraraghavan, "Modeling Fault-Tolerant System Reliability: An Overview for System Designers," *IEEE Computer Magazine*, Vol. 24, No. 4, Apr. 1991, pp. 49-57.

- **Book chapters**

- (1) G. Dommety and M. Veeraraghavan, "Location Management in Wireless ATM Networks," *Advances in Wireless Communications*, Kluwer Academic Publishers, 1997.
- (2) M. Veeraraghavan, T. F. La Porta, and R. Ramjee, "User Signaling Servers for ATM-Based PCS Networks," in the *Annual Review of Communications*, presented by the International Engineering Consortium, Vol. 50, 1997, pp. 969-974.
- (3) S. Srinivasan and M. Veeraraghavan, "Fast Handoffs using Virtual Paths in Mobile ATM Networks," in *Mobile Multimedia Communications*, edited by D. J. Goodman and D. Ray-

chaudhri, Plenum Press, New York, 1997, pp. 67-74.

- (4) I. Katzela and M. Veeraraghavan, "Routing in an ATM-Based Mobile Network," *Multi-access, Mobility and Teletraffic for Personal Communications Workshop*, Paris, France, May 1996, Kluwer Academic Press.
- (5) M. Veeraraghavan, "Coverage Modeling for the Design of Network Management Procedures," *Network Management and Control*, Vol. 2, Edited by Ivan Fritsch, M. Malek, and S. S. Panwar, Plenum Press 1994, pp. 53-65.
- (6) T. F. La Porta and M. Veeraraghavan, "Broadband UNI Signaling Techniques," *Network Management and Control*, Vol. 2, Edited by Ivan Fritsch, M. Malek, and S. S. Panwar, Plenum Press 1994, pp. 261-275.
- (7) M. Veeraraghavan and K. S. Trivedi, "Multiple Variable Inversion Techniques," *New Trends in System Reliability Evaluation*, Edited K. B. Misra, Elsevier Publishers, 1993.
- (8) M. Veeraraghavan, D. M. Rouse, and R. Kapoor, "Signaling Architectures and Protocols for Broadband ISDN Services," *Telecommunications Access Networks, Technology and Service Trends*, Editor, W. Lemstra, Elsevier Science Publishers B. V. (North-Holland), 1991.
- (9) M. Veeraraghavan and K. S. Trivedi, "Hierarchical Modeling for Reliability and Performance Measures," in: *Concurrent Computations: Algorithms, Architecture and Technology*, S. K. Tewksbury, B. W. Dickson and S. C. Schwartz (eds.), Plenum Press, New York, 1988.

- **Edited special issues of journals**

- (1) C. S. Albanese, J. A. Bannister, G. Polyzos, M. Veeraraghavan, M. Zitterbaart, "Editorial Introduction," Special Issue of *Computer Networks and ISDN Systems Journal* on "Signaling and Management in ATM Networks, Vol. 29, No. 5, April 14, 1997.

- **Refereed conference papers**

- (1) X. Fang and M. Veeraraghavan, "Internetworking circuit and connectionless networks," *IEEE ICACT 2009*, Feb. 15-18, Phoenix Park, Korea.
- (2) X. Fang and M. Veeraraghavan, "On using circuit-switched networks for file transfers," *IEEE Globecom 2008*, Nov. 30- Dec. 4, New Orleans, US.
- (3) M. McGinley, T. Li, and M. Veeraraghavan, "On Virtualizing Ethernet Switches," *IEEE ICCN'08*, US Virgin Islands (St. Thomas), USA, August 3-7, 2008 (acceptance rate: 24.6%; nominated for Best Paper Award).
- (4) X. Zhu, M. E. McGinley, T. Li, M. Veeraraghavan, "An Analytical Model for a Book-ahead Bandwidth Scheduler," *IEEE Globecom 2007*, Nov. 26-30, Washington, DC.
- (5) M. Veeraraghavan and T. Li, "Signaling Transport Options in GMPLS Networks: In-band or Out-of-band," *Proc. of IEEE ICCCN'07*, Aug. 13-16, 2007, Honolulu, HI.
- (6) X. Fang, M. Veeraraghavan, M. E. McGinley, R. W. Gisiger, "An overlay approach for enabling access to dynamically shared backbone GMPLS networks," *Proc. of IEEE ICCCN'07*, Aug. 13-16, 2007, Honolulu, HI.
- (7) M. Veeraraghavan, X. Fang, X. Zheng, "On the suitability of applications for GMPLS networks," *Proc. of IEEE Globecom 2006*, San Francisco, Nov. 27 - Dec. 1, 2006.
- (8) X. Zhu, X. Zheng, M. Veeraraghavan, Z. Li, Q. Song, I. Habib, N. S. V. Rao, "Implementation of a GMPLS-based Network with End Host Initiated Signaling," *Proc. of IEEE ICC 2006*, June 11-15, 2006, Istanbul, Turkey.

