

Vipin Kumar  
Computer Science Department  
4-192 EE/CSci Building  
University of Minnesota  
Minneapolis, MN 55455  
Tel: 612-624-8023, Internet: kumar@cs.umn.edu, FAX: 612-625-0572

## **EDUCATION:**

Ph.D. (Computer Science)  
Univ. of Maryland, College Park, December 1982  
Dissertation Title: A Unified Approach to Problem Solving Search Procedures.

M.E. (Electronics Engineering)  
Philips International Institute, Eindhoven, Netherlands, May 1979

B.E. (Electronics & Communication Engineering)  
Indian Institute of Technology, Roorkee (formerly, University of Roorkee), India, June 1977

## **WORK EXPERIENCE:**

7/2005 - current: William Norris Professor and Head, Department of Computer Science and Engineering, University of Minnesota  
11/98- 8/2005: Director, Army High Performance Computing Research Center,  
6/98 - 5/99: Director, Graduate Program in Scientific Computation  
8/95- current: Professor, Department of Computer Sciences, University of Minnesota  
8/89-7/95: Associate Professor, Department of Computer Sciences, University of Minnesota  
1/83-7/89: Assistant Professor, Department of Computer Sciences, University of Texas at Austin

## **RESEARCH INTERESTS:**

High-Performance Computing, Data Mining, Bioinformatics

## **HONORS & AWARDS:**

- [1] Distinguished Alumnus Award, Computer Science Department, University of Maryland, College Park, 2009.
- [2] IEEE ICDM 2008 Outstanding Service Award, December 2008.
- [3] Elected Fellow of AAAS (American Association of Advancement of Science), 2006.
- [4] Named to the Alumni Hall of Fame, Computer Science Department, University of Maryland, College Park, 2006.
- [5] Elected Fellow of the ACM, 2005
- [6] The 2005 IEEE Computer Society's Technical Achievement Award for contributions to the design and analysis of parallel algorithms, graph-partitioning, and data mining.

- [7] Distinguished Paper Award from Euro-Par' 2000.
- [8] Best Contributed Paper Award in Applications Development Section of the Ninth Annual Conference of the Western Users of SAS Software, September 2001.
- [9] IBM Partnership Awards, 1995 & 1996.
- [10] Elected Fellow of the IEEE, 2000.
- [11] Outstanding Student Paper Award from the Supercomputing 94 conference for papers jointly authored with students.
- [12] Fellow, Minnesota Supercomputer Institute.
- [13] Honorable Mention in the 1989 Gordon Bell Competition for practical parallel processing research.
- [14] Dissertations of two PhD students were among five finalists in the ACM Doctoral Dissertation Award competition (Yow-Jian Lin (1988) for his work on automatic parallel execution of logic programs and Anshul Gupta (1995) for his work on highly scalable sparse Cholesky factorization.
- [15] Graduate Student Research Excellence Award from the Maryland chapter of Sigma-Xi, the Scientific Research Society, 1982.
- [16] ACM Samuel Alexander Fellowship Award from the Washington D.C. chapter of the Association of Computing Machinery, 1981.
- [17] Gold medal for first rank in the merit list of over 350,000 students for the 12th grade state-wide examination (US equivalent: High School) in the state of Uttar Pradesh, India, 1973.
- [18] Gold Medal for first place in district level Math Olympiad, Muzaffarnagar, India, 1972.

