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Education

- Ph.D.** Computer Science and Engineering, University of California, San Diego (1993)
- M.S.** Computer Science, Colorado State University, Fort Collins (1988)
- B.Tech.** Computer Science and Engineering, Indian Institute of Technology, Bombay, India (1987)

Academic Appointments

- 9/99 - present: Associate Professor of Computer Sciences, The University of Texas at Austin
- 9/93 - 8/99: Assistant Professor of Computer Sciences, The University of Texas at Austin

Research Areas

Multimedia computing, high speed networking, fault-tolerance, distributed systems, operating systems

Awards and Honors

- **Faculty Fellow in Computer Sciences**, Department of Computer Sciences, UT Austin, 1996-present
- **Dean's Fellowship**, The University of Texas at Austin, 2002-2003 and 1996-1997
- **Fellow, IBM Center for Advanced Studies**, 2001–2002.
- **IBM University Partnership Faculty Award**, 2000–2002.
- Finalist, International Takeda Techno-Entrepreneurship Award, 2002 (a competition that promotes leading edge R&D projects that are likely to have substantial impact on the society)
- **AT&T Foundation Award**, 1996-1997
- **National Science Foundation CAREER Award**, 1996-2000
- **IBM Faculty Development Award**, 1995-1999
- **National Science Foundation Research Initiation Award**, 1994-1997
- **IBM Doctoral Fellowship**, 1990-1993
- **San Diego Supercomputer Center Creative Computing Award** for innovative research on “*Designing a Storage Server for Digital Continuous Multimedia*”, 1992
- **NCR Graduate Innovation Award** for excellence in Doctoral Research (*NCR - University Stakeholder Partnership Program*), 1989-1990
- **National Merit Scholarship**, Bombay, India - Awarded in recognition of the high position secured in the list of meritorious candidates, 1983
- **College Merit Scholarship** for the best academic record, Wilson College, Bombay, India, 1981-1982
- Our paper titled: “Determining End-to-End Delay in Heterogeneous Networks” was one of the papers nominated by the program committee of the 5th International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV’95) for the Special Issue of ACM Multimedia Systems Journal on NOSSDAV’95.

- Our paper titled: “Start-time Fair Queuing: A Scheduling Algorithm for Integrated Services Packet Switching Networks” was one of the papers selected by the program committee of the ACM SIGCOMM’96 for the Special Issue of IEEE/ACM Transactions on Networking on SIGCOMM’96.

Journal Publications

1. B. Hardekopf, T. Riche, J. Mudigonda, M. Dahlin, H.M. Vin, and J. Kaur, “Impact of Network Protocols on Programmable Router Architectures,” Submitted for publication, April 2003
2. P. Shenoy, P. Goyal, S. Rao, and H.M. Vin, “Design Considerations for Symphony: An Integrated Multimedia File System,” *ACM Multimedia Systems* journal, to appear, 2003.
3. P. Shenoy, P. Goyal, and H.M. Vin, “Architectural Considerations for Next-generation File Systems,” *ACM Multimedia Systems* journal, Vol. 8, No. 4, pp. 270-283, 2002
4. P. Shenoy and H.M. Vin, “Cello: A Disk Scheduling Framework for Next-generation Operating Systems,” *Real Time Systems Journal: Special Issue on Flexible Scheduling of Real-Time Systems*, Vol. 22, No. 1, pp. 9-47, January 2002.
5. S. Rao, L. Alvisi, and H.M. Vin, “Cost of Recovery in Message Logging Protocols,” *IEEE Transactions on Knowledge and Data Engineering*, Vol. 12, No. 2, March/April 2000, pp. 160-173.
6. P. Shenoy and H.M. Vin, “Failure Recovery Algorithms for Multimedia Servers,” *ACM Multimedia Systems Journal*, Vol. 8, No. 1, pp. 1-19, January 2000.
7. P. Shenoy and H.M. Vin, “Efficient Striping Techniques for Multimedia File Servers,” *Performance Evaluation Journal*, Vol. 38, Issue 3-4, December 1999, pp. 175-199.
8. P. Shenoy and H.M. Vin. “Efficient Support for Interactive Operations in Multi-resolution Video Servers,” *ACM Multimedia Systems Journal*, Vol. 7, No. 3, pp. 241-253, May 1999.
9. P. Goyal, H.M. Vin, and H. Cheng, “Start-time Fair Queuing: A Scheduling Algorithm for Integrated Services Packet Switching Networks,” *IEEE/ACM Transactions on Networking*, Vol. 5, No. 5, pp. 690-704, October 1997.
10. E.J. Posnak, R.G. Lavendar, and H.M. Vin, “An Adaptive Framework for Developing Multimedia Software Components,” *Communications of the ACM*, Vol. 40, No. 10, pp. 43-47, October 1997.
11. P. Goyal and H.M. Vin, “Generalized Guaranteed Rate Scheduling Algorithms: A Framework,” *IEEE/ACM Transactions on Networking*, Vol. 5, No. 4, pp. 561-571, August 1997.
12. P. Goyal, S.S. Lam, and H.M. Vin, “Determining End-to-End Delay in Heterogeneous Networks,” *ACM Multimedia Systems*, Vol. 5, No. 3, pp. 157-163, 1997.
13. P. Shenoy, P. Goyal, and H.M. Vin, “Issues in Multimedia Server Design,” *ACM Computing Surveys*, Vol. 27, No. 4, pp. 636-639, December 1995.
14. D.J. Gemmell, H. M. Vin, D.D. Kandlur, P. Venkat Rangan and L. Rowe, “Multimedia Storage Servers: A Tutorial and Survey,” *IEEE Computer*, Vol. 28, No. 5, pp. 40-49, May 1995.
15. H. M. Vin, A. Goyal and P. Goyal, “Algorithms for Designing Large-Scale Multimedia Servers,” *Computer Communications*, Vol. 18, No. 3, pp. 192-203, March 1995.
16. S. Ramanathan, H. M. Vin and P. Venkat Rangan, “Towards Personalized Multimedia Dial-up Services,” *Computer Networks and ISDN Systems*, Vol. 26, pp. 1305-1322, 1994.
17. P. Venkat Rangan and H. M. Vin, “Efficient Storage Techniques for Digital Continuous Multimedia,” *IEEE Transactions on Knowledge and Data Engineering*, Vol. 5, No. 4, pp. 546-573, August 1993.
18. P. Venkat Rangan, S. Ramanathan, H. M. Vin and T. Kaepfner, “Techniques for Multimedia Synchronization in Network File System,” *Computer Communications*, Vol. 16, No. 3, pp. 168-176, March 1993.