- (9) A. P. Mudambi, X. Zheng, M. Veeraraghavan, "A Transport Protocol for dedicated end-to-end circuits," *Proc. of IEEE ICC 2006*, June 11-15, 2006, Istanbul, Turkey.
- (10) X. Fang, X. Zheng, and M. Veeraraghavan, "Improving web performance through new networking technologies," *IEEE ICIW'06*, Feb. 23-25, 2006, Guadeloupe, French Caribbean.
- (11) M. Veeraraghavan, H. Lee, E. K. P. Chong and H. Li, "A varying-bandwidth list scheduling heuristic for file transfers," *Proc. of IEEE ICC2004*, June 20-24, Paris, France.
- (12) H. Wang, M. Veeraraghavan, R. Karri, "A Hardware-Accelerated Implementation of the RSVP-TE Signaling Protocol," *Proc. of IEEE ICC 2004*, June 20-24, Paris, France.
- (13) H. Lee, M. Veeraraghavan, H. Li and E. K. P. Chong, "Lambda scheduling algorithm for file transfers on high-speed optical circuits," *IEEE International Symposium on Cluster Computing and the Grid (CCGrid 2004)*, April 19-22, 2004, Chicago, Illinois, USA, <http://www.ccgrid.org/ccgrid2004>.
- (14) M. Veeraraghavan, X. Zheng, H. Lee, M. Gardner, W. Feng, CHEETAH: Circuit-switched High-speed End-to-End Transport Architecture, *Proc. of Opticomm 2003*, Oct. 13-17, 2003. Dallas, TX (was selected as Best Student Paper).
- (15) T. Moors, and M. Veeraraghavan, "Design of a transport protocol for bulk data transfer over optical lightpaths," *Conference on the Optical Internet & Australian Conference on Optical Fibre Technology (COIN + ACOFT 2003)*, July 13-16, 2003, Melbourne, Australia.
- (16) H. Wang, M. Veeraraghavan and R. Karri, "A hardware implementation of a signaling protocol," *Proc. of Opticomm 2002*, July 29-Aug. 2, 2002, Boston, MA.
- (17) T. Moors, M. Veeraraghavan, Z. Tao, X. Zheng, R. Badri, "Experiences in automating the testing of SS7 Signaling Transfer Points," *Proc. of ACM International Symposium on Software Testing and Analysis (ISSTA)*, July 22-24, 2002, Rome, Italy.
- (18) M. Veeraraghavan, H. Lee, R. Grobler, "A low-load comparison of TCP/IP and end-to-end circuits for file transfers," *Proc. of INET 2002*, June 18-21, Arlington, VA.
- (19) M. Veeraraghavan, H. Lee, J. Anderson, K. Y. Eng, "A network throughput comparison of optical metro ring architectures," *OFC2002*, March 2002, Anaheim, CA, in a poster session.
- (20) M. Veeraraghavan and D. Logothetis, "Using dial-up lightpaths for high-speed optical access," *IEEE Globecom 2001*, Nov. 25-29, 2001, San Antonio, Texas.
- (21) M. Veeraraghavan, N. Cocker, T. Moors, "Support of voice services in IEEE 802.11 wireless LANs," *IEEE Infocom 2001*, April 23-26, 2001, Anchorage, Alaska.
- (22) M. Veeraraghavan, R. J. Munoz and D. M. Rouse, "Interworking of addressing schemes in an internetwork," *Proc. of IEEE Globecom2000*, San Francisco, CA, Nov. 27-30, 2000.
- (23) M. Veeraraghavan and M. Karol, "Using WDM technology to carry IP traffic," *34th Annual Conference on Information Sciences and Systems*, Princeton, NJ, Mar. 15-17, 2000.
- (24) M. Veeraraghavan and M. Karol, "Internetworking connectionless and connection-oriented networks," *Proc. of IEEE BSS'99*, Kingston, ON, June 1-3, 99 (published as a Selected paper in *IEEE Communications Magazine*, Dec. 1999).
- (25) D. Logothetis and M. Veeraraghavan, "Delay Sensitive Routing in PNNI-Based ATM Networks," *Proc. of the IEEE Globecom'98*, Australia, Nov. 98.
- (26) M. Veeraraghavan, "Internetworking Telephony, IP and ATM Networks," *Proc. of the SBT/IEEE International Telecommunications Symposium*, Sao Paulo, Brazil, August 9-13, 1998.
- (27) G. Dommety, M. Veeraraghavan, M. Singhal, "Rerouting Connections in Mobile ATM Net-

