

CURRICULUM VITAE

Vijay Kumar

Professor

**Computer Science Electrical Engineering
School of Computing and Engineering (SCE)**

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EMPLOYMENT

Date	Position Held
2002 –	Professor. Computer Science, University of Missouri-Kansas City, U.S.A.
1990 – 2002	Associate Prof. Computer Science, University of Missouri-Kansas City, U.S.A.
1986 – 1990	Asst. Prof. Computer Science., University of Missouri-Kansas City, U.S.A.
1985 – 1986	Asst. Prof. Dept. of Math. and Comp. Sc., Univ. of Massachusetts, Boston, U.S.A.
1983 – 1985	Asst. Professor. Dept. of CIS, Cleveland State Univ., Cleveland, Ohio, U.S.A.
1975 – 1982	Sr. Syst. Eng. Data Processing, International Computers Ltd., Bracknell, U.K.
1973 – 1974	Research Asst. Dept. of Computer Science, Bristol Poly., U.K.
1971 – 1972	Lecturer (Asst. Professor). Dept. of Physics, Ranchi University, India.
1970 – 1971	Research Fellow. CSIR, National Metallurgical Lab., Jamshedpur, India.

Honors and Special Recognition

- System Software Development Award, International Computers Limited, England, 1975.
- Fulbright Senior Specialist in Information Technology: May 2003 –
Delivered seminars and invited talks at Charles University, University of West Bohemia in Pilsen, Masaryk University, Technical University of Brno, University of Technology at Liberec, and the Institute of Computer Science Academy of Sciences in Czech Republic.

Educational Record

Date	Institution	Degree
1967	Ranchi University, India	B. Sc. (Physics Honors)
1969	Ranchi University, India	M. Sc. (Crystallography)
1973	Cambridge University, Cambridge, U.K.	Grad. Diploma (Computer Sc.)
1975	Manchester University, Manchester, U.K.	M. Sc. (Computer Sc.)
1983	Southampton University, Southampton, U.K.	Ph. D. (Computer Sc.)

PUBLICATIONS AND RESEARCH ACTIVITIES

Refereed Journal Papers

1. Debopam Acharya, Vijay Kumar Gary M. Gaddis, and Nicholas Garvin, "SAVE: A Wireless Java Enabled Automobile Accident Reporting System," *International Journal of Intelligent Defense Support Systems*, Vol. 1, No. 3, 2008.
2. Sanjay K. Madria, M. Baseer, Vijay Kumar, and Sourav Bhowmick, "A Multiversion Transaction Model and Concurrency Control Mechanism For Mobile Database Systems", *Parallel and Distributed Databases*, Vol. 22, No. 2-3, December, 2007, pp: 165-196.
3. Vijay Kumar and Debopam Acharya. "Web Bazaar: A Location-Dependent Secured Mobile Web Service System", Special Issue of the Journal *Revue Ingénierie des Systèmes d'information Networking and Information Systems*, July 2005.
4. Debopam Acharya and Vijay Kumar. "Indexing Location Dependent Data in Broadcast Environment", *Journal of Digital Information Management (JDIM)*, Vol. 3, Issue 2, June 2005.
5. Debopam Acharya, Vijay Kumar and Margaret H. Dunham, "InfoSpace: Hybrid and Adaptive Public Data Dissemination System for Ubiquitous Computing", Accepted for publication in the Special issue on Pervasive Computing of *Wireless Communications and Mobile Computing*, John Wiley.
6. Vijay Kumar, Margaret H. Dunham and Nitin Prabhu, "A Mobile Transaction Framework Supporting Spatial Replication and Spatial Consistency", *Special Issue on Mobile Databases International Journal of Computer Systems Science & Engineering*. Vol. 20, No 2. March 2005.
7. Dharma P. Agrawal, Mingming Lu, Tim C. Keener, Ming Dong, and Vijay Kumar, "Exploiting the use of Wireless Sensor Networks for Environmental Monitoring", *Journal of the Environmental Management*, May 2004.
8. Rajgopal Kannan, Ram Kalindini, Sitharam Iyengar, and Vijay Kumar, "Energy and Rate Based MAC Protocol for Wireless Sensor Networks", *ACM Sigmod Record*, Dec. 03, pp: 60-65.
9. Vijay Kumar, "Sensor: The Atomic Computing Particle", *ACM Sigmod Record*, December 2003, pp: 16-21.
10. Sashidhar Gadiraju, Vijay Kumar, and Maggie Dunham, "Recovery in the Mobile Wireless Environment Using Mobile Agents", *IEEE Transactions on Mobile Computing*, Vol. 3, No. 2, April-June 2004, pp: 180-191.
11. Qun Ren, Maggie Dunham, and Vijay Kumar, "Semantic Caching and Query Processing". *IEEE Transactions on Knowledge and Data Engineering*, Vol. 15, No. 1, January/February 2003, pp 192-210.
12. Vijay Kumar, Nitin Prabhu, Maggie Dunham, and Yasemin A. Seydim, "TCOT - A Timeout-based Mobile Transaction Commitment Protocol", *Special issue of IEEE Transaction on Computers*, Vol. 51, No. 10, Oct. 2002, pp: 1212-1218.