19. P. Venkat Rangan, H. M. Vin and S. Ramanathan, "Communication Architectures and Algorithms for Media Mixing in Multimedia Conferences," *IEEE/ACM Transactions on Networking*, Vol. 1, No. 1, pp. 20-30, February 1993.
20. H. M. Vin and P. Venkat Rangan, "Designing a Multi-User HDTV Storage Server," *IEEE Journal on Selected Areas in Communications*, Vol. 11, No. 1, pp. 153-164, January 1993.
21. H. M. Vin, M. S. Chen and T. Barzilai, "Collaboration Management in DiCE," *Computer Journal*, Vol. 36, No. 1, pp. 87-96, January 1993.
22. S. Ramanathan, P. Venkat Rangan and H. M. Vin, "Designing Communication Architectures for Inter-Organizational Multimedia Collaboration," *Journal of Organizational Computing Systems*, Vol. 2, No. 3 and 4, pp. 277-302, December 1992.
23. P. Venkat Rangan, H. M. Vin and S. Ramanathan, "Designing an On-Demand Multimedia Service," *IEEE Communications Magazine*, Vol. 30, No. 7, pp. 56-64, July 1992.
24. S. Ramanathan, P. Venkat Rangan and H. M. Vin, "Integrating Virtual Reality, Tele-Conferencing, and Entertainment into Multimedia Home Computers," *IEEE Transactions on Consumer Electronics*, Vol. 38, No. 2, pp. 70-76, May 1992.
25. H. M. Vin, P. T. Zellweger, D. C. Swinehart and P. Venkat Rangan, "Multimedia Conferencing in the Etherphone Environment," *IEEE Computer*, Vol. 24, No. 10, pp. 69-79, October 1991.
26. H. M. Vin, F. Berman and J. Mattson, "Efficient Data-Driven Evaluation: Theory and Implementation," *Journal of Parallel and Distributed Computing*, Vol. 10, No. 12, pp. 367-385, December 1990.
27. H. M. Vin and A. K. Uht, "Dynamic Instruction Substitution: A Technique to Minimize Dependencies for Memory References," *IEEE-CS TC MICRO MicroArch*, Vol 4, No 1-2, pp. 17-24, July 1989.
28. H. M. Vin and S. S. S. P. Rao, "Graphics Controllers: An Overview," *IETE Technical Review*, Vol 4, No 10, pp. 371-377, October 1987.

Conference Publications

1. M. Kounavis, A. Kumar, H.M. Vin, R. Yavatkar, and A. Campbell, "Packet Classification Under Stringent Space-Time Constraints", Submitted for publication, June 2003
2. S. Gorinsky, S. Jain, H.M. Vin, and Y. Zhang, "Robustness to Inflated Subscription in Multicast Congestion Control," In Proceedings of *ACM SIGCOMM'03*, Karlsruhe, Germany, August 2003 (to appear)
3. J. Napper, L. Alvisi, and H.M. Vin, "A Fault-tolerant Java Virtual Machine," In Proceedings of *Dependable Systems and Networks (DSN'03)*, June 2003 (to appear).
4. S. Gorinsky, S. Jain, H.M. Vin, and Y. Zhang, "Robustness of Multicast Congestion Control to Inflated Subscription," In Proceedings of *ACM SIGMETRICS* (poster presentation), June 2003 (to appear).
5. J. Kaur and H.M. Vin, "Providing Deterministic End-to-end Fairness Guarantees in Core-stateless Networks," In Proceedings of *Eleventh International Workshop on Quality of Service (IWQoS'03)*, Monterey, California, June 2003 (to appear).
6. J. Kaur and H.M. Vin, "Core-stateless Guaranteed Throughput Networks," In Proceedings of *IEEE INFOCOM'03*, April 2003.
7. M. Kounavis, A. Kumar, H.M. Vin, R. Yavatkar, and A. Campbell, "Directions in Packet Classification for Network Processors," In Proceedings of *2nd Workshop on Network Processors*, February 2003.
8. J. Kaur and H.M. Vin, "End-to-end Fairness Analysis of Fair Queuing Networks," In Proceedings of the *23rd IEEE International Real-Time Systems Symposium (RTSS'02)*, Austin, TX, Dec 2002.
9. R. Kokku, R. Rajamony, L. Alvisi, and H.M. Vin, "Half-pipe Anchoring: An Efficient Technique for Multiple Connection Handoff," In Proceedings of the *10th International Conference on Network Protocols (ICNP 2002)*, Paris, France, November 2002.