- works,” *1998 Intl. Conference on Parallel Processing*, Minneapolis, August 10-14, 1998.
- (28) M. Veeraraghavan, P. Pancha, and K. Y. Eng, “ATM Switch Routers for Combined Connection-Oriented and Connectionless Transport,” *Proc. of the IEEE Globecom’97*, Phoenix, Arizona, Nov. 4-8, 1997.
 - (29) H. Tan, M. Veeraraghavan, and D. Vaman, “Resource Sharing Technique for ATM Virtual Networking,” *Proc. of the IEEE Globecom’97*, Phoenix, Arizona, Nov. 4-8, 1997.
 - (30) G. Dommety, M. Veeraraghavan, and M. Singhal, “Flat Location Management Scheme for PCNs,” *Proc. of IEEE ICUPC’97*, San Diego, Oct. 12-16, 1997.
 - (31) G. Dommety, M. Veeraraghavan, and M. Singhal, “Route Optimization in Mobile ATM Networks,” *Proc. of ACM/IEEE Mobicom’97*, Budapest, Hungary, Sept. 26-30, 1997, pp. 43-54.
 - (32) M. Veeraraghavan, P. Pancha, and K. Y. Eng, “ATM Switch Routers for Combined Connection-Oriented and Connectionless Transport,” *Proc. of ISS’97*, Toronto, Canada, Sept. 21-24, 1997.
 - (33) M. Veeraraghavan, P. Pancha, and K. Y. Eng, “Application-Aware Routing Protocol,” *Proc. of the IEEE ISCC’97*, Alexandria, Egypt, July 1-3, 1997.
 - (34) M. Veeraraghavan and G. Dommety, “Location Management in Wireless ATM Networks,” *Proc. of the IEEE ICC’97*, Montreal, Canada, June 8-12, 1997.
 - (35) P. Pancha, M. Veeraraghavan, and S. Rai, “Comparison of Video Conference Realization Schemes,” *Proc. of the IEEE ICC’97*, Montreal, Canada, June 8-12, 1997, pp. 798-804.
 - (36) M. Veeraraghavan, P. Pancha, and G. Dommety, “Connectionless ATM using an ATM Switch Router,” *Proc. of ECMAST’97*, Milan, Italy, May 21-23, 1997, pp. 199-212.
 - (37) S. Srinivasan and M. Veeraraghavan, “DIVA: A DIstributed and Dynamic VP Management Algorithm,” *Proc. of IEEE IM’97*, San Diego, May 12-16, 1997.
 - (38) M. Veeraraghavan, G. L. Choudhury, and M. Kshirsagar, “Implementation and Analysis of Parallel Connection Control (PCC),” *Proc. of IEEE Infocom’97*, Kobe, Japan, April 7-11, 1997.
 - (39) M. Karol, M. Veeraraghavan, and K. Y. Eng, “Implementation and Analysis of Handoff Procedures in a Wireless ATM LAN,” *Proc. of IEEE Globecom’96*, London, U.K., November 18-22, 1996.
 - (40) C. Woodworth, M. Veeraraghavan, and D. Shur, “Connection Request Protocol (CRP) for IP over ATM,” *Proc. of IEEE Globecom’96*, London, U.K., November 18-22, 1996.
 - (41) Z. Liu, M. Veeraraghavan, and K. Y. Eng, “A Scalable Wireless Virtual LAN,” *Proc. of ACM/IEEE Mobicom’96*, Rye, New York, Nov. 10-12, 1996.
 - (42) M. Veeraraghavan, M. Karol, and K. Y. Eng, “Implementation and Analysis of Connection Management Procedures in a Wireless ATM LAN,” *Proc. of IEEE ICUPC’96*, Cambridge, MA, Sept. 29-Oct. 3, 1996.
 - (43) I. Katzela and M. Veeraraghavan, “Virtual Trees Routing Protocol for a Wireless ATM LAN,” *Proc. of IEEE ICUPC’96*, Cambridge, MA, Sept. 29-Oct. 3, 1996.
 - (44) M. Veeraraghavan, “Distributed Call Processing Architecture (DCPA),” *Proc. of TINA’96*, Heidelberg, Germany, Sept. 1996.
 - (45) M. Veeraraghavan and M. Kshirsagar, “PCC: Parallel Connection Control Algorithm for ATM Networks,” *Proc. of IEEE ICC’96*, Dallas, Texas, June 24-27, 1996, pp. 1635-1641.
 - (46) M. Veeraraghavan, M. Kshirsagar, and G. L. Choudhury, “Concurrent ATM Connection Set-

- up Reducing Need for VP Provisioning,” *Proc. of IEEE Infocom’96*, San Francisco, CA, pp. 303-311, March 24-28, 1996.
- (47) M. Veeraraghavan, T. F. La Porta, and R. Ramjee, “User Signaling Servers for ATM-Based PCS Networks,” *Proc. of ISSLS’96*, Melbourne, Australia, February 4-9, 1996 (won Best Paper Award for Network and Technology Theme).
 - (48) M. Veeraraghavan, M. J. Karol, and K. Y. Eng, “Mobility Management in a Wireless ATM LAN,” *Proc. of IEEE Globecom’95*, Singapore, Nov. 13-17, 1995, pp. 316-321.
 - (49) Z. Qin, M. Veeraraghavan, and T. F. La Porta, “An Improved Mobile Tracking and Location Procedure for ATM-Based PCNs,” *Proc. of IEEE Globecom’95*, Singapore, Nov. 13-17, 1995, pp. 6-11.
 - (50) M. J. Karol, M. Veeraraghavan, and K. Y. Eng, “Mobility-Management and Media-Access Issues in the BAHAMA Wireless ATM LAN,” *Proc. of IEEE ICUPC’95*, Tokyo, Japan, Nov. 6-10, 1995.
 - (51) M. Malhotra and M. Veeraraghavan, “Performability-based Quality of Service Metrics for Communication Services,” *Proc. of IEEE Intl. Conf. on Computer Communications Networks*, Las Vegas, Nevada, Sept. 20-23, 1995.
 - (52) M. Veeraraghavan, T. F. La Porta, and R. Ramjee, “A Distributed Control Strategy for Wireless ATM Networks,” *Proc. of IEEE ICC’95*, Seattle, Washington, June 18-22, 1995 (also presented in the *IEEE Computer Comm. Workshop’94*).
 - (53) K. Y. Eng, M. J. Karol, M. Veeraraghavan, E. Ayanoglu, C. B. Woodworth, P. Pancha, and R. A. Valenzuela, “BAHAMA: A Broadband Ad-Hoc Wireless ATM Local-Area Network,” *Proc. of IEEE ICC’95*, Seattle, Washington, June 18-22, 1995.
 - (54) T. F. La Porta and M. Veeraraghavan, “Direct Signaling: A New Access Signaling Architecture,” *Proc. of IEEE ICC’95*, Seattle, Washington, June 18-22, 1995.
 - (55) T. F. La Porta and M. Veeraraghavan, “An Experimental Signaling Architecture and Modular Signaling Protocols,” *Proc. of ISS’95*, Berlin, Germany, April 23-28, 1995.
 - (56) M. Veeraraghavan, T. F. La Porta, and W. S. Lai, “An Alternative Approach to Call/Connection Control in Broadband Switching Systems,” *Proc. of IEEE BSS’95*, Poznan, Poland, April 19-21, 1995 (won Best Paper Award), appeared as selected paper in *IEEE Communications Magazine*, Vol. 33, No. 11, November 1995, pp. 90-96.
 - (57) T. F. La Porta and M. Veeraraghavan, “Design and Implementation of a Distributed Call Processing Architecture,” *Proc. of IEEE ICC’94*, New Orleans, May 1-5, 1994.
 - (58) T. F. La Porta and M. Veeraraghavan, “Description of a B-ISDN Functional Signaling Architecture,” *Proc. of Globecom’93*, Houston, Texas, Nov. 29-Dec. 2, 1993.
 - (59) M. Veeraraghavan and K. S. Trivedi, “An Algorithm for Combinatorial Performance and Availability Analysis,” *12th Symp. on Reliable Distributed Systems (SRDS)*, Princeton, NJ, October 6-8, 1993.
 - (60) M. Veeraraghavan and T. F. La Porta, “Signaling Models for Control of B-ISDN and IN-Supported Services,” *Proc. of ISSLS’93*, Vancouver, Canada, Sept. 27-Oct. 1, 1993 (won Best Paper Award for Architectures and Technology Theme).
 - (61) M. Veeraraghavan and T. F. La Porta, “Call, Connection, and Service Control Protocols for Broadband Networks,” *Proc. of the Second Intl. Conf. on Computer Communications Networks*, San Diego, CA, June 28-30, 1993.
 - (62) M. Veeraraghavan, D. M. Rouse, and R. Kapoor, “Signaling Architectures and Protocols for