13. Vijay Kumar and Narayan Gaddipati, "An Efficient CCM KRISHNA for High Contention Environment and its Performance Comparison with WDL". *Data and Knowledge Engineering*, Vol. 34, 2000, pp: 39-76.
14. Anindya Datta, Sang Son, and Vijay Kumar, "Is a Bird in Hand Worth More than Two in the Bush? Limitations of Priority Cognizance in Conflict Resolution for Firm Real Time Database Systems". *IEEE Transactions on Computers*, Vol. 49, No. 5, May 2000, pp: 482-502.
15. Anindya Datta, Ashlihan Celik, Debra E. VanderMeer and V. Kumar, "Adaptive Broadcast Protocols to Support Efficient and Energy Conserving Retrieval from databases in Mobile Computing Environments". *ACM Transactions on Database Systems (TODS)*, Vol. 24, No. 1, March 1999, pp: 1-79.
16. Albert Burger, Vijay Kumar and Mary Lou Hines, "Performance of Multiversion and Distributed Two-Phase locking Concurrency Control Mechanisms in Distributed Databases". *Information Sciences*, Vol. 1-2, 1997, pp: 129-152.
17. V. Kumar, "KRISHNA - An efficient CCM based on Dynamic Attributes of Transactions and its Performance", *Data and Knowledge Engineering*. Vol. 21, 1997, pp: 281-296.
18. V. Kumar and Shawn Moe, "Performance of Recovery Algorithms for Centralized database Management Systems", *Information Sciences*, An International Journal, Vol. 86, Nos. 1-3, September 1995, pp: 101-147.
19. Vijay Kumar and Judy Mullins, "An Integrated Data Structure with Multiple Access Paths for Database Systems and its Performance", *Data and Knowledge Engineering*, 16 (1995), pp: 51-72.
20. Aris Ouksel, V. Kumar and Chayanika Majumdar, "Management of Concurrency in Interpolation Based Grid File Organization and its Performance", *Information Sciences*, An International Journal, Vol. 78, Nos. 1 and 2, May 1994, pp: 129-158.
21. V. Kumar and Albert Burger, "Performance of Distributed Multiversion Concurrency Control Mechanisms in Partitioned and Partially Replicated Databases", *Computer Science and Informatics*, Vol 23, No. 1, 1993, pp: 47-58.
22. V. Kumar and Albert Burger, "Performance Measurement of Main Memory Database Recovery Algorithms Based on Update-in-Place and Shadow Approaches", Special Issue of *IEEE Trans on Knowledge and Data Eng.*, Vol. 4, No. 6, Dec. 1992, pp: 567-571.
23. V. Kumar, Jerry Place and Gi-Chul Yang, "An Efficient Algorithm for Mutual Exclusion using Queue Migration in Computer Network", *IEEE Trans on Knowledge and Data Engineering*, Vol. 3, No. 3, Sep. 1991, pp: 380-384.
24. V. Kumar and M. Hsu "A Superior Two-Phase Locking Algorithm and its Performance", *Information Sciences*, An International Journal, Vol. 54, No. 1, 2., 1991, pp: 147-168.
25. V. Kumar, "Concurrent Operations on Extendible Hashing and its Performance", *Communications of the ACM*, Vol. 33, No. 6, June 1990, pp: 681- 694.
26. Jerry Place, V. Kumar and Appie van de Liefvoort, "The Behavior of Database Concurrency Control Mechanisms under Bursty Arrivals", *Springer Lecture Notes in Computer Science*, No. 468, Edited by S.G. Akl, F. Fiala and W.W. Koczkodaj, 1990, pp:

27. V. Kumar, "Performance Comparison of Some Database Concurrency Control Mechanisms based on Two-Phase Locking, Timestamping and Mixed Approach", *Information Sciences*, Vol. 51, No. 3, 1990, pp: 221-261.
28. V. Kumar, "Concurrency Control and Recovery in Main Memory Database Systems", *The Journal of Computer Information Systems*, Vol. 34, No. 1, 1990, pp: 24-30.
29. V. Kumar, "Current Trends in Transaction Processing Systems", *Journal of Systems Management*, January 1990, pp: 10-20.
30. V. Kumar, "Concurrency on extendible Hashing", *Information Processing Letters*, Vol. 30, No. 6, April 1989, pp: 35-41.
31. V. Kumar, "Behavior of Read:Write Ratio and Read-Only Transactions", *Information Systems*, Vol. 14, No. 1., 1989, pp: 1-12.
32. V. Kumar, "Synchronization and Recovery in Database Systems", *Infotech State of the Art Reports*, England, Series 9, No. 8, 1981, pp: 469-481.

National and International Refereed Conferences and Workshops

1. Debargh Acharya, Vijay Kumar and Debopam Acharya, "DVD: A Secure Unicast based Pairwise Key Generation Scheme for Wireless Sensor Networks", *The Second International Conference on Sensor Technologies and Applications (SENSORCOMM 2008)*, August 25-31, 2008 - Cap Esterel, France.
2. Debopam Acharya, Vijay Kumar, Nicholas Garvin, Ardian Greca and Gary M. Gaddis, "A Sun SPOT based Automatic Vehicular Accident Notification System," *5th IEEE International Conference on Information Technology and Applications in Biomedicine (ITAB 2008)*, 30- 31 May, 2008, Shenzhen, China.
3. Debopam Acharya, Vijay Kumar, "DataMall: A Mobile Broadcasting Environment for location dependent data with provision for Secure Mobile Transactions," *International Conference on Communication Convergence and Broadband Networking (ICCBN-2008)*, Bangalore, India, July 17-19, 2008..
4. Debopam Acharya, Vijay Kumar, and Gary M. Gaddis, "A Mobile System for Detecting and Notifying Vehicle Rollover Events". *15th International Conference on Advanced Computing & Communication (ADCOM 2007)*, December, 18 - 21, 2007, Guwahati, India.
5. Evens Jean, Yu Jiao, Ali R. Hurson, and Vijay Kumar, "Pushing Sensor Network Computation to the Edge while Enabling Inter-Network Operability and Securing Agents." *The Third International Innovations and Real-time Applications of Distributed Sensor Networks (DSN) Symposium* <http://www.ira-dsn.org/> November 26-27, 2007. Shreveport, Louisiana.
6. Margaret H. Dunham and Vijay Kumar, "Stream Hierarchy Data Mining for Sensor Data." *The Third International Innovations and Real-time Applications of Distributed Sensor Networks (DSN) Symposium* <http://www.ira-dsn.org/> November 26-27, 2007. Shreveport, Louisiana.