10. S. Gorinsky, S. Jain, and H.M. Vin, "Multicast Congestion Control with Distrusted Receivers," In Proceedings of *Networked Group Communication (NGC 2002)*, October 2002.
11. S. Gorinsky and H.M. Vin, "The Utility of Feedback in Layered Multicast Congestion Control," In Proceedings of *11th International Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV01)*, June 2001.
12. J. Kaur and H.M. Vin, "Core-Stateless Guaranteed Rate Scheduling Algorithms," In Proceedings of *IEEE INFOCOM'01*, April 2001.
13. P. Yalagandula, L. Alvisi, M. Dahlin, and H. Vin, "Consistent 0-Administration Personal Environment," In Proceedings of the *IEEE 6th Int'l Workshop on Object Oriented Real-Time Dependable Systems (WORDS)*, Rome, Italy, January 2001.
14. V. Sundaram, A. Chandra, P. Goyal, P. Shenoy, J. Sahni and H.M. Vin, "Application Performance in the QLinux Multimedia Operating System," In Proceedings of *Eighth ACM Conference on Multimedia*, Los Angeles, CA, pp. 127-136, November 2000.
15. P. Shenoy, P. Goyal, and H.M. Vin, "Architectural Considerations for Next Generation File Systems," In Proceedings of *ACM Multimedia'99* pp. 457-468, November 1999.
16. J. Sahni, P. Goyal, and H.M. Vin, "Scheduling CBR Flows: FIFO or Fair Queuing?," In Proceedings of *9th International Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV99)*, pp. 13-27, June 1999.
17. S. Rao, L. Alvisi, and H.M. Vin, "Egida: An Extensible Toolkit For Low-overhead Fault-Tolerance," In Proceedings of *IEEE International Conference on Fault-Tolerant Computing (FTCS)*, pp. 48-55, June 1999.
18. R. Tewari, M. Dahlin, H.M. Vin, and J. Kay, "Design Considerations for Distributed Caching on the Internet," In Proceedings of the *International Conference on Distributed Computing and Systems (ICDCS)*, pp. 273-284, May 1999.
19. P. Goyal and H.M. Vin, "Statistical Delay Guarantee of Virtual Clock," In Proceedings of *IEEE Real-time Systems Symposium (RTSS)* pp. 450-459, December 1998.
20. S. Rao, L. Alvisi, and H.M. Vin, "Cost of Recovery in Message Logging Protocols," In Proceedings of *IEEE Symposium on Reliable Distributed Systems*, pp. 10-18, November 1998.
21. P. Goyal and H.M. Vin, "On the Effectiveness of Buffer in Deterministic and Statistical Services," In Proceedings of *8th International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV'98)*, pp. 161-172, July 1998.
22. P. Shenoy and H.M. Vin, "Cello: A Disk Scheduling Framework for Next-generation Operating Systems," In Proceedings of *ACM SIGMETRICS'98, the International Conference on Measurement and Modeling of Computer Systems*, Madison, WI, pp. 44-55, June 1998.
23. S. Rao, L. Alvisi, and H.M. Vin, "Hybrid Message Logging Protocols for Fast Recovery," In Proceedings of the *28th Annual International Symposium on Fault Tolerant Computing (FTCS-28)*, pp. 41-42, June 1998.
24. L. Alvisi, S. Rao, and H.M. Vin, "Low-overhead Protocols for Fault-tolerant File Sharing," In Proceedings of the *18th International Conference on Distributed Computing Systems (ICDCS)*, Amsterdam, pp. 452-461, May 1998.
25. P.J. Shenoy, P. Goyal, S. Rao, and H.M. Vin, "Symphony: An Integrated Multimedia File System," In Proceedings of *ACM/SPIE Multimedia Computing and Networking 1998. (MMCN'98)*, San Jose, pp. 124-138, January 1998.
26. R. Tewari, H.M. Vin, A. Dan, and D. Sitaram, "Resource-based Caching for Web Servers," In Proceedings of *ACM/SPIE Multimedia Computing and Networking 1998. (MMCN'98)*, San Jose, pp. 191-204, January 1998.

27. P. Goyal and H.M. Vin, "Fair Airport Scheduling Algorithms," In Proceedings of the *7th International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV'97)*, pp. 273-282, May 1997.
28. P. Shenoy and H.M. Vin. "Efficient Striping Techniques for Multimedia File Servers," In Proceedings of the *7th International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV'97)*, pp. 25-36, May 1997.
29. P. Goyal, X. Guo, and H.M. Vin, "A Hierarchical CPU Scheduler for Multimedia Operating Systems," In Proceedings of the *Second Symposium on Operating Systems Design and Implementations (OSDI'96)*, Seattle, Washington, pp. 107-122, October 1996.
30. E.J. Posnak, R.G. Lavender, and H.M. Vin, "Adaptive Configurations," In Proceedings of the *3rd Pattern Languages of Programming Conference*, Monticello, Illinois, September 1996.
31. P. Goyal, H.M. Vin, and H. Cheng, "Start-time Fair Queuing: A Scheduling Algorithm for Integrated Services Packet Switching Networks," In Proceedings of *ACM SIGCOMM'96*, San Francisco, pp. 157-168, August 1996.
32. R. Tewari, R. Mukherjee, D.M. Dias, and H.M. Vin, "Design and Performance Tradeoffs in Clustered Video Servers," In Proceedings of the *IEEE International Conference on Multimedia Computing and Systems 1996. (ICMCS'96)*, Tokyo, Japan, pp. 144-150, May 1996.
33. S.S. Rao, H.M. Vin, and A. Tarafdar, "Comparative Evaluation of Server-push and Client-pull Architectures for Multimedia Servers," In Proceedings of the *6th International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV'96)*, Japan, pp. 45-48, April 1996.
34. P. Goyal and H.M. Vin, "Network Algorithms and Protocol for Multimedia Servers," In Proceedings of *INFOCOM'96*, San Francisco, pp. 1371-1379, March 1996.
35. P. Goyal, H. M. Vin, C. Shen, and P.J. Shenoy, "A Reliable, Adaptive Network Protocol for Video Transport," In Proceedings of *INFOCOM'96*, San Francisco, pp. 1080-1090, March 1996.
36. R. Tewari, D.M. Dias, R. Mukherjee, and H.M. Vin, "High Availability in Clustered Multimedia Servers," In Proceedings of the *IEEE International Conference on Data Engineering*, New Orleans, pp. 645-654, February 1996.
37. E.J. Posnak, H.M. Vin, and R.G. Lavender, "Presentation Processing Support for Adaptive Multimedia Applications," In Proceedings of the *Multimedia Computing and Networking 1996. (MMCN96)*, San Jose, CA, pp. 234-245, January 1996.
38. P.J. Shenoy and H.M. Vin, "Efficient Support for Scan Operations in Video Servers," In Proceedings of the *ACM Multimedia'95*, San Francisco, CA, pp. 131-140, November 1995.
39. H. M. Vin, P.J. Shenoy, and S. Rao, "Efficient Failure Recovery in Multi-Disk Multimedia Servers," In Proceedings of the *25th Annual International Symposium on Fault Tolerant Computing (FTCS-25)*, Pasadena, California, pp. 12-21, June 1995.
40. H. M. Vin, S. Rao and P. Goyal, "Optimizing the Placement of Multimedia Objects on Disk Arrays," In Proceedings of the *IEEE International Conference on Multimedia Computing and Systems (ICMCS'95)*, Washington, D.C., pp. 158-165, May 1995.
41. S. Rajan, P. Venkat Rangan, and H. M. Vin, "A Formal Basis for Structured Multimedia Collaborations," In Proceedings of the *IEEE International Conference on Multimedia Computing and Systems (ICMCS'95)*, Washington, D.C., pp. 194-201, May 1995.
42. P. Goyal, S.S. Lam, and H.M. Vin, "Determining End-to-End Delay Bounds in Heterogeneous Networks," In Proceedings of the *5th International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV'95)*, Durham, New Hampshire, pp. 287-298, April 1995.