Broadband ISDN Services,” *Proc. of IEEE Globecom’92*, Orlando, FL, Dec. 6-9, 1992, pp. 1156-1160.

- (63) M. Veeraraghavan, D. M. Rouse, and R. Kapoor, “Signaling Architectures and Protocols for Broadband ISDN Services,” *The International Symposium on Subscriber Loops and Services*, Amsterdam, April 1991, pp. 351-356.
- (64) A. Modarressi and M. Veeraraghavan, “Network signaling architectures for Broadband ISDN,” *World Telecom Forum*, Geneva, Oct. 10-15, 1991.
- (65) M. Veeraraghavan and K. S. Trivedi, “An Improved Algorithm for the Symbolic Reliability Analysis of Networks,” *Ninth Symposium on Reliable Distributed Systems*, Huntsville, AL, October 1990, pp. 137-147.
- (66) R. C. Lian, D. M. Rouse, and M. Veeraraghavan, “Signaling Architectures, Transport, and Evolution for Broadband Services,” *7th International Teletraffic Congress*, Morristown, NJ, October 1990.
- (67) J. B. Dugan, M. Veeraraghavan, M. A. Boyd, and N. Mittal, “Bounded Approximate Reliability Models for Distributed Systems,” *Eighth Symposium on Reliable Distributed Systems*, Seattle, WA, October 10-12, 1989, pp. 137-147.
- (68) M. Boyd, M. Veeraraghavan, J. B. Dugan, and K. S. Trivedi, “An Approach to Solving Large Reliability Models,” *Proc. of AIAA/IEEE Digital Avionics Systems Conference*, October 17-20, 1988, pp. 243-250.

- **Workshop papers**

- (1) Josh Dehlinger, Joanne Bechta Dugan, Malathi Veeraraghavan and Mark McGinley, “Continuous Open Design of Dependable Systems for Critical Infrastructure,” Emerging Trends in FLOSS (Free/Libre/Open Source Software) Research and Development Workshop at the 31st International Conference on Software Engineering (ICSE) 2009, May 18, 2009, Vancouver, Canada.
- (2) M. Veeraraghavan and Haobo Wang, “A Comparison of In-Band and Out-of-Band Transport Options for Signaling,” *IEEE Workshop On the Quest to Control Next-Generation Transport Networks: The Role of Generalized Multi-Protocol Label Switching (GMPLS)*, held in conjunction with *IEEE Globecom 2004*, Nov. 29 - Dec. 3, Dallas, TX.
- (3) X. Zheng, A. P. Mudambi, and M. Veeraraghavan, “FRTP: Fixed Rate Transport Protocol - A modified version of SABUL for end-to-end circuits,” Pathnets Workshop, held in conjunction with Broadnets 2004, October 25-29, 2004, San Jose, CA.
- (4) M. Veeraraghavan, Circuit-Switched High-Speed Transport Architecture (CHEETAH), <http://www.mcnc.org/mcncopticalworkshop/opticalProcess404.cfm>, April 23, 2004, Chicago.
- (5) M. Veeraraghavan, X. Zheng, W. Feng, H. Lee, Edwin Chong, Hua Li, “Scheduling and transport for file transfers on high-speed optical circuits,” *Second International Workshop on Protocols for Fast Long-Distance Networks (PFLDnet 2004)*, <http://www-didc.lbl.gov/PFLDnet2004/index.htm>, Chicago, Feb. 16-17, 2004 (reviewed).
- (6) H. Wang, M. Veeraraghavan, R. Karri, “A Dynamic Circuits Based Wide-Area SAN Solution,” *Optical Networking Technologies for Global SAN Solutions*, held in conjunction with Opticomm 2003, Oct. 13-17, 2003, Dallas, TX (reviewed).
- (7) M. Veeraraghavan, H. Lee and X. Zheng, “File transfers across optical circuit-switched networks,” *First International Workshop on Protocols for Fast Long-Distance Networks*

(PFLDnet 2003), <http://datatag.web.cern.ch/datatag/pfldnet2003/>.