#### **RESEARCH GRANTS/PROJECTS:**

- [1] "Generalization of the Association Analysis Framework," NSF, \$499,996, August 1, 2009 - July 31, 2012 (Principal Investigator)
- [2] "ELLF: Extensible Language and Library Frameworks for Scalable and Efficient Data-Intensive Applications", NSF, 07/01/09 - 08/31/12; \$730K. Co-PI with PI Eric Van Wyk. Part of \$1.12 Million collaborative project joint with Northwestern University.
- [3] "Algorithms for Forest cover change detection using MODIS data", NASA AMES RES CTR/NNX09AL60G, 06/04/09 - 06/03/10; \$80,000. (Principal Investigator)
- [4] "Automated Assessment of Forest Cover Change", University of Minnesota - Future Grants Program, \$250K, July 1, 2009- June 30, 2011. (Principal Investigator, with co-PIs Joe Knight and Sudipto Banerjee).
- [5] "Using Data mining to Improve Clinical Support", Medtronic Inc, 02/10/09 - 06/30/09, \$40,000. (Principal Investigator)
- [6] "Mining Mayo Clinic Database for Cases of Drug Induced Liver Injuries", Pfizer Corporation, 5/26/2008 - 7/01/2009. (Joint project with Mayo Clinic; U of M portion \$86,902.) (Principal Investigator)
- [7] "Detecting Anomalies from Numeric and Textual Data Using Data Mining", NASA, 01/01/08-12/31/10 \$960K. (Co-PI, with PI: Jaideep Srivastava and co-PIs: Arindam Banerjee and William Schuler).

- [8] "Collaborative Research: Spatio-Temporal Data Mining For Global Scale Eco-Climatic Data," National Science Foundation, August 1 , 2007 - July 31, 2010 \$269,982. (Principal Investigator, with co-PI: Michael Steinbach)
- [9] "NOAA Interdisciplinary Scientific Environmental Technology (ISET) Cooperative Research and Education Center", NOAA, \$12,000,000, 09/01/2006 - 08/31/2011. Prime: NORTH CAROLINA A&T ST UNIV. (Principal Investigator on Minnesota subaward \$440K, with co-PI: Michael Steinbach)
- [10] "Collaborative Research: CRI - Scalable Benchmarks, Software and Data for Data Mining, Analytics and Scientific Discoveries," National Science Foundation, \$180K, 3/15/2006 - 2/28/2010. (Principal Investigator, with co-PI: Michael Steinbach)
- [11] NIH-NSF BBSI. THE UNIVERSITY OF MINNESOTA SUMMER BIOINFORMATICS INSTITUTE, NIH-NSF, \$422,872, 01/01/2007-12/31/2009 (Co-PI, with PI: Yiannis Kaznessis)
- [12] "Cross Domain Intrusion Detection Using Privacy Preserving Distributed Data Mining", DHS SBIR Phase 2 project (subcontract from Agnik Corporation) \$80K, 12/01/2005 - 10/31/2007 (Principal Investigator)
- [13] ITR Collaborative Research: A Data Mining and Exploration Middleware for Grid and Distributed Computing, National Science Foundation, \$611,000, September 1 , 2003 - October 31, 2007. (Principal Investigator with co-PI: J. Weissman) Part of a \$1.6 Million ITR grant jointly with University of Florida and University of Illinois.
- [14] Data Mining Tools for the CQWEST Decision Support System. NASA, \$150,000, March 1, 2005 - August 31, 2008. (Principal Investigator)
- [15] Data Mining for Rare Class Analysis, National Science Foundation, \$299,979, November 1 , 2003 - October 31, 2007. (Principal Investigator with co-PI: J. Srivastava)
- [16] Situational Awareness Analysis Tool for Aiding Discovery of Security Events and Patterns, ARDA, \$800,000, 9/24/03-5/31/05. (Principal Investigator with co-PIs: J. Srivastava, Z. Zhang, Y. Kim)
- [17] "NIH-NSF BBSI: The University of Minnesota Summer Bioinformatics Institute." National Science Foundation; \$657K, January 1, 2003 - December 2006.. (Principal Investigator - transferred to Yiannis Kaznessis in 2004)
- [18] Army High Performance Computing Research Center, Cooperative Agreement \$22.5 Million, August 2001 - August 2006. (Principal Investigator - transferred to Shashi Shekhar on September 1, 2005)
- [19] Data Mining for Scientific and Engineering Applications, Department of Energy (Lawrence Livermore Laboratory), \$500K; 5/1/2001 - 4/31/2004. (Principal Investigator with co-PI: K. Tamma)
- [20] Discovery of Patterns from the Global Carbon Cycle and Climate System Using Data Mining, NASA, \$550K, April 15, 2001 - April 14, 2004. (Principal Investigator with co-PIs: G. Karypis and S. Shekhar)
- [21] Scientific Data Mining, Department of Energy (Lawrence Livermore Laboratory), \$128,000; 1/1/2000 - 12/31/2000. (Principal Investigator)
- [22] Multi-Constraint, Multi-Objective Graph Partitioning, National Science Foundation, \$286,544; 09/01/99-08/31/03. (Co-PI with George Karypis (PI)).
- [23] Dynamic Feature Extraction and Data Mining for the Analysis of Turbulent Flows, National Science Foundation, \$1,462,500; 10/15/99- 9/30/03 (Co-PI with Candler, Garrick, Interrante, Karypis, Longmire, Marusic (PI)).