43. E.J. Posnak, S.P. Gallindo, A.P. Stephens and H. M. Vin, "Techniques for Resilient Transmission of JPEG Video Streams," In Proceedings of *Multimedia Computing and Networking*, San Jose, pp. 243-252, February 1995.
44. H. M. Vin, P. Goyal, A. Goyal and A. Goyal, "A Statistical Admission Control Algorithm for Multimedia Servers," In Proceedings of the *ACM Multimedia'94*, San Francisco, pp. 33-40, October 1994.
45. H. M. Vin, P. Shenoy and S. Rao, "Analyzing the Performance of Asynchronous Disk Arrays for Multimedia Retrieval," In Proceedings of the *ISMM International Conference on Distributed Multimedia Systems and Applications*, Honolulu, Hawaii, pp. 14-17, August 1994.
46. H. M. Vin, A.Goyal, A. Goyal and P. Goyal, "An Observation-Based Admission Control Algorithm for Multimedia Servers" In Proceedings of the *First IEEE International Conference on Multimedia Computing and Systems (ICMCS'94)*, Boston, pp. 234-243, May 1994.
47. S. Ramanathan, H. M. Vin and P. Venkat Rangan, "Schemes for Efficient Transmission of Encoded Video Streams on High-Speed Networks," In Proceedings of the *IS&T/SPIE Symposium on Electronic Imaging Science and Technology - Technical Conference on High-Speed Networking and Multimedia Computing*, San Jose, pp. 122-133, February 1994.
48. S. Ramanathan, P. Venkat Rangan and H. M. Vin, "Frame-Induced Packet Discarding: An Efficient Strategy for Video Networking," In Proceedings of the *Fourth International Workshop on Network and Operating System Support for Digital Audio and Video*, Lancaster, pp. 175-186, November 1993.
49. M. S. Chen, Z. Shae, D. Kandlur, T. Barzilai and H. M. Vin, "A Multimedia Desktop Collaboration System," In proceedings of the *IEEE GLOBECOM'92*, Orlando, Florida, pp. 739-750, December 6-9, 1992.
50. H. M. Vin and P. Venkat Rangan, "Admission Control Algorithms for Multimedia On-Demand Servers," In proceedings of the *Third International Workshop on Network and Operating System Support for Digital Audio and Video*, San Diego, California, pp. 50-62, November 12-13, 1992.
51. H. M. Vin, P. Venkat Rangan and M. S. Chen, "System Support for Computer Mediated Multimedia Collaborations," In proceedings of the *1992. ACM Conference on Computer Supported Cooperative Work (CSCW'92)*, Toronto, Canada, pp. 203-209, November 1-4, 1992.
52. S. Ramanathan, P. Venkat Rangan, H. M. Vin and T. Kaepfner, "Optimal Communication Architectures for Multimedia Conferencing in Distributed Systems," In Proceedings of the *12th International Conference on Distributed Computer Systems (ICDCS'92)*, Yokohoma, Japan, pp. 46-53, June 1992.
53. P. Venkat Rangan, S. Ramanathan, H. M. Vin and T. Kaepfner, "Media Synchronization in Distributed Multimedia File Systems," In Proceedings of the *4th IEEE COMSOC International Workshop on Multimedia Communications (Multimedia'92)*, Monterey, California, pp. 315-328, April 1992. (An extended abstract of this paper appeared in the *ACM SIGCOMM Computer Communication Review*, Vol. 22, No. 3, pp. 88-89, July 1992.)
54. M. S. Chen, H. M. Vin and T. Barzilai, "Designing a Distributed Collaboration Environment," In proceedings of the *IEEE GLOBECOM'92*, Orlando, Florida, pp. 213-219, December 6-9, 1992. (A preliminary version of this paper appeared in the proceedings of the *4th IEEE COMSOC International Workshop on Multimedia Communications (Multimedia'92)*, Monterey, California, pp. 172-185, April 1992. An extended abstract of this paper appeared in the *ACM SIGCOMM Computer Communication Review*, Vol. 22, No. 3, pp. 51-52, July 1992.)
55. H. M. Vin, M. S. Chen and T. Barzilai, "A Framework for Modeling Collaborations," In *Upper Layer Protocols, Architectures, and Applications*, G. Neufeld and B. Plattner (Editors), Elsevier Science Publishers (North-Holland), pp. 89-102, 1992. (Proceedings of the *1992. IFIP TC6/WG6.5 International Conference on Upper Layer Protocols, Architectures and Applications (ULPAA'92)*, Vancouver, Canada, May 1992.)