- (8) R. Grobler and M. Veeraraghavan, "Scheduling of calls with known holding times," *IEEE CCW 2000*, Captiva Island, Florida, Oct. 15-18, 2000.
- (9) M. Veeraraghavan, N. Cocker, A. Wang, "QoS Support in 802.11 Wireless LANs," *IEEE LANMAN99 workshop*, Sydney, Australia, Nov. 99.
- (10) M. Veeraraghavan and M. Karol, "Internetworking IP and WDM networks," *IEEE CCW 99*, Estes Park, CO, Oct. 99.
- (11) M. Veeraraghavan, A. Rodriguez-Moral, J. Anderson, "Integrated Routing Strategies in IP/WDM Networking," *ICC'98 workshop on the Management of Multiwavelength Optical Networks*, Atlanta, GA, June 7, 1998.
- (12) M. Veeraraghavan, "Internetworking telephony, IP and ATM networks," *Openarch'98*, San Francisco, CA, April 3-4, 1998.
- (13) M. Veeraraghavan, G. Dommety, "Mobile Location Management in Wireless ATM Networks," *Opensig'97*, Columbia University, NY, October 6-7, 1997.
- (14) G. Dommety and M. Veeraraghavan, "Location Management in Wireless ATM Networks," *WINLAB workshop*, New Brunswick, NJ, Mar 21-23, 1997, to appear in a Kluwer Publishers book.
- (15) S. Srinivasan and M. Veeraraghavan, "DIVA: A DIstributed and Dynamic VP Management Algorithm," *Proc. of MoMuC workshop'96*, Princeton, NJ, Sept. 25-27, 1996.
- (16) M. Veeraraghavan, M. Karol, and K. Y. Eng, "Mobility- and Connection-Management in a Wireless ATM LAN," *IEEE Computer Communications Workshop'96*, Reston, VA, Sept. 22-25, 1996.
- (17) M. Veeraraghavan, M. Karol, and K. Y. Eng, "Implementation and Analysis of Mobility Management in a Wireless ATM LAN," *IEEE LAN/MAN Workshop'96*, Potsdam, Germany, Aug. 25-28, 1996.
- (18) M. Veeraraghavan and T. F. La Porta, "Distributed Call Processing Architecture (DCPA)," *Proc. of the IEEE Electro'96 Workshop*, Somerset, NJ, April 30-May 2, 1996, pp. 347-353.
- (19) M. Veeraraghavan and T. F. La Porta, "Application of Intelligent Network Principles to B-ISDN and PCS Networks," *Proc. of Intelligent Networks Workshop*, Ottawa, Canada, May 9-11, 1995.
- (20) M. Veeraraghavan and T. F. La Porta, "A Distributed Control Strategy for Wireless ATM Networks," *The Ninth Annual IEEE Workshop on Computer Communications*, Marathon, Florida, Oct. 24-26, 1994.
- (21) M. Veeraraghavan and T. F. La Porta, "Signaling Models for Control of B-ISDN and IN-Supported Services," *IEEE LAN/MAN workshop'93*, San Diego, CA, Oct. 14-16, 1993.
- (22) M. Veeraraghavan, "Coverage Modeling for the Design of Network Management Procedures," *Second IEEE Network Management and Control Workshop*, Tarrytown, NY, Sept. 21-23, 93.
- (23) T. F. La Porta and M. Veeraraghavan, "Broadband UNI Signaling Techniques," *Second IEEE Network Management and Control Workshop*, Tarrytown, NY, Sept. 21-23, 93.
- (24) M. Veeraraghavan, W. S. Lai, and T. F. La Porta, "Implementation, and Performance Analysis of a Distributed Call Processing Architecture," *Proc. of IEEE HPCS'93*, Williamsburg, VA, Sept. 1-3, 1993.

- (25) M. Veeraraghavan, "Performability Modeling of Communication Network Management Procedures," *2nd Intl. Workshop on Performability Modeling of Comp. and Comm. Systems*, Le Mont Saint Michel, France, June 28-30, 1993.

- **Technical reports**

- (1) M. Veeraraghavan, X. Zheng, X. Zhu, "Addressing and secure control-plane network design in GMPLS networks," Technical Report, <http://cheetah.cs.virginia.edu/documents/dcn/dcn-design.pdf>, April 7, 2006.
- (2) T. Moors and M. Veeraraghavan, "Specification of (and reasoning behind) Zing: A transport protocol for file transfers over circuits," CATT Technical Report, Polytechnic University, New York, Jan. 2001, available online at <http://kunene.poly.edu/~mv/pdf-files/Zingspec2.pdf>.
- (3) R. Grobler, M. Veeraraghavan and D. M. Rouse, "Scheduling Calls with Known Holding Times," *CATT Technical Report*, Polytechnic University, New York, July 2000, available online at <http://kunene.poly.edu/~mv/ps-files/call-sched.ps>.
- (4) M. Veeraraghavan and J. B. Dugan, "Modeling Fault-Tolerant Computer, Network and Control Systems," *Technical Report TR CS-1988-20*, Duke University CS Department, Durham, NC, July 1988.

- **ATM Forum contributions**

- (1) M. Veeraraghavan and E. Gray, "Study of Mechanisms to Support Short-Lived Data Exchanges," ATM_Forum 97-0867, Sept. 21-26, 1997.
- (2) M. Karol and M. Veeraraghavan, "Proposed Editorial Changes to the WATM Baseline Document," ATM_Forum 97-0866, Sept. 21-26, 1997.
- (3) M. Veeraraghavan, P. Pancha, and K. Y. Eng, "Connectionless Transport in ATM Networks," ATM_Forum 97-0141, February 9-14, 1997.
- (4) M. Veeraraghavan and M. Karol, "Handover Scheme Description for the Baseline Document," ATM_Forum 97-0125, February 9-14, 1997.
- (5) M. Veeraraghavan M. Karol, and K. Y. Eng, "A Combined Handoff Scheme for Mobile ATM Networks," ATM_Forum 96-1700, December 1-6, 1996.
- (6) M. Veeraraghavan and G. Dommety, "Location Management Update," ATM_Forum/96-1701, December 1-6, 1996.
- (7) M. Veeraraghavan, P. Pancha, and G. Dommety, "Connectionless Transport of Signaling Messages in Wireless ATM Networks," ATM_Forum 96-1702, December 1-6, 1996.
- (8) M. Veeraraghavan, M. Karol, and K. Y. Eng, "Handoff Scheme for Mobile ATM Networks," ATM_Forum 96-1499, October 6-11, 1996.
- (9) M. Veeraraghavan, M. Karol, and K. Y. Eng, "Location Management in Wireless ATM Networks," ATM_Forum 96-1500, October 6-11, 1996.