- [24] Scalable Parallel Algorithms for Irregular & Adaptive Computations, Department of Energy (The ASCI Initiative Level II), \$576,000, October 1998 - September 2001. (Principal Investigator)
- [25] Army High Performance Computing Research Center, Cooperative Agreement \$2.2 Million, January 1999 - January 2001. (Principal Investigator)
- [26] Army High Performance Computing Research Center, Infrastructure Support Contract, \$32 Million, January 1999 - January 2001. (Principal Investigator)
- [27] "CISE Research Instrumentation: Research in Networked Information Systems", (co-PI with A. Tripathi (PI), S. Shekhar, J. Srivastava, Z. L. Zhang), NSF, \$97,000 (with matching funds of \$67,356 from U. of Minnesota), January 1, 1999 - December 31, 2001.
- [28] Scheduling Algorithms and Applications Development, NASA, \$40,000; April 1999 - September 1999. (Principal Investigator)
- [29] Scalable Parallel Algorithms for Solving Sparse Linear Systems, Army Research Office, \$330,000, September 1998 - August 2001; (Principal Investigator)
- [30] Graph Partitioning for Dynamic, Adaptive and Multi-Phase Computations, SGI/Cray, \$55,000, January 1998 - December 1999; (Principal Investigator)
- [31] Load Balancing on the Information Power Grid, NASA, \$40,000; May 1998 - September 1998. (Principal Investigator)
- [32] Scalable Parallel Algorithms for Data Mining, Army Research Office, \$75,000, June 1997 - May 2001; (Principal Investigator)
- [33] Enabling Technology Research for the AHPCRC, \$515,000, January 1997 - January 1999. (Principal Investigator)
- [34] "Highly Parallel Direct Solvers for Sparse Linear Systems" NSF, July 1, 1995 - March 30, 1999, \$191,471. (Principal Investigator)
- [35] Architectures, Algorithms and Applications for Future generation Parallel Computers, NSF, September 1, 1996 - August 30, 1997, \$100,000, Principal Investigator with Co-PI: Sameh)
- [36] IBM Partnership Award, July 1, 1995 - June 30, 1996, \$72,000. (Principal Investigator)
- [37] "Scalable Parallel Algorithms", Army Research Office, \$265,046, August 1995 - July 1998. (Principal Investigator)
- [38] "Applications over High-Speed Networks: A Pilot Project for the NII", NSF, 1.5 Million (with matching funds of \$700,000 by the University of Minnesota), 1995-2000. (Co-PI with David Du (PI), Woodward, Yew)
- [39] Benchmarks for Real-Time Embedded HPC Systems, ARPA and Rome Laboratories, \$1 Million, January 1996- August 31, 1998, funded jointly with Honeywell technology Center (Prime), Alphas-ech, and University of Minnesota. Subcontract to U of M - \$92,087.
- [40] A Technology and Architecture Integration Study for Product System Design, \$800,000, NASA, January 1995 - July 1997, funded jointly with JPL, Caltech (Prime), University of Colorado, and University of Minnesota. Subcontract to U of M - \$105,000.
- [41] "U.S.-France Cooperative Research: Highly Parallel Branch-and-Bound Algorithms for Solving Optimization Problems", NSF, March 1996 - February 1999, \$27,000.00, (co-PI with S. Dutt).
- [42] "Acquisition of A Workstation Cluster for Research in High-Performance Computing." NSF, \$550,260 (with matching funds of \$484,064 by the University of Minnesota) June 1994 - September 1997. (co-PI with Kaveh, Li, Lilja, O'Keefe, Park, Riedl, Saad, Sameh (PI), Tewfik, Tripathi).