7. Vijay Kumar, "Sensor Mining in a Massive Wireless Sensor Network", *MobiSensor NSF Workshop*, University of Pittsburgh, Pittsburgh, January 15-17, 2007.
8. Vijay Kumar, "Sensor Mining", *The 2nd International Symposium on Innovations and Real-Time Applications of Distributed Sensor Networks*, Embassy Suites, Crystal City, Washington DC, USA October 16-17, 2006.
9. Debopam Acharya, Vijay Kumar, and Gi-Chul Yang, "DAYS Mobile: A Location based Data Broadcast Service for Mobile Users". *The 22nd ACM Symposium on Applied Computing*, Seoul, Korea, March 11-15, 2007.
10. V. Kumar, "Trust and Security in Mobile Peer-to-Peer Systems (Invited paper)," *3rd International Workshop on P2P Data Management, Security and Trust (PDMST'06)* in conjunction with the 17th International Conference on Database and Expert Systems Applications (DEXA'2006), Krakow, Poland, September 4 – 8, 2006.
11. V. Kumar, "Security in Location Dependent Transactions on Web Services," (Invited Paper), *IEEE Workshop on Distributed Systems and Networks*, Bern, Switzerland, in Cooperation with: University of Bern and Purdue University, May 9, 2006.
12. Debopam Acharya and Vijay Kumar, "Location based Indexing Scheme for DAYS," *4th International ACM Workshop on Data Engineering for Wireless and Mobile Access (MobiDE'05)*, in conjunction with SIGMOD 2005, June 12, 2005, in Baltimore, Maryland, USA.
13. Nitin Prabhu and Vijay Kumar, "Data Scheduling for Multi-item and Transactional Requests in On-demand Broadcast," *The 6th International Conference on Mobile Data Management (MDM'05)*, Ayia Napa, Cyprus, May 9-13, 2005.
14. Vijay Kumar, "Data in Your Space", (Keynote Paper), *1st International Conference on Distributed Computing and Internet Technology (ICDCIT04)*, Bhubaneswar, Dec. 22-24, India, 2004.
15. Vijay Kumar, Nitin Prabhu, and Panos K. Chrysanthis, "HDC – Hot Data Caching in Mobile Database Systems", *The 3rd ACS/IEEE International Conference on Computer Systems and Applications (AICCSA-05)*, Cairo, Egypt, January 3-6, 2005.
16. Terry Bearly and Vijay Kumar, "Expanding Trust Beyond Reputation in Peer-To-Peer Systems", *15th International Workshop on Database and Expert Systems Applications (DEXA 2004)*, 30 August - 3 September 2004, Zaragoza, Spain.
17. Nitin Prabhu, Debopam Acharya, Vijay Kumar "Discovering and Using Web Services in M-Commerce", *VLDB Workshop on Technologies for E-Services (TES-04) in conjunction with 30th International Conference on Very Large Data Bases (VLDB 2004)*, Toronto, Canada, August 30 - September 1, 2004.
18. Nitin Prabhu, Vijay Kumar, and Indrakshi Ray, "Periodic scheduling in on-demand broadcast system", *3rd Int. Conf. On Information Systems Technology and its Applications (ISTA04)*, Salt Lake City, Utah, USA, July 14-16, 2004.
19. Indrakshi Ray, Monte Lunacek, Ross M. McConnell, Vijay Kumar, "Reducing Damage Assessment Latency in Survivable Databases", *21st British National Conference on Databases*, 7th - 9th July 2004, Edinburgh, UK.

20. Nitin Prabhu, Vijay Kumar, Indrakshi Ray, and Gi-Chul Yang, "Concurrency Control in Mobile Database Systems", *The 18th International Conference on Advanced Information Networking and Applications (AINA 2004)*, Fukuoka Institute of Technology (FIT), Fukuoka, Japan, March 29 - March 31, 2004.
21. Vijay Kumar, (Invited paper) "Integration, Diffusion and Merging in Information Management Discipline", *30th Anniversary Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2004)*, January 24-30, 2004, Czech Republic.
22. Nimisha Garg, Vijay Kumar, and Maggie H. Dunham, "Information Mapping and Indexing in DAYS", *6th International Workshop on Mobility in Databases and Distributed Systems, in conjunction with the 14th International Conference on Database and Expert Systems Applications (DEXA'2003)* September 1-5, 2003 Prague, Czech Republic.
23. Chaitanya Garikiparthi, Vijay Kumar, and Sharma Chakravarthy, "A Multi-level Scheme for Web Security", *6th International Conf. on High Performance Computing (ASIA 2002)*, Dec. 16-19, 2002, Bangalore, India.
24. Deendayal Dinakarandian and Vijay Kumar, "BIOMIND-Protein Property Prediction by Property Proximity Profiles", *17th ACM Symp. on Applied Computing (SAC) 2002*. March 10-14, 2002, Madrid, Spain.
25. Vinode Vulupala and Vijay Kumar, "Dynamic Mobile IP for Improving TCP/IP Performance", Workshop on Reliable and Secure Applications in Mobile Environment, In conjunction with 20th IEEE Symposium on Reliable Distributed Systems SRDS'2001, New Orleans, October 28-31, 2001.
26. Ayse Seyedim, Maggie Dunham, and Vijay Kumar, "An Architecture for Location Dependent Query Processing", 4th Int. Workshop on Mobility in Databases and Distributed Systems, Technical University of Munich, Germany, September 3-7, 2001.
27. Vinode Vulupulla and Vijay Kumar, "Mobile IP", *4th World Multiconference on Systematic, Cybernetics, and Informatics (SCI2001)*, Orlando, Florida, July 22-25, 2001, pp: 352-360.
28. Kiran Chelluri and Vijay Kumar, (Invited paper), "Data Classification and Management in Very Large Data Warehouses", 3rd Int. Workshop on Advanced Issues of E-commerce and Web-based Information Systems, San Jose, California, June 21-22, 2001, pp: 52-57.
29. M. Dunham, A. Al-Mogren, A. Seydim, and Vijay Kumar, "Data in Your Space", (Invited Paper), 3rd Int. Workshop on Advanced Issues of E-commerce and Web-based Information Systems, San Jose, California, June 21-22, 2001, pp: 66-73.
30. Yasemin Seydim, Margaret Dunham, and Vijay Kumar, "Location Dependent Query Processing", *2nd ACM Int. Workshop on Data Engineering for Wireless and Mobile Access (MOBIDE01)*, Santa Barbara, May 20, 2001, pp: 47-53.
31. Mukesh Mohania, Vijay Kumar, (Invited paper) Yahiko Kambayashi, and Bharat Bhargava, "Secured Web Access", *International conference on Digital Libraries*, Kyoto, Japan, No. 13-17, 2000, pp: 182-189.