- **AT&T/Lucent symposia:**

- (1) M Veeraraghavan, A. Rodriguez-Moral, J. Anderson, "Issues in Integrated IP/WDM

- Routing,” Lucent Network Management Symposium, Holmdel, NJ, June 25-26, 1998.
- (2) M. Veeraraghavan, “Connectionless ATM and ATM Switch Routers,” Proc. of the ATM Symposium 1997, Holmdel, NJ, July 17-18, 1997.
 - (3) M. Veeraraghavan and R. Buskens, “Configuration Management Issues in ATM Based PCNs,” Proc. of the AT&T 1995 Network Management Workshop, June 26-27, 1995, Holmdel, NJ, pp. 69-76.
 - (4) M. Veeraraghavan, M. Karol, K. Y. Eng, “Mobility and Connection Management in a Wireless ATM LAN,” 2nd AT&T Workshop on Wireless Communications and Mobile Computing, Holmdel, NJ, Nov. 2-3, 1995.
 - (5) M. Veeraraghavan, T. La Porta, P. Treventi, S. Nanda, “A Distributed Control Strategy for Wireless ATM Systems,” AT&T Workshop on Wireless Communications and Mobile Computing, Holmdel, NJ, Oct. 3-4, 1994.
 - (6) M. Veeraraghavan and T. La Porta, “Signaling Models for Control of B-ISDN and IN-Supported Services,” AT&T workshop on Control and Signaling of Broadband Services and Networks, Oct. 15-16, 1992.

U.S. PATENTS

Issued

- (1) *Signaling for reserving a communications path*, 7,212,495, May 1, 2007.
- (2) *Scheduling of calls with known holding times*, 7,051,106, May 23, 2006.
- (3) *Methods and apparatus for automating testing of signaling transfer points*, 7,012,992, March 14, 2006.
- (4) *WDM optical networks arranged for internetworking with packet networks*, 6,798,993, Sept. 28, 2004.
- (5) *Method for location management in a communication network*, 6,771,604, August 3, 2004.
- (6) *Interworking of addressing schemes in an internetwork*, 6,741,585, May 25, 2004.
- (7) *Quality of service based path selection for connection-oriented networks*, 6,687,229, February 3, 2004.
- (8) *A method for rerouting and route optimization for handoff management in a connection-oriented network*, 6,654,361, Nov. 25, 2003.
- (9) *Technique for internetworking traffic on connectionless and connection-oriented networks*, 6,628,617, September 30, 2003.
- (10) *Communications system for transmission of datagram packets over connection-oriented networks*, 6,516,000, dated Feb. 4, 2003.
- (11) *Communications system for transmission of datagram packets over connection-oriented networks*, 6,483,853, dated Nov. 19, 2002.
- (12) *Administrative weight assignment for enhanced network operation*, 6,385,172, dated May 7, 2002.
- (13) *Virtual Path Management Algorithm in Hierarchical ATM Networks*, 6,304,549, dated 10/16/2001.
- (14) *Connectionless message service using ATM routers*, 6,151,319, dated 11/21/2000.
- (15) *Network-Based Migrating User Agents for Personal Communication Services*, 6,085,086,

dated 07/04/2000.

- (16) *Method and System for Distributed Control in Wireless Cellular and Personal Communication Systems*, 6,081,715, dated 6/27/2000.
- (17) *Mobile Location Management in ATM Networks*, 6,078,575, dated 6/20/2000.
- (18) *Communication System for Transmission of Datagram Packets Over Connection Oriented Networks*, 6,016,319, dated 01/18/2000.
- (19) *Wireless Services Data Network Translating MAC Address to ATM Address*, 5,958,018, dated 9/28/99.
- (20) *Parallel Connection Control*, 5,933,412, dated 8/3/99.
- (21) *Virtual Trees Routing Protocol for an ATM-based Mobile Network*, 5,872,773, dated 2/16/99.
- (22) *Signaling and Control Architecture for an Ad-Hoc ATM LAN*, US Patent 5,822,309, dated 10/13/1998.
- (23) *Method and Apparatus for Routing ATM Cells in an Ad-Hoc ATM LAN*, US Patent 5,757,783, dated 5/26/98.
- (24) *Method and System for Distributed Control in Wireless Cellular and Personal Communication Systems*, US Patent 5,659,544, dated 8/19/97.
- (25) *A Packet-Based Telecommunications Network*, US Patent 5,610,904, dated 3/11/97.
- (26) *Method and System for Delivering a Communication Service*, US Patent 5,563,939, dated 10/8/96.
- (27) *Communication Signaling Protocols*, US Patent 5,509,010, dated 4/16/96.
- (28) *A Signaling System for Broadband Communication Systems*, US Patent 5,473,679, dated 12/5/95.
- (29) *Distributed Call Processing Architecture for Control of Broadband and Narrowband Communication Networks*, US Patent 5,434,852, dated 7/18/95.

Pending

- (1) Network-based migrating user agents for personal communication services.
- (2) An ATM call server for connectionless IP over ATM.
- (3) Transferring data such as files.