- [43] C3I Parallel Benchmark Suite, Rome Laboratories, \$1.1 Million, October 1994- December 1996, funded jointly with Honeywell technology Center (Prime), Alphatech, and University of Minnesota. Subcontract to U of M - \$119,000.
- [44] "Parallel Sparse Systems Solvers and Applications", Army Research Office, \$100,000, May 1995 - April 1998. (Principal Investigator)
- [45] "Highly Parallel Direct Solvers and Graph Partitioning for Sparse Linear Systems" Cray Research Inc., August 15, 1995 - August 15, 1996, \$24,000. (Principal Investigator)
- [46] "Scalable Parallel Algorithms", IST/SDIO and Army Research Office, \$130,000, April 1993 - July 1995. (Principal Investigator)
- [47] "Scalable Parallel Algorithms for Finite Element Problems", Army Research Office, \$75,000, April 1993 - April 1996. (Principal Investigator)
- [48] "Design and Analysis of Scalable Parallel Algorithms", IST/SDIO and Army Research Office, \$158,851, August 1990 - August 1993. (Principal Investigator)
- [49] "Parallel Multiagent Planning", NSF, \$48,264 (July 1992-1993). (Principal Investigator)
- [50] "CISE Research Instrumentation", (co-PI with Maria Gini and Daniel Boley), NSF, \$22,777.00 (with matching funds of \$11,388 from U. of Minnesota), April 1991.
- [51] Army High Performance Computing Research Center (one of the 30+ founding co-investigators; PI: George Sell), Army Research Office, \$66,900,000, October 1989 - September 1994.
- [52] "Artificial Intelligence Project at The University of Texas at Austin" (co-PI with Gordan Novak (PI), Robert Simmons, Bruce Porter) from the Army Research Office, \$6.5 million, 1984-1989.
- [53] "Computer Research into Multiprocessing Systems via Hypercube Architecture" (co-PI with J. K. Aggarwal (PI), A. Bovik, R. Boyer, C. L. Wu, F. Bostick). NSF, Division of Computer and Communications Research, \$78,245, 1985-88.
- [54] "A Design and Execution Environment for Parallel Computations" (co-PI with Jim Browne (PI), Don Fussell, Al Mok, Vincent Hwang, Clement Leung), ONR, \$600,000, April 1986.
- [55] "Formulation and Programming of Distributed and Parallel Computation", (one of the twelve founding co-investigators; PI: Jim Browne), Office of Naval Research, \$2.5 million, 1986-88.
- [56] "Modernization Grant for the Parallel Processing Lab" (co-PI with Al Dale, Jim Browne (PI), Roy Jenevein, Dan Miranker), Shell Development Foundation, \$180,000, April 1988.

#### **COURSES TAUGHT:**

Research Problems in Data Mining for Bioinformatics; Introduction to Data Mining; Introduction to Parallel Computing; Parallel and High Performance Computing; Discrete Structures of Computer Science; Introduction to Data Structures and Algorithms; Introduction to Artificial Intelligence; Parallel Architectures for Artificial Intelligence; Topics in Parallel Symbolic Computing; Computer Systems Architecture;