32. Vijay Kumar, "A Timeout-based Mobile Transaction Commitment Protocol", *2000 ADBIS-DASFAA Symposium on Advances in Databases and Information Systems*, Springer Verlag Lecture Notes in Computer Science No. 1884. In Cooperation with ACM SIGMOD, Moscow, Prague, Czech Republic, September 5-8, 2000, pp: 339-345.
33. S. K. Madria, Bharat Bhargava, E. Pitoura, and Vijay Kumar, "Data Organization Issues for Location-Dependent Queries in Mobile Computing", *2000 ADBIS-DASFAA Symposium on Advances in Databases and Information Systems*. Springer Verlag Lecture Notes in Computer Science No. 1884. In Cooperation with ACM SIGMOD, Moscow, Prague, Czech Republic, September 5-8, 2000, pp: 142-156.
34. Lein Harn, H.-Y Lin, and Vijay Kumar, "A fair E-lottery without the assistance of a mutually trusted drawing party", *Proc. of the 10th National Conference on Information Security Information Security Conference*, Taiwan, May 5-6, 2000, pp: 323-336.
35. Kalpana Dash, R. B. Mohapatra, and Vijay Kumar, "A Transaction Processing Model for Mobile Computing Environment", *Conference on Information Technology*, Bhubaneswar, India, Dec. 20-22, 1999, pp: 15-25.
36. Sunil Samtani, Vijay Kumar, and Mukesh Mohania, "Self Maintenance of Multiple Views in Data Warehousing", *8th International Conf. on Information and Knowledge Management (CIKM '99)*, Kansas City, MO, November 2-6, 1999, pp: 292-299.
37. Vijay Kumar, "Challenges and Opportunities in the Management of Location Dependent Data and Transaction Processing in Mobile Databases", (A panel and discussion paper), *Int. Workshop on Mobility in Databases and Distributed Systems (MDDS99)*, Florence, Italy, September 3, 1999, pp: 5-6.
38. Margaret Dunham and Vijay Kumar, "Impact of Mobility on Transaction Management", *Int. Workshop on Data Engineering for Wireless and Mobile Access (MobiDE99)*, Seattle, Washington, August 20, 1999, pp: 14-21.
39. Sunil Samtani, Mukesh Mohania, Vijay Kumar, and Yahiko Kambayashi, "Recent Advances and Research Problems in Data Warehousing", *Int. Workshop on Data Warehousing and Data Mining (ER '98)*, Singapore, Nov. 1998, pp: 81-92.
40. Margaret H. Dunham, and Vijay Kumar, "Location Dependent Data and its Management in Mobile Databases", *Proc. of the Ninth Workshop of Database and Expert Systems Applications (DEXA'98)*, Vienna, Austria, August 26-28, 1998, pp: 549-555.
41. Sunil Samtani and Vijay Kumar, "Maintaining Consistency in Partially Self-Maintainable Views at the data Warehouse", *Int. Workshop on Data Warehouse Design and OLAP Technology (DWDOT' 98)*, Vienna, Austria, August 26-28, 1998, pp: 206-211.
42. Invited Paper: Vijay Kumar, "Gharelu Vidyapeeth: An Educational Institution on the Air", *Int. Conference on Technical Education in 21st Century (ICTE-21)*, Indore, India, January 8-10, 1998, pp: 22-32.
43. Yutong Wang and Vijay Kumar, "Performance of Main Memory Recovery Algorithms", *9th international Conference on Management of Data (COMAD 97)*, Calcutta, India, 1997, pp: 55-63.

44. Raju V. J. Chintalapati, Vijay Kumar and Anindya Datta, "An Adaptive Location Management Algorithm for Mobile Computing", *22nd Annual Conference on Local Computer Networks (LCN '97)*, Minneapolis, Minnesota, Nov. 2-5, 1997, pp: 107-114.
45. Anindya Datta, Igor R. Viguier, Sang H. Son and Vijay Kumar, "A Study of Priority Cognizance in Conflict Resolution for Firm Real Time Database Systems", Second International Workshop on Real-Time Databases, RTDB'97, September 18-19, 1997, Burlington, Vermont, USA. The paper also appeared in Azer Bestavros and Victor Fay Wolfe (eds.) *Real-Time and Database and Information Systems - Research Advances*, Azer Bestavros and Victor Fay Wolfe (eds.), pp: 167-180.
46. Anindya Datta, Aslihan Celik, Jeong G. Kim, Debra E. VanderMeer and Vijay Kumar, "Adaptive Broadcast Protocols to Support Efficient and Energy Conserving Retrieval from Databases in Mobile Computing Environments", *13th IEEE International Conf. on Data Engineering (ICDE '97)*, Birmingham, England, April 7-11, 1997, pp: 124-133.
47. V. Kumar, "Recovery in Main Memory Database Systems", *7th International Conference on Database and Expert Systems Applications (DEXA 96)*, Zurich, Switzerland, September, 1996, pp: 768-778.
48. Hung-Yu Lin, Lein Harn and V. Kumar, "Authentication Protocols in Wireless Communications", *International Conference on Automation*, Indore, India, Dec. 12-14, 1995, pp: 49-57.
49. V. Kumar, "An Efficient Algorithm for Managing Concurrent Operations on Data Using Dynamic Attributes of Transactions", *5th International Conference on Management of Data (COMAD '93)*, Calcutta, India, pp: 68-95.
50. V. Kumar and Judy Mullins, "An Integrated data Structure with Multiple Access Paths for Database Systems and its Performance", *IEEE COMPSAC*, Phoenix, Arizona, April, 1993, pp: 241-247.
51. V. Kumar and Albert Burger, "Performance Measurement of Distributed Concurrency Control Mechanisms with Object-Oriented Simulation Approach", The 23rd Annual Pittsburgh Conference on Modeling and Simulation, Pittsburgh, May 1992.
52. V. Kumar and Judy Mullins, "An Integrated data Structure with Multiple Access Paths for Database Systems", *ACM Annual Computer Science Conference*, Kansas City, Missouri, March 3-5, 1992, pp: 57-64.
53. V. Kumar and Albert Burger, "Performance Measurement of Some main Memory Database Recovery Algorithms", *7th IEEE International Conference on Data Engineering*, Kobe, Japan, 1991, pp: 436-443.
54. V. Kumar and James Mumper, "KRISHNA - Concurrency Control Algorithms based on Dynamic Attributes", *2nd International Conference on Database and Expert Systems Applications (DEXA 91)*, Berlin, Germany, 1991, pp: 185-190.
55. Margaret Easter and V. Kumar, "Extendible hashing for Distributed database Systems", *2nd International Conference of the Information Resource Management Association*, Memphis, Tennessee, 1991, pp: 124-131.