56. P. Venkat Rangan, T. Kaepfner and H. M. Vin, "Techniques for Efficient Storage of Digital Video and Audio," In Proceedings of the 1992. *International Workshop on Multimedia Information Systems (MMIS'92)*, Tempe, Arizona, pp. 68-85, February 1992.
57. P. Venkat Rangan, H. M. Vin, K. Chan and I. Aaberg, "A Window-Based Editor for Digital Video and Audio," In Proceedings of the 25th *Hawaii International Conference on System Sciences (HICSS-25)*, Koloa, Hawaii, Vol. 2, pp. 640-648, January 1992.
58. H. M. Vin, P. Venkat Rangan and S. Ramanathan, "Hierarchical Conferencing Architectures for Inter-Group Multimedia Collaboration," In Proceedings of the *Conference on Organizational Computer Systems (COCS'91)*, Atlanta, Georgia, SIGOIS Bulletin, Vol. 12, No. 2-3, pp. 43-54, November 1991.
59. P. Venkat Rangan and H. M. Vin, "Designing File Systems for Digital Video and Audio," In Proceedings of the 13th *ACM Symposium on Operating Systems Principles (SOSP'91)*, Monterey, California, Operating Systems Review, Vol. 25, No. 5, pp. 81-94, October 1991.
60. P. Venkat Rangan, W. Burkhard, R. Bowdidge, H. M. Vin, J. W. Lindwall, K. Chan, I. A. Aaberg, L. M. Yamamoto and I. G. Harris, "A Testbed for Managing Digital Video and Audio Storage," In Proceedings of *Multimedia - for now and the future, USENIX Summer Conference*, Nashville, Tennessee, June 1991.
61. P. Venkat Rangan and H. M. Vin, "Multimedia Conferencing as A Universal Paradigm for Collaboration," In *Multimedia - Principles, Systems, and Applications*, Chapter 14, Ed. Lars Kjell Dahl, Springer-Verlag, pp. 173-185, April 1991. (Proceedings of *Eurographics Workshop on Multimedia Systems, Applications, and Interaction*, Stockholm, Sweden)
62. P. Venkat Rangan, W. Burkhard, H. M. Vin and R. Bowdidge, "Multimedia Conferencing and File Storage Architectures," In Proceedings of the *First International Workshop on Network and Operating System Support for Digital Audio and Video*, Berkeley, California, November 1990.
63. H. M. Vin and F. Berman, "Architectural Support for the Efficient Data-Driven Evaluation Scheme," In Proceedings of *Symposium on Parallel Algorithms and Architectures'90*, pp. 179-187, Crete, Greece, July 1990.
64. H. M. Vin, J. Walicki and A. K. Uht, "Integrated Approach to Concurrent Code Execution With Respect to Instruction Scheduling and Memory Reference Disambiguation," Poster Presentation at Supercomputing'89, Reno, Nevada, November 1989
65. H. M. Vin and J. Walicki, "Instruction Scheduling in High Performance Architectures - MIDR Algorithm," In Proceedings of *CIPS*, Edmonton, Canada, November 1988.

Book Chapters and Invited Papers

1. M Kounavis, A. Kumar, H.M. Vin, R. Yavatkar, and A. Campbell, "Directions in Packet Classification for Network Processors," In *Network Processors Design: Issues and Practices, Volume 2*, Edited by P. Crowley, M. Franklin, H. Hadimioglu, and P. Onufryk, Morgan Kaufmann, 2003.
2. R. Tewari, D.M. Dias, R. Mukherjee, and H.M. Vin, "High Availability in Clustered Multimedia Servers," *High Performance Mass Storage and Parallel I/O: Technologies and Applications*, H. Jin, T. Cortes, and R. Buyya (Editors), IEEE & Wiley Press, New York, pp. 555-565, 2001.
3. P.J. Shenoy and H.M. Vin, "Multimedia Storage Servers," *Readings in Multimedia Computing*, Kevin Jeffay et. al. (Editors), Morgan Kaufmann Publishers, 2001.
4. H.M. Vin and P.J. Shenoy, "Storage Architectures for Digital Imagery" *Image Databases, Search and Retrieval of Digital Imagery*, V. Castelli and L. D. Bergman (Editors), John Wiley & Sons, Inc. New York, 2000.
5. H.M. Vin, "Supporting Next-generation Distributed Applications," *IEEE Multimedia*, Vol. 5, No. 3, pp. 78-83, September 1998.

6. H.M. Vin, "Algorithms for Designing Multimedia Storage Servers," *Encyclopedia of Computer Science and Technology*, Marcel-Dekker, pp. 1-16, 1998.
7. H.M. Vin, P.J. Shenoy, and S.S. Rao, "Efficient Failure Recovery in Multi-disk Multimedia Servers," In *High-density Data Recording and Retrieval Technologies*, T. Schwarz, M. Francis, Editors, Proceeding SPIE 2604, pp. 121-132, 1996.
8. H.M. Vin and P. Venkat Rangan, "Multimedia Storage Systems," In *Design and Applications of Multimedia Systems*, Ed. Borko Furht, Kluwer Academic Publishers, pp. 123-144, May 1995.
9. H. M. Vin, "Multimedia System Architecture," In *Defining the Global Information Infrastructure: Infrastructure, Systems, and Services*, Ed. Stephen F. Lundstrom, Vol. CR56, SPIE Press, pp. 287-296, November 1994.

Grants

1. Principal investigator, "Shangri-La: Designing a Programming Environment for Network Systems," Intel, \$92,000, 2003.
2. Co-principal investigator, "Orchestrating Computations on the World-Wide-Web," National Science Foundation CCR-0204323, \$160,000, 09/01/02-08/31/04.
3. Co-principal investigator, "Resource Management in Server Clusters," Texas Higher Education Coordinating Board, Advanced Technology Program, \$150,000, 1/1/02 - 12/31/03.
4. Principal investigator, "Designing Network Protocols and Services Using the Intel Internet Exchange Architecture," Intel, \$290,000 + equipment grant (\$170,632), 2000-2003.
5. Principal investigator, "Designing Network Protocols and Services Using the Intel Internet Exchange Architecture," Microsoft, Software Grant (\$17,613), 2002-2003.
6. Co-principal investigator, "A Failure Model for Wide-Area Services," Cisco University Research Program, \$35,400, 06/01-05/02.
7. Co-principal investigator, "Resource Management in Server Clusters," IBM Faculty Partnership Award, \$25,000, 6/1/01 - 5/31/02.
8. Co-principal investigator, "TRIPS: The Tera-op Reliable Intelligently Adaptive Processing System," DARPA, \$3,027,480, 6/01/01-5/31/03
9. Co-principal investigator, "Issues in Improving Web Server Performance," IBM, \$30,000 (equipment grant), December 2000
10. Principal investigator, "Multicast Congestion Control Protocols," NSF ANI-0082294, Special Projects in Network Research, \$600,000, 9/01/00-8/31/03.
11. Co-principal investigator, "Issues in Improving Web Server Performance," IBM, \$25,000, 6/1/00 - 5/31/01.
12. Co-principal investigator, "Infrastructure for Large-Scale Distributed Services," Tivoli, \$30,000, 5/00-4/03.
13. Co-principal investigator, "COPE: Consistent 0-administration Personal Environment," Tivoli, \$30,000, 5/00-4/03.
14. Co-principal investigator, "SCOUT: Scientific Computing Cluster of UT (CISE Research Instrumentation)," National Science Foundation, \$139,481, 3/00-2/03.
15. Co-principal investigator, "A Flexible and Robust Global Data Infrastructure," Texas Higher Education Coordinating Board, Advanced Technology Program, \$142,604, 1/1/00 - 12/31/01.
16. Principal investigator, "Fundamental Problems in Designing Next Generation Internet," Intel, \$150,000 + equipment grant (\$19,297), 1999-2002.
17. Principal investigator, "Fundamental Problems in Designing Next Generation Internet," Microsoft, Software Grant (\$11,982), 1999-2000.