**PhD STUDENTS GRADUATED:**

- [1] Yow-Jian Lin, April 1988. (Winner of **the Outstanding Dissertation Award** from the University of Texas at Austin. Lin's dissertation was selected as one of the five finalists in **the 1988 ACM Doctoral Dissertation Award Competition**.) Currently employed at AT&T Bell Laboratories, NJ.
- [2] Eric Hartman, December 1989, currently employed by MCC, Austin, Texas.
- [3] V. N. Rao, July 1990, currently employed at Unisys Corporation, Houston.
- [4] Tim Mikula, June 1994, currently employed at 3M Corporation, Minneapolis.
- [5] Dan Challou, August 1994, currently employed as Project Leader, United Defense, Minneapolis, MN.
- [6] Anshul Gupta, July 1995. Gupta's dissertation was selected as one of the five finalists in **the 1995 ACM Doctoral Dissertation Award Competition**.) Currently employed at IBM T.J. Watson Research Center.
- [7] Ananth Grama, May 1996. Currently Full Professor, Department of Computer Science, Purdue University.
- [8] George Karypis, May 1996. Currently Associate Professor, Department of Computer Science, University of Minnesota.
- [9] Tom Nurkkala, June 1996. Currently Associate Professor, Taylor University.
- [10] Sam Han, October 1999. Currently at iXmatch, Inc., Minneapolis.
- [11] Kirk Schloegel, November 1999. Currently Research Scientist, Honeywell Technology Corp, MN.
- [12] Bill Leinberger, November 2001, Currently Research Scientist, General Dynamics, Bloominton, MN.
- [13] Pang Tan, July 2002, Currently Assistant Professor, Department of Computer Science, Michigan State University.
- [14] Mahesh Joshi, November 2002, Currently Research Scientist at SAS, Inc. Cary North Carolina.
- [15] Hui Xiong, June 2005, Currently Assistant Professor, Department of Management Science and Information Systems, Rutgers University, NJ.
- [16] Pusheng Zhang, June 2005, Currently Research Scientist at Microsoft, Inc. Seattle.
- [17] Bilgehan Uygur Oztekin, July 2005, Currently Research Scientist at Google, Inc. Mountain View, CA.
- [18] Michael Steinbach, October 2005, Currently Research Scientist at University of Minnesota.
- [19] Mark Shaneck, July 2007. Currently at Liberty University.
- [20] Eric Eliertson, October 2007. Currently at Institute for Defense Analysis.
- [21] Gyorgy Simon, February 2008. Currently research scientist at Mayo Clinic, MN.
- [22] Varun Chandola, September 2009, Current at oak Ridge National Lab.

**PROFESSIONAL AFFILIATIONS:**

Fellow of AAAS, ACM, IEEE, IEEE computer society, member of SIAM.

**PROFESSIONAL ACTIVITIES:****Editor-in-Chief**

Founding Co-Editor-in-Chief, Journal of Statistical Analysis and Data Mining (Wiley), 2006 - 2009.

Editor-in-Chief, IEEE Intelligent Informatics Bulletin, 2006 - 2009.

Series Editor, Data Mining and Knowledge Discovery Series, Chapman and Hall/CRC Press, 2006 - current.

Co-founder and steering committee chair, SIAM International Conference on Data Mining, 2001-2007.

**EDITORIAL BOARDS**

IEEE Transactions on Knowledge and Data Engineering, 2008 - current.

Data Mining and Knowledge Discovery, 2005 - current.

International Journal of Data Mining and Bioinformatics (IJDMB), 2006-current.

IEEE Computational Intelligence Bulletin, 2003 -2005.

Annual Review of Intelligent Informatics, 2002 - current.

Knowledge and Information Systems, 2000 - current.

Journal of Parallel and Distributed Computing (JPDC), 1994- current.

Parallel Computing, 1996 - 2006.

International Journal of Computational Science and Engineering, 2006 - current.

International Journal of High Performance Computing and Networking (IJHPCN), 2004 - current.

IEEE Concurrency, 1997 - 2000.

IEEE Parallel and Distributed Technology, 1995 - 1997.

IEEE Transactions on Knowledge and Data Engineering, 1993- 1997.

Guest Editor, Parallel Computing, special issue on Numerical Optimization, 2003.