TUTORIALS

- (1) GMPLS networks and Optical Network Testbeds, IEEE ICACT 2009, Phoenix Park, Korea, Feb. 15, 2009.
- (2) Generalized MultiProtocol Label Switched (GMPLS) Networks, IEEE Globecom 2007, Washington, DC, Nov. 30, 2007.
- (3) Generalized MultiProtocol Label Switched (GMPLS) Networks, IEEE Globecom 2006, San Francisco, Dec. 1, 2006.
- (4) "Wireless MAC and Mobility Management Protocols," IEEE Globecom 2002, half-day tutorial.
- (5) "Internetworking: Voice over packet-switched networks and IP over X," IEEE Globecom 2000 all-day tutorial.
- (6) "Internetworking: Voice over packet-switched networks and IP over X," CATT Seminar, Polytechnic University, Dec. 3, 1999; also at Lucent Technologies, May 3, 2000.

- (7) "Wireless networking (with emphasis on the mobility problem)," Teachers' workshop in Michigan State University, July 1998.
- (8) "A Fast Introduction to Computer Networking," Nov. 18-20, 1997, Department of Telecommunications, India.
- (9) "Wireless ATM," Infocom 1997.
- (10) "Advanced Topics in Broadband ATM Networks," Infocom 1994.
- (11) "Network Management for Fault Handling in Telecommunication Networks," IEEE Symposium on Reliable Distributed Systems, October 1993.

SEMINARS/PANELS

- (1) "GMPLS Optical Networks," ETRI, Daejon, Korea, Feb. 13, 2009.
- (2) "Applications and CHEETAH," MCNC Applications Symposium, April 10, 2006.
- (3) "Status of US optical networking R&D," NSF/EU Workshop on Optical Networks, Brussels, Belgium, June 27-28, 2005.
- (4) "Match between Grid Computing and GMPLS networks," NSF/EU Workshop on Optical Networks, Brussels, Belgium, June 27-28, 2005.
- (5) "Enabling a connection-oriented internet," Brookhaven National Labs, Upton, NY, May 16, 2005.
- (6) "CHEETAH," Joint Engineering Team Review of Optical Networking Testbeds, NSF, Washington, DC, April 19, 2005.
- (7) "CHEETAH," NSF Sponsored Planning Workshop on "The Future of Optical Communications: Understanding the Choices," Santa Barbara, April 12 & 13, 2005.
- (8) "Enabling a connection-oriented internet," Seminar at Georgia Tech, March 30, 2005.
- (9) "Enabling a connection-oriented internet," Seminar at Duke University, Feb. 11, 2005.
- (10) "CHEETAH," Exhibitor at SuperComputing 2005, Nov. 6-12, 2004.
- (11) "Immediate-request vs. scheduled calls, Short-duration vs. long-duration calls," at MCNC Workshop on GMPLS Control Plane, November 12, 2004.
- (12) Panelist on the "Optical Networks and Grid Computing Panel," Broadnets 2004, Oct. 25-29, 2004.
- (13) "Use of SONET/SDH and WDM networks for fast end-to-end file transfers," Hong Kong University of Science and Technology, July 28, 2000.
- (14) "Use of SONET/SDH and WDM networks for fast end-to-end file transfers," Tsinghua University, July 26, 2000.
- (15) "Advances in connection-oriented networking," Princeton University, Princeton, NJ, Oct. 16, 97.
- (16) "Mobile location management in ATM Networks," Brooklyn Polytechnic University, Nov. 25, 97.
- (17) "Connectionless ATM using an ATM Switch Router," University of Genoa, Italy, May 20, 97.
- (18) "Location Management for Mobile ATM Networks," Politecnico di Milano, Italy, May 19, 97.
- (19) "Configuration Management Issues in ATM-Based PCNs," Panel on "Managing Mobility," *The Fifth IFIP/IEEE Intl Symp. on Integrated Network Management (IM'97)*, San Diego,

May 12-16, 1997.

- (20) "Distributed Call Processing Architecture," TINA-C group, Bellcore, June 96.
- (21) "Mobility and Connection Management in a Wireless ATM LAN," Univ. of California at Davis, March 96.
- (22) "Distributed Call Processing Architecture for ATM Networks and PCNs," UCLA, Feb. 96.
- (23) "Parallel Connection Control for ATM Networks," Curtin Institute of Technology, Perth, Australia, Feb. 96.
- (24) "Parallel Connection Control for ATM Networks," Telstra Research Labs, Melbourne, Australia, Feb. 96.
- (25) "Control-Plane Aspects of ATM Networks," NTT Labs, Tokyo, Nov. 95
- (26) "BAHAMA: A Wireless ATM LAN," HP Labs, Palo Alto, June 95.
- (27) "Call and Connection Control of ATM Networks," University of Connecticut, Storrs, November 93.

TECHNICAL REPORTS

- (1) M. Veeraraghavan, X. Zhu, T. Li, "A discussion of goals and control-plane implications for our HOPI experiments," Technical Report, <http://www.ece.virginia.edu/cheetah/documents/hopi/mv-dragon-cheetah-ctl-plane.pdf>, May 5, 2007.
- (2) M. Veeraraghavan, T. Li, J. Vollbrecht, B. Cashman, "Proposal for experimentation on the HOPI testbed," Technical Report, <http://www.ece.virginia.edu/cheetah/documents/hopi/proposal-to-use-HOPI.pdf>, Jan. 29, 2007.