18. Co-principal investigator, "Designing Reliable Server Clusters," LARIAT—Leadership Alliance for Research, Instruction and Technology, Strategic partnership between Dell Computer Corporation and The University of Texas at Austin, \$25,000, 6/99-5/00.
19. Co-principal investigator, "Development and Evaluation of Electronic Textbook Technology Based on Active Names Framework," LARIAT—Leadership Alliance for Research, Instruction and Technology, Strategic partnership between Dell Computer Corporation and The University of Texas at Austin, \$25,000, 6/99-5/00.
20. Co-principal investigator, "Beyond Browsers," Novell at UT Austin Program, \$183,800, 6/99-8/00
21. Principal investigator, "Video Phone Development Lab," Intel, \$7,000 + Equipment Grant (\$21,523), 1998.
22. Principal investigator, "Video Phone Development Lab," Microsoft, Software Grant (\$12,899), 1998.
23. Principal investigator, "InfoWeave: A Visual Learning Environment," Dell, Equipment Grant (\$40,000), 1998
24. Principal investigator, "Multimedia Systems Teaching Laboratory," Intel, Equipment grant (\$302,435), 1998
25. Principal investigator, "Multimedia Delivery Systems," Intel, Equipment grant (\$399,353), 1998.
26. Principal investigator, "InfoWeave: A Visual Learning Environment," Texas Higher Education Coordinating Board, Advanced Technology Program, ATP-443, \$132,749, 1/1/98 - 12/31/99.
27. Principal investigator, "InfoWeave: A Visual Learning Environment," College of Natural Sciences, UT Austin, \$18,600, 6/1/97-8/31/98 (+ \$10,000 equipment matching grant from Department of Computer Sciences, UT Austin)
28. Principal investigator, "InfoWeave: A Visual Learning Environment," Lucent Bell Laboratories, Equipment Grant (\$30,000), 1997
29. Co-principal investigator, "System Support for a Hierarchy of Distributed Applications," NSF CISE Research Infrastructure Award CDA-9624082, \$998,578 (+ \$579,567 in university matching funds), 9/1/96 - 8/31/01.
30. Principal investigator, "Designing an End-to-End Architecture for Distributed Multimedia Systems," NSF CAREER Award, CCR-9624757, \$200,000, 4/1/96 - 3/31/00.
31. Principal investigator, "Digital Course Delivery: An Experiment in Distance Learning and Self-paced Education," AT&T Foundation, \$20,000, 1996-97.
32. Equipment grant for establishing a "Multimedia Systems Teaching Laboratory," Intel, \$190,000, 1996
33. Co-principal investigator, Software grant (\$36,960), Microsoft, 1995-96.
34. Principal investigator, "Research in Distributed Multimedia Systems," IBM Faculty Development Award, \$140,000 + Equipment grant (\$185,000) towards the acquisition of a 4-node IBM POWERParallel SP-2 system (+ \$90,000 in university matching equipment funds), 1995-1999.
35. Principal investigator, "Designing and Implementing an Integrated Multimedia Conferencing Environment," Electrospace Systems Inc., \$16,000, 9/1/95 - 12/31/95.
36. Principal investigator, "Network and Operating System Support for Multimedia," Intel, \$188,000 + Equipment grant (\$150,000), 1/1/95 - 12/31/97
37. Co-principal investigator, "Multi-resolution Information Archival and Analysis System," NASA NAGW-4247, \$720,000, 1/1/95-12/31/97.
38. Principal investigator, "System Support for Designing Distributed Multimedia Computing Environments," Mitsubishi Electric Research Laboratories (MERL), \$225,000, 1994-1998.
39. Principal investigator, "Efficient Storage and Retrieval Techniques for Multimedia Servers," NSF Research Initiation Award, CCR-9409666, \$85,399, 9/1/94-8/30/97.

40. Principal investigator, "Architectures and Algorithms for Designing Large-Scale Multimedia Storage Servers," Sun Microsystems Inc. Equipment Grant (\$30,000), 1994.
41. Principal investigator, "Designing Digital Multimedia Storage Servers," University Research Institute, Summer Research Award, \$11,335, 1994.
42. Principal investigator, "Designing Digital Multimedia Storage Servers," Equipment grant, University of Texas at Austin, \$80,000, 1993

Professional Activities

1. **Editor**, ACM Journal on Multimedia Systems, 1995-2002
2. **Editor**, IEEE Transactions on Multimedia, 1999-2002
3. **Editor**, IEEE Multimedia Magazine, 1995-2002
4. **Guest Editor**, IEEE Network, Special Issue on Network Processors, 2003
5. **Conference Co-chair**, ACM Multimedia'03, Berkeley, CA, November 2003
6. **Proceedings Chair**, ACM SIGMETRICS, Atlanta, May 1999
7. **Program Chair**, IEEE International Conference on Multimedia Systems, Austin, June 1998
8. **Vice-chair** in the area of Distributed Multimedia Systems, the 17th International Conference on Distributed Computing Systems (ICDCS), Baltimore, Maryland, May 1997
9. **Program Co-chair**, International Workshop on Network and Operating System Support for Digital Audio and Video, 2000 (NOSSDAV'00)
10. **Program Co-chair**, Multimedia Computing and Networking, San Jose, February 1997
11. **Program Co-chair**, Multimedia Computing and Networking, San Jose, January 1996
12. **Associate Chair of Program Committee**, ACM Multimedia'00, October 2000
13. **Associate Chair of Program Committee**, ACM Multimedia'99, October 1999
14. **Associate Chair of Program Committee**, ACM Multimedia'98, September 1998
15. **Associate Chair of Program Committee**, ACM Multimedia'96, October 1996
16. **Associate Chair of Program Committee**, ACM Multimedia'95, November 1995
17. **Participant**, NSF Networking Principal Investigators' Workshop, January 2003 and November 2000.
18. **Member**, NSF Panel for Networking Research program, 2002
19. **Member**, NSF Panel for the CISE/EIA Research Infrastructure program, 2001
20. **Member**, National Workshop on Developing Guidance for NSF Advanced Networking Infrastructure Support, AAAS Research Competitiveness Program, 1999
21. **Member**, NSF Panel for the CCR - Software Systems program, 1998
22. **Member**, NSF Panel for the CCR - Software Systems program, 1997
23. **Member**, NSF Panel for the Combined Research-Curriculum Development (CRCD) program, 1996
24. **Member, Program Committee** for:
 - (a) Eleventh International Workshop on Quality of Service (IWQoS), 2003
 - (b) ACM/SPIE Multimedia Computing and Networking (MMCN), 2001
 - (c) IEEE OPENARCH'01 (The Fourth IEEE Conference on Open Architectures and Network Programming), April 2001
 - (d) OPENSIG'2000 Workshop, October 2000
 - (e) ACM SIGMETRICS'99 International Conference on Measurement and Modeling of Computer Systems, Atlanta, 1999
 - (f) 19th International Conference on Distributed Computing Systems (ICDCS)