Guest Editor, Journal of Parallel and Distributed Computing, special issue on High Performance

Data Mining, 1999.

Guest Editor, Journal of Parallel and Distributed Computing, special issue on scalability, September 1994.

## **CHAIR of CONFERENCES AND WORKSHOPS**

Panel Chair, ACM SIGKDD-2007, the Thirteenth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, San Jose, August 12-15, 2007.

Honorary Chair, THE INTERNATIONAL CONFERENCE ON COMPUTATIONAL SCIENCE AND ITS APPLICATIONS, May 9 - May 12, 2005, Singapore.

Honorary Chair, THE INTERNATIONAL CONFERENCE ON COMPUTATIONAL SCIENCE AND ITS APPLICATIONS, Perugia, Italy, May 14 - May 17, 2004.

Co-Chair, ICDM Workshop on Data Mining for Computer Security (DMSEC), Melbourne, Florida, Nov 19-22, 2003.

Co-Chair, Workshop on Data Mining Middleware for the Grids, University of Minnesota Supercomputing Institute, September 18-19, 2003.

Honorary Chair, THE INTERNATIONAL CONFERENCE ON COMPUTATIONAL SCIENCE AND ITS APPLICATIONS, Montreal, Quebec, Canada, May 18 - May 21, 2003.

Program Chair, The 2002 IEEE International Conference on Data Mining, November 2002

Global Chair, Euro-Par 2002 Track on Applications of High Performance Computers, August 2002.

Program Chair, First SIAM International Conference on Data Mining, April 2001

Keynote Chair, Seventh International Conference on High Performance Computing (HiPC01) (sponsored by the IEEE Computer Society), December 2001.

Program Chair, International Parallel and Distributed Processing Symposium, April 2001

Co-Chair, KDD 2000 Workshop on Distributed and Parallel Knowledge Discovery, August 2000

Co-Chair, IPDPS Workshop on High Performance Data Mining, May 1, 2000.

Keynote Chair, Seventh International Conference on High Performance Computing (HiPC00) (sponsored by the IEEE Computer Society), December 2000.

Co-Chair, Joint IMA/AHPCRC/MSI Workshop on Text Mining, April 2000

Vice-Chair, Sixth International Conference on High Performance Computing (HiPC99)

(sponsored by the IEEE Computer Society), December 1999.

Co-Chair, Workshop on Graph Partitioning and Applications, AHPCRC, University of Minnesota, October 14-15, 1999.

Co-Chair, Workshop on Mining Scientific Datasets, AHPCRC, University of Minnesota, September 9-10, 1999.

Vice-Chair, EuroPar 1999, Track on High Performance Data Mining, Toulouse, France, August 1999.

Co-chair, IMA Workshop on Challenges and Opportunities in Genomics:  
Production, Storage, Mining and Use, April 26-28 1999, University of Minnesota.

Co-chair, Workshop on High Performance Data Mining, Tuesday April 16, 1999.

Vice-Chair, Fifth International Conference on High Performance Computing (HiPC98) (sponsored by the IEEE Computer Society), December 1998.

Co-Chair, IPPS Workshop on High Performance Data Mining, Tuesday March 31, 1998.

Co-Chair, AHPCRC Workshop on Unstructured Mesh Generation and Partitioning, October 6-7, 1997.

Global Chair, Euro-Par'97 Workshop on Scheduling and Load Balancing, August 1997.

Co-Chair, Symposium on Intelligent Technologies and Systems, October 1996.

Vice-Chair, the Ninth International Parallel Processing Symposium (IPPS) (sponsored by the IEEE Computer Society), April 1995.

Co-chair, The International Workshop on Parallel Processing for Artificial Intelligence, Chambéry, France (in conjunction with IJCAI-93).

Chair, Supercomputing 1992 Workshop on Analyzing Scalability of Parallel Algorithms and Architectures, Minneapolis, November 1992.

Vice-Chair, Third International Conference on Tools for Artificial Intelligence, 1991.