56. Albert Burger, V. Kumar and Pat Simpson, "An Integrated Data Structure with Multiple Access Paths", *IFIP WG 2.6, 2nd Conference on Visual Database Systems*, Budapest, Hungary 1991, pp: 301-315.
57. V. Kumar and Albert Burger, "Main Memory Database Recovery Algorithms and their Performance", *2nd IEEE Symposium on Parallel and Distributed Processing*, Dallas, TX, December 1990, pp: 152-155.
58. B. Unger, L. Harn and V. Kumar, "Entropy as a measure of database information", *6th Annual Computer Security Applications*, April, 1990, pp: 80-87.
59. Albert Burger and V. Kumar, "PRABHA- A distributed concurrency control mechanism", *ACM Annual Computer Science Conference*, Washington, D.C., February 20-22, 1990, pp: 392-397.
60. V. Kumar, Jerry Place and Appie van de Liefvoort, "The behavior of database Concurrency control mechanisms under bursty traffic", *International Conference on Computing and Information, ICCI'90*, Toronto, Canada, May, 1990, pp: 250-254.
61. V. Kumar and Albert Burger, "Recovery in Main Memory Systems", *Int. Conference on Computing and Information, ICCI'90*, Toronto, Canada, May, 1990, pp: 215-220.
62. V. Kumar, Gi-Chul Yang and Jerry Place "A Superior Algorithm for Mutual Exclusion in Computer Networks-VISHNU", *IFIP 11th World Computer Congress*, San Jose, CA, August, 1989, pp: 169-174.
63. V. Kumar, Gi-Chul Yang and Jerry Place, "An Efficient Algorithm for Mutual Exclusion in Distributed Systems", *ACM/IEEE Workshop on Applied Computing*, Stillwater, OK, August, 1989.
64. V. Kumar and Lingling Polican, "Managing Concurrent Transactions on Extendible Hashing", *ACM/IEEE Workshop on Applied Computing*, Stillwater, OK, August 1989.
65. V. Kumar, Al Goerner, Jerry Place and Appie van de Liefvoort, "Database Concurrency Control Algorithms and Stochastic Predicate Event Nets", *International Conference on Computing and Information, ICCI'89*, Toronto, Canada, July, 1989, pp: 135-138.
66. V. Kumar, Alan Goerner, Jerry Place and Appie van de liefvoort, "Stochastic Predicate Event Nets for Modeling Database Concurrency Control Mechanisms", *ACM/IEEE Workshop on Applied Computing*, Stillwater, OK, June 1989, pp: 210-215.
67. V. Kumar, "A Concurrency Control Mechanism based on Extendible Hashing for Main Memory Database Systems", *ACM Annual Computer Sci. Conf*, Louisville, Kentucky, February 21-23, 1989, pp: 109-113.
68. Gi-Chul Yang, Jerry Place, and V. Kumar, "A Floating Queue Algorithm for Mutual Exclusion in Computer Networks", *International, Computer Symp. (ICS'88)*, Taipei, Taiwan, December 1988, pp: 1022-1030.
69. V. Kumar and Jerry Place, "An Analysis of the Behavior of a New Non-Preemptive Two-Phase Locking Mechanism Using an Open Queuing Network", *National Conf. of Decision Science Institute*, Las Vegas, August, 1988, pp: 45-51.

70. V. Kumar, "An Analysis of Roll-Back and Blocking Operations of Three Concurrency Control Mechanisms", AFIP Conf. Proceedings 56, *National Computer Conference*, Chicago, May 1987, pp: 485-497.
71. V. Kumar, "Two-Phase Locking Schemes and Read-Only Transactions", *National Conference of Decision Science Institute*, Boston, September 1987.
72. V. Kumar and Prashant Palvia, "Physical Database Design to Improve Concurrency", *SE Decision Science Institute Conference*, Richmond, Virginia, July, 1987, pp: 81-91.
73. V. Kumar, "Transaction Roll-Back and Blocking, and Read-Only Transactions" *North American Conference International Business School Computer User Group*, Flint, Michigan, May 1987.

RESEARCH FUNDING AND GRANTS

NSF

1. Collaborative Research in Location Dependent Data Management
 PI: Vijay Kumar (Project leader), University of Missouri-Kansas City.
 Amount: \$184,354.
 PI: Maggie Dunham, Southern Methodist University.
 Amount: \$180,000.
 Status: Funded.
 Duration: 3 years. October 1999 to September 2001.
 Total amount: \$360,354.
2. Collaborative Research in Location Dependent Data Management
 PI: Vijay Kumar.
 Funding: REU (Research Experience for Undergraduate).
 Amount: \$12,000.
3. Collaborative Research in DAYS - Data in Your Space
 PI: Vijay Kumar (Project leader), University of Missouri-Kansas City.
 Amount: \$160,000.
 PI: Maggie Dunham, Southern Methodist University.
 Amount: \$120,000.
 Status: Funding approved.
 Duration: 3 years. August 2002 to July 2005.
 Total amount: \$280,000.

NSF Workshop

1. Workshop on Context-Aware, Mobile Database Management (CAMM)
 PI: Vijay Kumar (University of Missouri-Kansas City).
 Co-PI: Stan Zdonik (Brown University).
 Funding Agency: NSF.
 Result: Funded.
 Amount: \$35,000.

Industry Grants

1. Topic: Main Memory Database Systems

Amount: \$107,534. Duration: 2 Years. Dates: 1987- 1989.

Funding Agency: United Telecom Inc.

Topic: Integrated Data Structure with Multiple Access Paths

Amount: \$32,000. Duration: 2 years.

Funding Agency: Consortium for Advance Technology, CSTP, UMKC.

2. HP-Labs research award (1999). Research topic: Workflow on mobile web.
Amount: \$5,000.
Funding Agency: HP-Labs.
3. HP-Labs research award (2000). Research topic: Mobile computing.
Amount: \$5,000.
Funding Agency: HP-Labs.
4. St. Lukes research grant (2005). Research topic: Design and development of an wireless event notification system (NOW – Notification On Wireless).
Amount: \$6,890 (one year).
Funding agency: St. Lukes Research Division.