- (g) ACM/SPIE Multimedia Computing and Networking (MMCN), 1999
 - (h) International Symposium on Broadband European Networks, Switzerland, May 1998
 - (i) ACM/SPIE Multimedia Computing and Networking (MMCN), 1998
 - (j) 1997 IEEE Real-time Technology and Applications Symposium (RTAS'97)
 - (k) International Workshop on Network and Operating System Support for Digital Audio and Video, 1997 (NOSSDAV'97)
 - (l) IEEE International Performance, Computing, and Communications Conference, 1997
 - (m) Electronic Imaging and Multimedia Systems, Beijing, China, November 1996
 - (n) 4th Eurographics Workshop on Multimedia, Rostock, Germany, May 1996
 - (o) Second International Conference on Distributed Multimedia Systems and Applications, Palo Alto, California, August 1995
 - (p) Third International Eurographics Symposium on Multimedia Systems, Austria, May 1994
25. **Session Chair**, (1) IEEE International Conference on Multimedia Computing and Systems, Washington D.C., May 1995; (2) ACM Multimedia'95, San Francisco, November 1995; and (3) Multimedia Computing and Networking 1996 (MMCN96), San Jose, California
 26. **Panelist**, ACM Multimedia workshop on Programming Abstractions for Distributed Multimedia Applications, Anaheim, August 1993
 27. **Local Arrangements Chair**, Third International Workshop on Networking and Operating System Support for Digital Audio and Video, San Diego, November 12-13, 1992
 28. **Reviewer** for a large number of conferences and journals, including ACM Transactions on Software Engineering, IEEE Computer, IEEE Transactions on Knowledge and Data Engineering, Computer Networks and ISDN systems, Software Practice and Experience, SIGMETRICS'94, PODS'93, Globecom'92, CSCW'92, Third International Workshop on Network and Operating System Support for Digital Audio and Video, Computer Communications, IEEE Multimedia, ACM Multimedia'94, ACM Multimedia'95, ACM Multimedia'96, ACM Multimedia'97, IEEE Journal on Selected Areas in Communications, Third International Eurographics Symposium on Multimedia Systems, Journal of Inter-networking Research and Experience, Telecommunications Systems: Modeling, Analysis, Design, and Implementation, and ACM SIGMETRICS'94, International Parallel Processing Symposium'95, International Conference on Multimedia Computing and Systems'95 (ICMCS'95), Fault-Tolerant Computing Systems 1996 (FTCS'96), IBM Systems Journal, NOSSDAV'97, and the National Science Foundation.

Recent Invited Talks, Tutorials, and Seminars

1. "Shangri-La: A Programming Environment for Network Systems," Intel Architecture Laboratories, Hillsboro, OR, August 2002.
2. "Scalable Network Architectures for Providing Per-flow Service Guarantees," Intel IXA University Workshop, June 2002.
3. "Fundamental Problems in Designing Differentiated Services Networks," Invited Lecture, Intel Architecture Laboratories, Hillsboro, OR, February 2000
4. "System Support for Next-generation Distributed Applications," Invited Lecture, Intel Architecture Laboratories, October 1999
5. "Design Considerations for Scalable Web Infrastructure," Tutorial, presented at the IEEE Multimedia Systems'98 conference, June 1998
6. "System Support for Next-generation Distributed Applications," IBM T.J. Watson Research Center, May 1998
7. "Research in Distributed Multimedia Systems," Invited Lecture, Bell Labs Multimedia Communications Summer Workshop, June 1997

8. "Multimedia Storage Servers," Tutorial, presented at the ACM SIGMETRICS'97 conference, Seattle, June 1997.
9. "Symphony: An Integrated Multimedia File System," IBM T.J. Watson Research Center, May 1997
10. "Design Principles for Multimedia File Systems," Tutorial, presented at the ACM Multimedia'96 conference, Boston, November 1996
11. "Multimedia Storage Servers," Invited Speaker, CSI/ACM Workshop on Multimedia Systems, Bombay, India, January 1996
12. "Research Issues in Distributed Multimedia Systems," presented at the Department of Computer Science and Engineering, Indian Institute of Technology, Bombay, India; and Tata Consultancy Services, Bombay, India, January 1996
13. "An End-to-End Architecture for Distributed Multimedia Systems," *Invited Lecture Series*, Department of Computer Science, University of Houston, November 1995
14. "An Integrated System Architecture for Distributed Multimedia Servers," *Distinguished Lecture*, Department of Computer Sciences, University of British Columbia, Vancouver, April 1995
15. "Multimedia Systems Architecture," Defining the Global Information Infrastructure: Infrastructure, Systems, and Services, SPIE International Symposium on Photonics for Industrial Applications, November 1994
16. "System Support for Designing Distributed Multimedia Services," Invited Speaker, The Multimedia Symposium (sponsored by the IEEE Communications and Vehicular Technology Society and IEEE Computer Society), Dallas, TX, April 19, 1994
17. "Efficient Storage and Retrieval Techniques for Distributed Multimedia Servers," Department of Computer and Information Sciences, University of California at Santa Cruz, February 1994
18. "Algorithms for Designing Multimedia Servers," Xerox Palo Alto Research Center, June 1993
19. "Architectures and Algorithms for Designing Digital Multimedia Storage Servers," Presented at Sun Microsystems Inc., Interval Research, IBM Almaden Research Center, IBM T.J. Watson Research Center, Bellcore, Bell Labs, Matsushita Research Laboratory, ISI, University of California at Santa Barbara, Washington University in St. Louis, The University of Texas at Austin, University of Michigan, Georgia Institute of Technology, March - May 1993