Co-Chair, Workshop on Parallel Computing of Discrete Optimization Problems, AHPCRC, University of Minnesota, 1991.

Co-chair, Workshop on Parallel Algorithms for Machine Intelligence and Pattern Recognition, August 1988, St. Paul, Minnesota. (sponsored by American Association for Artificial Intelligence).

Co-chair, IJCAI-89 Workshop on Parallel Algorithms for Machine Intelligence August 1989, Detroit, Michigan. (sponsored by American Association for Artificial Intelligence).

Member, IEEE Technical Committee on Parallel Processing, 1992-.

### **PROGRAM COMMITTEES:**

SIAM International Conference on Data Mining (SDM), 2001-2009.

ACM SIGKDD, the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 2001-2009.

IEEE International Conference on Data Mining (ICDM) 2001-2009.

IEEE International Conference on Data Engineering (ICDE 2007), 2007.

The Eleventh Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD-07), 2007.

International Conference on High Performance Computing (HiPC06) (sponsored by the IEEE Computer Society), December 2006.

AI Nectar track, AAAI 2006, Boston, July 16-20, 2006.

The 35th International Conference on Parallel Processing (ICPP 2006), August 14-16, 2006.

The Tenth Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD-06), Singapore April 9-12, 2006.

Supercomputing'2005, November 2005, Seattle.

International Conference on Parallel and Distributed Computing Systems (PDCS-2005), November 14-16, 2005, Phoenix.

WebKDD'2005, August 2005.

ICDM-2005, the Fifth IEEE International Conference on Data Mining, Houston, 27 - 30 November 2005.

The Ninth Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD-05), Hanoi, Vietnam, April 2005.

The First International Workshop on Autonomous Intelligent Systems - Agents and Data Mining June 6-8, 2005, St. Petersburg, Russia.

IEEE International Conference on Data Engineering (ICDE 2005), Boston, April 2005.

IEEE International Conference on Data Mining, November 2004.

2004 IEEE/WIC/ACM International Conference on Web Intelligence (WI 2004).

WebKDD'2004, August 22, 2004.

International Conference on Parallel Processing, August 2004.

SIGMOD Workshop on Research Issues in Data Mining and Knowledge Discovery (DMKD 2004), June 2004.

ACM SIGKDD-2004 (The Tenth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining), August 22-25, 2004, Seattle.

The Eighth Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD-04), 26-28 May, 2004, Sydney, Australia.

IEEE International Conference on Data Mining, November 2003.

International Conference on machine Learning (ICML'03), Washington D.C. August 21-24, 2003.

ACM SIGKDD-2003 (The Ninth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining), August 24-27, 2003, Washington DC.

WebKDD'2003, August 24, 2003

Workshop on Research Issues in Data Mining and Knowledge Discovery (DMKD 2003), June 2003.

PAKDD-2003, Seoul, Korea, May 2003.