UMKC and UM Research Board Grants

1. Topic: Performance measurement of Concurrency Control Mechanisms for DBMS
Amount: \$4,000
Funding Agency: UMKC Faculty Research Grant
2. Topic: Design, Development and Implementation of Recovery Algorithms for Main Memory Database
Amount: \$40,000
Duration: 22 months (1994-1996)
Funding Agency: University Research Board
3. Topic: Design, Development and Implementation of Recovery Algorithms for Main Memory Database
Amount: \$17,385
Duration: 12 months (1996-1997)
Funding Agency: University Research Board.

Books

1. Performance of Concurrency Control Mechanisms for Centralized Database Systems
Editor: Vijay Kumar.
Publisher: Prentice Hall, May 1996.
ISBN: 0-13-065442-6.
2. Recovery Mechanism in Database Systems
Editors: Vijay Kumar and Mei Hsu.
Publisher: Prentice-Hall, January 1998. (Being translated in five other languages.)
ISBN: 0-13-614215-X.
3. Database Recovery
Authors: Vijay Kumar and Sang S. Son.
Publisher: Kluwer International, 1998.
ISBN: 0-7923-8192-0.

4. Mobile Database Management Systems
Author: Vijay Kumar
Publisher: John Wiley and Sons, 2006
ISBN: 0-471-46792-8.

Book Chapters

1. “A Study of Priority Cognizance in Conflict Resolution for Firm Real Time Database Systems,” Azer Bestavros and Victor Fay Wolfe (Eds.) Real-Time and Database and Information Systems - Research Advances.
2. “Concurrency Control Mechanisms in Distributed Database Systems,”
Encyclopedia of Distributed Computing,
Partha Dasgupta and Joseph E. Urban (Eds.), Kluwer.
5. Building Trust and Security in Peer-to-Peer System, in Security in Decentralized Data Management. Ting Yu and Sushil Jajodia (Eds). Springer Verlag.

Research Areas

I collaborate with a number other researchers from industry such as HP-Labs, ABC Virtual, etc., and universities such as Pittsburgh, Southern Methodist, University of Missouri, Columbia, Georgia Tech, Purdue University, etc. Most of these research projects are funded by NSF, Industry, and University of Missouri system.

1. Location Dependent Data Dissemination through Wireless Channels

This is a NSF funded collaborative project with Southern Methodist University. The objective of this project is to investigate and develop efficient schemes for data dissemination on wireless channels. We have developed a dissemination scheme which integrates Push and Pull approaches to minimize latency and improve dissemination frequency. We call our system “Infospace” which uses “Data Staging” to provide continuous data availability. We have proposed and used the idea of “Surrogate” (a kind of mobile hardware cache) in “Infospace” to store current and future data requirements. We are in the process of integrating our system to web also. We have published a number of papers on Infospace, including a keynote talk.

2. Mobile Database Systems (MDS)

This project was funded by NSF. The objective of the project is to design, develop, and implement a Mobile Database System (MDS) for managing M-commerce activities. A wireless platform offers a less restrictive environment for information management, however, this flexibility comes with unique problems related to data distribution, data types (location dependent and location independent), query types (location dependent, location aware, and location independent), and data caching and require new approaches for their management. In addition to this, a number of problems related to radio channel management make the situation more complex. All these issues must be resolved before the capability of MDS can be fully exploited. We have developed a new transaction model called “Mobilaction” for managing Location Dependent Data (LDD) and Location Dependent Queries (LDQ) efficiently. We have also developed a commit protocol called TCOT (Transaction Commitment on Timeout).

We have also developed mobile concurrency control mechanisms based on Epsilon-serializability and a recovery mechanism based on mobile agents. A number of research papers on this project have been published in IEEE TMC, IEEE Computers (Special issues) and in a number of conferences (total number of paper published is 15+).

3. Mobile Data Warehouse

All organizations require historical data for a number of their activities. The problem is to provide efficient access to historical data in a format required by a particular organization from anywhere and anytime. I am investigating indexing and maintenance of materialized view problems for mobile data warehouse which is relatively more complex than conventional system. I am also in the process of developing data warehouse for biological data.

4. Web and Web Services

The potential of Web for providing information and desired services are well-recognized. When a user visits a web site, the entire information on that site is open to the user. A user

can get desired service and also desired information through wired and wireless communication from the web. We have developed an infrastructure called “Web Bazaar” which provides web services to mobile as well as static users. We also have developed a web service security mechanism which we call “Location Signature”. A number of papers, including in VLDB Workshop (Toronto) have been published. Grant proposal on this topic is under review.

5. Bioinformatics

I am working on two projects: (a) development of a semantic data model for biological activities and data and (b) design and development of a biological database called “BioMind”. My approach is to investigate the complex relationship between structural and functional properties of proteins and develop a prediction system. I believe that knowing a subset of functional properties one can identify its structural property and vice versa. I plan to use this relationship in BioMind for database search. This study will also provide us a sound basis for developing an intelligent database for life science. Our conference paper on BioMind explains the detail of our approach.

6. Sensor Technology

Biosensors (invasive or non-invasive) are used to study and monitor biological system activities and non-bio sensors are deployed to collect and process all kinds of information from multiple sources. There are a large number of easy to complex problems related to sensor network, data security, data validation, data stream processing, and so on, which require efficient solutions. We are looking into information management, information security, and ad-hoc self-configuring network problems.

7. Management of Malicious Transactions in Mobile Database Systems

Management (identification and recovery) of malicious transactions has been an active area of research for some time. Significant amount of work has been done in this area, however, nearly all of them deal with conventional database systems. Our investigation is in mobile database systems where no work has been done so far. We are trying to formalize the definition of a malicious activity and develop schemes for its detection and recovery from its effect.

PROFESSIONAL ACTIVITIES AND SERVICE

- Program Co-Chair:** MUBICA07 Workshop in Conjunction with the 4th Annual International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services (MOBIQUITOUS 2007). August 6-10, 2007, Philadelphia, PA.
- Organization member:** NSF funded workshop “MobiSensor”, University of Pittsburgh, Pittsburgh, January 15-17, 2007.
- Panel Chair:** Pane Chair. The 7th International Conference on Mobile Data Management (MDM'06)
- Workshop Chair:** The 2006 International Symposium on Applications and the Internet, Phoenix, Arizona, USA, January 23-27, 2006 (SAINT06).

General Co-Chair: 6th ACM SIGMOD workshop on Mobile data engineering (MobiDE 2006).