Other Academic Activities

- **Student Advising**

1. Graduated 6 Ph.D. students —
 - Jasleen Kaur Sahni, Summer 2002
 - Xingang Guo, Fall 2000
 - Sriram S. Rao, Summer 1999
 - Prashant Shenoy, Summer 1998
 - Renu Tewari, Summer 1998
 - Pawan Goyal, Summer 1997
2. Supervising 8 Ph.D. students —
 - Scott Page,
 - Sergey Gorinsky,
 - Jayaram Mudigonda,
 - Sugat Jain,
 - Ravindranath Kokku,

- Benjamin Hardekopf,
Taylor Riche,
Rajeev Sudhakar
3. Supervised 10 M.A. theses —
M. Venkatachalam, Fall 2000
Balaji Balasubramanyam, Spring 1998
Edward Posnak, Spring 1997
Sundeep Abraham, Spring 1997
Kapil Gupta, Spring 1996
Manu Namboodri, Spring 1995
Bhagat Nainani, Spring 1995
Premal Shah, Spring 1995
Nagraj Kashyap, Spring 1995
Jamie Kleiner, Spring 1994
 4. Other graduate research supervision —
Taroon Mandhana, MS, Summer 2001;
Alok Kumar, MS, Summer 2001;
Saurabh Agarwal, MS, Fall 2000;
Sachin Jain, MS, Fall 2000;
T. R. Vishwanath, MS, Spring 1999;
Jian Yu, MS, Spring 1999;
Haichen Cheng, MS, Spring 1996;
Qiming Huang, MS, Spring 1996;
Tarun Anand, MS, Spring 1996;
Alok Goyal, MS, Summer 1994;
Anshuman Goyal, MS, Summer 1994
 5. Supervised 9 undergraduate honors theses —
Maciej G. Stoszko, Spring 2000;
Syed M. Amir Husain, Spring 1998;
Jin Yu, Spring 1996;
Zaijin Guan, Spring 1996;
Brian Albers (Plan II), Spring 1996;
Balaji Mohanarangan, Spring 1995;
Supreet Singh Oberoi, Spring 1995;
H. S. Lee, Spring 1994;
Mantian Zhu, Spring 1994
 6. Supervised Postdoctoral Fellow — Dr. Jonathan Kay (Ph.D., Univ. of California at San Diego), 1997-98
 7. Served as a member of several doctoral dissertation committees and Masters thesis committees.

• **Teaching:**

1. *CS 384M - Multimedia Systems*: This course was introduced in the Department of Computer Sciences during the Spring of 1994. It is an advanced systems covering both theoretical and practical issues in designing multimedia systems. Topics covered included introduction to multimedia systems, digital video compression techniques, operating system support for digital audio and video, as well as network and transport protocols for multimedia. I have taught this course in the Spring'94, Spring'95, Fall'96, Fall'97, Fall'98, Fall'99 and Fall'01 semesters.

2. *CS 380L - Advanced Operating Systems*: This is a graduate level operating systems course. Topics covered in the course include: design and implementation of distributed and real-time operating systems, system support for mobile/wireless computing environments, and some case studies. I taught this course in the Fall'93 and Fall'94 semesters.
3. *CS 395T - Network Design and Implementation*: Introduced in the Spring'01 semester, the goal of this course is to learn about network design, implementation, and evaluation using routers that utilize programmable network processors. Teams of students engaged in the design, implementation, and evaluation a network protocol or a router feature. The network infrastructure consists of a collection of programmable routers based on the Intel IXP1200 packet processor.
4. *CS 395T - Consistent O-administration Personal Environments*: Co-taught with Lorenzo Alvisi and Michael Dahlin, this course was introduced in the Spring'00 semester. We considered issues that arise when individuals own, interact with, and manage dozens of information access devices (or information appliances). The topics covered in this course include distributed state maintenance; resource discovery and directory services; security and authentication; mobile networking; and fault tolerance.
5. *CS 395T - Topics in Multimedia Communication and Databases*: This course was introduced during the Fall 1995 semester. The topics discussed in this course include: transport protocol design for multimedia, routing and multicasting, mobile networking and multimedia, operating system support for multimedia, and multimedia databases. I have taught this course in the Fall'95, Spring'98 and Spring'99 semesters.
6. *CS372 - Introduction to Operating Systems*: I am teaching this upper-division Computer Science course in the Spring 2003 semester. I have previously taught CS372 in the Spring and Fall 2001 semesters.
7. *CS352 - Computer Architecture*: This is an upper-division Computer Science course, which I taught in the Spring 1998, 1999, and 2000 semesters.
8. *CS 315 - Data Structures*: This is a lower-division Computer Sciences course, which I taught in Spring 1996.

- **Departmental and University Committees**

1. 2002-2003: Faculty Recruiting, Chair Recruiting
2. 2001-2002: Faculty Recruiting, CISE (chair)
3. 2000-2001: Faculty Recruiting, CISE (chair)
4. 1999-2000: Faculty Recruiting, Ad-hoc Committee for CS396 (chair), CISE, and Undergraduate Advising
5. 1998-1999: Faculty Recruiting, Faculty Evaluation, and CISE Committees
6. 1997-1998: Faculty Recruiting and CISE Committee
7. 1996-1997: Industrial Relations and CISE Committees
8. 1995-1996:
 - (a) Department: Industrial Relations and Space Committees
 - (b) University: DISC Multimedia Instruction Committee (MIC), Telecommunications and Distance Education Committee, and its Future Needs sub-committee
9. 1994-1995: Computer Science Industrial Forum (CSIF'95) and Graduate Admissions Committees.
10. 1993-1994: Library/Technical Reports Committee.