GRADUATE STUDENTS

- Ph.D. students
 - Xiudian Fang, University of Virginia, "On Using Circuit-switched Networks for File Transfers," Dec. 2008 (defended in Sept. 08).
 - Xiangfei Zhu, University of Virginia, "A Study of Bandwidth-Sharing Mechanisms in Connection-Oriented Networks," May 2008.
 - Tao Li, University of Virginia, Thesis: "Analysis and Implementation of Multiplexing Techniques in Connection-Oriented Communication Networks," Aug. 2006.
 - Haobo Wang, Polytechnic University, Thesis: "Hardware-Accelerated Signaling: Design, Implementation and Implications," Nov. 2004.
 - Hojun Lee, Polytechnic University, Thesis: "Scheduling file transfers on a circuit-switched network," May 2004.
 - Xuan Zheng, University of Virginia, Thesis: "Enabling New Applications with Optical Circuit-Switched Networks," May 2004.
 - Gopal Dommetty, Ohio State University, Thesis: "Efficient Techniques for Supporting Mobile Hosts in Hierarchically Organized Networks," Mar 1998. Gopal did his research work under my guidance and financial support at Bell Labs.
- Masters students
 - Xiudian Fang, University of Virginia, "A Study of Applications for Opti-

- cal Circuit-Switched Networks,” MS, Comp. Sc., May 2006.
- Zhanxiang Huang, University of Virginia, “End-host Route Selection in the CHEETAH networking solution,” MCS, May 2006.
- Anant P. Mudambi, University of Virginia, Transport protocols for dedicated circuits, MS, Computer Engineering, Dec. 2005.
- Xiangfei Zhu, “End-to-End GMPLS Signaling in the CHEETAH project,” University of Virginia, MCS, May 2005.
- Reinette Grobler, University of Pretoria, CATT Scholar, Polytechnic University, 2000-2001, Thesis: “Signaling and Scheduling for Efficient Bulk Data Transfer in Circuit-Switched Networks,” Aug. 2000. Won the “S2A3 bronze medal for the best Masters dissertation in the various sciences (Medicine, Natural, Engineering, etc.)” University of South Africa, 2000. SA3 stands Southern Africa Association for the Advancement of Science. Reinette did her research work under my guidance and financial support at Polytechnic University.
- Rimma Iontel, Polytechnic University, Honors Student, Thesis: “Performance Testing of Signaling Transfer Points used in Signaling System No. 7 (SS7) Networks,” June 2001.
- Nabeel Cocker, Polytechnic University, Honors Student, Thesis: “Carrying Voice on IEEE 802.11 Wireless Local Area Networks,” June 2001.
- Ramesh Badri, Polytechnic University, Thesis: “Automating SS7 STP Interoperability Test Results Analysis,” October 2001.
- Examined Ph.D. thesis by Alex Lam, “Protocol Design and Implementation Architecture for High Speed Wireless MAC,” March 2001, Macquarie University, Sydney, Australia.
- Examined Ph.D. thesis by M. Hogan, “Support of Integrated Services by B-ISDN CPE,” 31 March 1996, Macquarie University, Sydney, Australia.

UNDERGRADUATE STS THESES:

- Hok Sum (Stanley) Chau, “Design and implementation of a traffic matrix generation system for Internet Service Providers,” 2009.
- Eric Karlinsky, “Digital Video Streaming System on Commodity Hardware Using DVTS Software,” 2008.
- Bryan Lin, “Configuring Policy-Based Routing Controllers for Flexible Network-Routing Applications,” 2008.
- Robert Gisiger, “Improving Internet Performance using Web-Caching and a Connection-Oriented Network,” 2007.
- Matt Greenfield, “Monitoring the Reliability of High-Speed Networks,” 2007.
- Think Ho, “A Router Traffic Monitor,” 2007.
- Marko Milko, “Bandwidth control within a Summit switch Ethernet network,” 2007
- Wesley Chi, “Extracting Usage Time Data from the CHEETAH Network,” 2007
- Albert Ho, “Bluetooth Communication in Vehicles: The Development of a Mechanism

for Communication Among Vehicles in Motion,” 2006.

- Robert Anthony, “Determine Real-Time Network Performance Factors,” 2006.
- Mike Wolyneec, “Designing Applications for Connection-Oriented Networks,” 2006.
- Erik Halseth, “Factors of Bandwidth Performance Constraints over Gigabit Networks,” 2006.
- Sukhoon Oh, “Security in VoIP Networks,” 2006.
- Lihan Li, “Internet Piracy: An Analysis of Possible Solutions,” 2006.
- Matt Eaton, “An Opportunistic Peer-to-Peer Electronic Conferencing System,” 2006.
- Albert Varma, “Probing Host-To-Host Network Pathways: Gathering Network Statistics for the Routing Decision Module for CHEETAH,” 2006.
- Chris Dahl (still ongoing; started in Spring 2006).
- Andrew Love, “Video Telephony: Ethernet-based Quality of Service,” 2005.
- Russ Glorioso, “A Hardware Accelerated Implementation of the Resource Reservation Protocol - Traffic Engineering Signaling Protocol,” 2005.
- Shen-Wei (Victor) Huang, “IEEE 802.11 Wireless LAN Studies,” 2005.
- Yanpeng (Roger) Guo, “Scientists' Reliable Network Infrastructure: End-host Software of High-speed CHEETAH,” 2005.
- Stephen Gaborik, “Development of an Advanced Multimedia Video-Telephony Setup, 2004.
- Yixing Qin: “Test Software Development for a Gigabit/second Networking Card,” 2004.
- Jean Anostere, Polytechnic University of New York, 2001.
- Yong Yi Zeng, Polytechnic University of New York, 2001.
- John Kuok, Polytechnic University of New York, 2001.
- Joga Hayre, Polytechnic University of New York, 2000.
- Niket Desai, Polytechnic University of New York, 2000.

VISITORS and POST-DOCTORAL FELLOWS

- Dr. Tao Li, Post-Doctoral Fellow, started Oct. 2006, current.
- Dr. Xuan Zheng, Post-Doctoral Fellow, 2004-2006.
- Prof. Suresh Rai, LSU, while I was at Bell Labs, 1998.
- Prof. Zhiseng Niu, Tsinghua University, China, while I was at Polytechnic University, 2001.