General Co-Chair: Fourth International ACM Workshop on Data Engineering for Wireless and Mobile Access, June 12, 2005, Baltimore, Maryland (in conjunction with SIGMOD/PODS 2005)

General Chair: International Conference on Distributed Systems and Internet Technology, 2005, Dec. 22-24, Bhubaneswar, India.

General Chair: 5th ACM SIGMOD workshop on Mobile data engineering (MobiDE 2005).

Guest Editor: ACM SIGMOD Record, December 2003 and March 2004.

Member Editorial Board: Data and Knowledge Engineering journal and Computing Letters (COLE). VSP/Brill Publishing Company, UK.

Guest Editor: Mobile Networks and Applications, Vol. 9, No. 5, 2004, Kluwer and ACM.

Vice Chair: IEEE ICDE 1999, Sydney, Feb. 1999, Australia.

Publication Chair: IEEE ICDE, Feb. 2000, San Diego.

Workshop Chair: 3rd ACS/IEEE Int. Conf. On Comp. Systems and Applications (AICCSA05), Cairo, Egypt, Jan. 3-6, 05.

Dist. Sys. Track Chair: Int. Conf. on Distributed Computing & Internet Technology (ICDCIT 2004), Bhubaneswar, India. Dec. 22-24, 04.

Steering Committee Member: 6th Int. DEXA 03 Workshop on Mobility in Databases and Dist. Sys. September 1-5, 2003 Prague, Czech Republic.

Publicity Chair: 3rd Int. ACM Workshop on Data Eng. for Wireless and Mobile Access (MobiDE03), San Diego, California. Sept. 19, 03

Seminar Co-Chair: IEEE, ICDE 2003, Bangalore, India. March 14-15, 03.

Int. Advisory Committee: 2nd Int. Conf. on Inf. Management, Indore, India. Oct. 21-23, 2003.

Proceedings Editor: WECWIS workshop 2002, Newport Beach, California. June 26-28, 2002

General Chair: Int. Workshop on Data Semantics in Web Inf. Sys. (DASWIS-2001), Yokohama, Japan. Nov. 29-30, 01

Co-Chair: Workshop on Reliable and Secure Applications in Mobile Environment (IEEE SRDS'01), New Orleans. Oct. 28, 01

Co-Chair: 4th Int. Workshop on Mobility in DB & Dist. Sys., Munich, Germany. Sep. 3 - 7, 2001

Treasurer: ACM Sigmod, Dallas. Feb. 2000.

Program Co-Chair ACM Computer Science Conference (CSC), March 3-5, 1992, Kansas City, MO.

Program Co-Chair ACM Symposium on Applied Computing (SAC), April 3-5, 1991, Kansas City, MO.

Reviewer (Partial list)

- IEEE Transactions on Computers.
- IEEE Transactions on Knowledge and Data Engineering.
- IEEE Transactions on Mobile Computing

- Performance Evaluation.
- Software Practice and Experience.
- Information Sciences.
- Information Systems.
- Data and Knowledge Engineering.
- Journal of Parallel and Distributed Systems.

Member Professional Organizations

- Association for the Computing Machinery (ACM).
- Senior Member, IEEE.

NSF Panel: Many.

Consulting

- United Nations
December 1992 - 1994. Country: India.
Project: Transfer of Technology Through Expatriate Nationals (TOKTEN).
Under this contract, I consulted the following institutions:
 - a. University of Calcutta, Calcutta, India. Presented a one day tutorial and delivered an invited paper.
 - b. Consulted Indian Statistical Institute researchers for further work on database area, India, 1993.
 - c. Tata Iron and Steel Company (TISCO), Jamshedpur, India. Consulted Data Processing department for further improvement in their data management activities, India, 1993.
 - d. Tata Refractories, Belpahar, India. Assisted in the installation of their data processing system, 1993.
 - e. University of Puna and for Development of Advanced Computing, Pune, India. Gave a seminar on database system development process, 1993.
 - f. University of Indore, Indore, India. Delivered an invited lecture and a full-day tutorial on Transaction Management, 1992.
 - g. Indian National Scientific Documentation, New Delhi, India. Gave a 7-day intensive course on database management systems, 1992.
- Sprint PCS, Kansas.
May 1998 - May 1999.
Project: Automatic Software Validation Workflow Systems.
- Cohen and Esrey Construction Inc.
November 1998 - May 1999.
Project: Intelligent Web Browser Design and Implementation.

Conference Tutorials and Technical Seminars

Date	Tutorial/Technical Seminars
January 5-7, 2008	Two-day tutorial on Mobile Database Systems, NIT Hamirpur, Himachal Pradesh, India.

- December 2007 Management of Transactions on Mobile Database Systems, 15th International Conference on Advanced Computing & Communication (ADCOM 2007) December 18 - 21 2007, Guwahati, India.
- March 2003 Technical seminar on Mobile Database Systems, IEEE, ICDE03, March 14-15, 2003, Bangalore, India.
- January 2000 One week seminar on database systems. IBM ACE Indore, India.
- December 2000 Tutorial on Mobile Databases. COMAD00, Pune, Dec. 14-15, 2000, India.
- December 1995 Distributed Databases and Client-Server Architecture. Pre-VLDB '96 tutorial, Jamshedpur, India.
- December 1995 Database Design: From ER to Relational. International Conference on Automation, Indore, India.
- December 1993 Distributed Databases with Client/Server Architecture. 5th Int. Conf. on Management of Data, Calcutta India.
- September 1993 Distributed Database and Client/Server Architecture. IEEE 7th Int. Conf. on Comp. Software and Applications, Tempe, Arizona.
- March 1992 Distributed Database Management Systems. IEEE International Phoenix Conference on Computers and Communications.
- March 1988 Main Memory Databases: A New Concept in Database Processing. National Conf. of Decision Sc. Institute, Las Vegas.

Key Note/Invited Talks

- | Date | Presentation |
|----------------|--|
| September 2007 | Identification of Malicious Activity. Georgia Tech. |
| October 2007 | Management of Malicious Transactions in Mobile Database Systems, George Mason University. |
| December 2004 | Keynote talk. 1 st International Conference on Distributed Computing and Internet Technology (ICDCIT2004), December 21-24, Bhubaneswar, India. |
| January 2004 | Key note talk. 30-th Anniversary Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2004), Czech Republic. |
| December 2003 | National Chiao-Tung University, Hsinchu, Taiwan Workshop on Pervasive Computing, December 18-19, 2003. |
| November 2002 | Mobile Database Systems, Mokpo University, Seoul, South Korea. |
| January 2001 | Mobile Database Systems, Indore University, India. |
| December 2000 | Mobile Database Systems, MBT, Pune, India. |
| January 1998 | Int. Conf. on Technical Education in 21st Century, Indore, India. |
| May 1996 | Recovery in Main Memory Database Systems. Georgia Tech, Atlanta, Georgia. |
| December 1993 | Transactions and its Management. University of Indore, Indore, India. |
| December 1993 | Invited Paper: An Efficient Algorithm for Managing Concurrent Operations on Data Using Dynamic Attributes of Transactions. Int. Conf. on Management of Data (COMAD '93), Univ. of Calcutta, India. |
| December 1993 | Transaction Management in Distributed Database Systems. University of Indore, Indore, India. |
| March 1989 | Main Memory Database Systems. Korean Institute of Science and Technology, Seoul, South Korea. |

December 1987	Role of Information Processing in Industrial organizations. Tata Iron and Steel Company, Jamshedpur, India.
December 1987	Database Management Systems and Management Science (two days). National Productivity Council, New Delhi, India.
December 1987	DBMS: Its importance in the management of companies. Xavior Institute of Management, Jamshedpur, India.
April 1986	Performance of Two-phase and Timestamp based CCMs. Computer Corporation of America, Cambridge, MA.
March 1984	Performance of Database Concurrency Control Mechanisms. Case Western Reserve University, Cleveland, Ohio.
July 1982	Serialization of Concurrent Transactions in Database Systems. NATO Summer School on Computer Systems, Bonas, France.

Program Committee Member

I have served as PC member to nearly all major ACM and IEEE conferences and also many international conferences.

RESEARCH SUPERVISION AND TEACHING

Ph. D. Advisor

Graduated

Name	Research Area	Degree
Debopam Acharya	Wireless Data Dissemination	Ph. D. (June 2006)
Nitin Prabhu	Mobile Database Systems	Ph. D. (July 2006)

Active

Name	Research Area	Degree
Terry Bearly	P2P Security	Ph.D
Francisco Landeras	Distributed Query Processing	Ph.D
Debargh Acharya	Secured sensor data aggregation	Ph.D
Priyanka Trehan	Mobile database security	MS

MS Advisor

Graduated

Student name	Degree	Year	Thesis title
Vinit Nagda	MS	2003	Denial of Services in Wireless Network
Kelly Kern	MS	2003	Medical Informatics
Shalini Pradhan	MS	2003	Enhanced UML for Protein database design
Shashidhar	MS	2003	Mobile recovery with Mobile Agents
Pradeep Kumar	MS	2003	Leader Election in Ad-Hoc Network
D. Dinakarpanidian	MS	2002	Protein Database System
Pravin Vajirkar	MS	2000	Data Warehouse Data Quality.
Vinode Vulupala	MS	2000	Mobile IP.
Kiran Chelluri	MS	1999	Data Warehouse Cleaning and Tuning.
Kalpna Dash	MS	1999	Transaction Management in Mobile Computing.
Amol Kher	MS	2000	MUNSHI: A Server Side Bookmarking System.

Shyam Selvara	MS	1999	Binary Coded Indexing scheme for Data Warehouse.
Sanjit Memnon	MS	1999	Caching in Mobile Databases.
Sunil Samtani	MS	1998	View Maintenance in Data Warehouse.
Prem Satish Makkena	MS	1997	Workflow Management Systems (ETM).
Girija Chavala	MS	1995	Perf. Measurement of Dist. Mutual Exclusion Algorithms.
Narayan Gaddipatti	MS	1994	Performance Measurement of KRISHNA and WDL CCMs.
Chayanika Majumdar	MS	1993	A CCM for IBGF organization and its Performance.
Phil Costantinou	MS	1993	Design and Implementation of a Research RDB.
Shawn Moe	MS	1993	Performance of Database Recovery Algorithms.
Mike Briley	MS	1993	Object Version Management.
Sudha Antani	MS	1992	Perf. of Undo-Redo and Undo-Noredo algorithms.
Judy Mullins	MS	1992	An IDS with multiple access paths and its performance.
Albert Burger	MS	1991	Performance of Multi-version distributed CCMs.
Margaret Easter	MS	1991	Design and Analysis of CCM for Distributed EH.
Lingling Polican	MS	1989	Design and Performance of a CCM for EH.
Angela Smith	MS	1985	Performance of a Primary Copy CCM. (Cleveland State).
Robert Cook	MS	1985	Natural Language Interface for UNIX. (Cleveland State).
Susan Penn	MS	1984	RDMS Natural language preprocessor (Cleveland State).

Member Supervisory Committees

Ph.D.	MS
Yongqiao Xiao	Upkar Varshney
Qun Ren	Yun-Heh Chen
Woody Acosta	Rudy Rojas
Qing Hu	Hung-Yu Lin
Hung-Yu Lin	Douglas Adams
Upkar Varshney	
Leijian Liu	
Yongnan Xu	
Fa Toh Yap	
Robert Cotter	

New Courses Developed

Number	Name	Level	Date
CS490	Introduction to Bioinformatics	Undergraduate	2002
CS470	Introduction to Database Management Systems	Undergraduate	1986
CS471	Database Design, Implementation and Validation	Undergraduate	1999
CS570	Advanced Database Management Systems	Graduate	1988
CS571	Object Information Management Systems	Graduate	1995
CS572	Mobile Computing	Graduate	1997
CS670	Distributed Database Management Systems	Graduate	1989

Courses Taught

Number	Name
CS670	Distributed Database Systems
CS572	Mobile Computing

CS570 Advanced Database Systems
CS531 Advanced Operating Systems
CS500 Advanced Pascal
CS490 Introduction to Bioinformatics
CS471 Database Design, Implementation and Validation
CS470 Introduction to Database Systems
CS431 Introduction to Operating Systems
CS430 Programming Languages
CS423 Client/Server Systems and Programming
CS421 Data Communication
CS325 Introduction to Data Structures and Algorithms
CS101 Introduction to Computing
CS100 Introduction to Pascal

Administrative Responsibilities and Committee Membership

Coordinator: Ph. D. Discipline Computer Science

Committee Name	Position
Post Tenure Evaluation	Chair
P&T	Chair