ACM SIGKDD-2002 (The Eighth ACM SIGKDD International Conference on Knowledge

Discovery and Data Mining), July 23-26th, 2002, Edmonton, Alberta, Canada  
 WebKDD'2002, August 2002  
 ACM SIGKDD 2002 Workshop on Temporal Data Mining, August 2002.  
 2nd IEEE International Symposium on Cluster Computing and the Grid (CCGrid2002), May 2002  
 Supercomputing'2001, November 2001  
 IEEE International Conference on Data Mining, November 2001  
 Workshop on Ubiquitous Data Mining (held at PKDD-2001), September 2001  
 IEEE Cluster 2001 conference, Newport Beach, October 2001  
 ACM SIGKDD-2001 Best Paper Award Evaluation Committee, August 2001  
 ACM SIGKDD-2001, August 2001  
 ACM SIGKDD Workshop on Temporal Data Mining, August 2001  
 WebKDD'2001, August 2001  
 KDD Workshop on Mining Scientific Data, August 2001  
 SIGMOD DMKD Workshop, 2001  
 SIAM Conference on Parallel Processing, March 2001  
 WebKDD-2000, August 2000  
 VECPAR'2000  
 PAREO '00 (Parallel Processing in Operations Research) Versailles, France, 2000  
 Heterogeneous Computing Workshop, May 2000.  
 Workshop on Large-Scale Parallel KDD Systems, August 1999  
 Petaflops II, 1999  
 Supercomputing 99  
 SIGMOD DMKD Workshop, 99  
 International Conference on Parallel Computing, 99  
 International Parallel Processing Symposium, 99  
 Symposium on Parallel Algorithms for Irregular Problems (Irregular'99)  
 PAREO '98 (Parallel Processing in Operations Research) Versailles, France, 1998  
 Workshop on Advances in Parallel and Distributed Systems, October 20-23, 1998.  
 IEEE Knowledge and Data Engineering Exchange Workshop (KDEX'98), Nov 98.  
 2nd CANPC (Workshop on Communication and Architectural Support for Network-based Parallel Computing), February 1998.  
 VECPAR'98, July 1998.  
 International Parallel Processing Symposium, 98  
 Petaflops Algorithms Workshop (PAL'97), April 97.  
 SIAM Conference on Parallel Processing, 1997.  
 International Parallel Processing Symposium, 1996  
 International Conference on High Performance Computing, 1996  
 International Conference on Parallel Processing, 1996  
 International Parallel Processing Symposium, 1995  
 International Conference on High Performance Computing, 1995  
 International Conference on Parallel Processing, 1995  
 International Parallel Processing Symposium, 1994  
 International Conference on Parallel Processing, 1994  
 National Conference on Artificial Intelligence (AAAI-93, AAAI-91, AAAI-90, AAAI-88, AAAI-87).  
 First International Workshop on Parallel Processing and AI, Sydney, Australia, 1991.  
 11th International Conference on Distributed Computing Systems, 1991.

National Conference on Logic Programming (NCLP-90, NCLP-89).  
1989 AAAI Symposium on Search and Planning (sponsored by American Association for Artificial Intelligence).

### **Conference Advisory Boards/Steering Committees:**

Series Editor, Data Mining and Knowledge Discovery, CRC Press, 2006-.

Steering Committee member, SIAM International Conference on Data Mining, 2007- current (founding chair 2001-2007).

Steering Committee Member, IEEE International Conference on Bioinformatics and Biomedicine, 2007-.

Steering Committee Member, IEEE International Conference on Data Mining, 2002-.

Steering Committee Member, THE INTERNATIONAL CONFERENCE ON COMPUTATIONAL SCIENCE AND ITS APPLICATIONS, 2003 - .

Executive Committee Member, IEEE Computer Society Technical Committee on Computational Intelligence, 2002 - .

Advisory Board, Euro-Par (Annual European Conference on Parallel Computing), 2000.

Steering Committee of The International Conference on Communications in Computing (CIC'2000).

IEEE Technical Committee on Parallel Processing (TCPP), 1994-2001.

### **Panels**

Member, Modeling and Simulation Panel for the Department of Homeland Security's Science Based Threat Analysis and Countermeasures (STAC) Program Office Annual Program Review, June 17, 2005, Washington, DC.

Chair, Board of Visitors, Mathematics Division, the Army Research Office (ARO), 2003.

Co-Chair, Panel on Advanced Computing, The Army Science Conference, Orlando, Florida, December 5, 2002.

Panel Chair, Data Mining for Cyberthreat Analysis, Second SIAM International Conference on Data Mining, April 2002.

Panel Chair, "Data Mining: The new Frontier for Supercomputing" Supercomputing'99, Portland, Oregon, November 1999.

Panel Chair, "Information Power Grid: The New Frontier in Parallel Computing", International Parallel Processing Symposium, April 1999.

Panel Chair, "Data Intensive vs. Scientific Computing" at International Parallel Processing Symposium, April 1998.

Invited panelist at the 1997 International Conference on Parallel Processing (ICPP 97), on the panel on "Wide-spread acceptance of general-purpose large-scale parallel machines: fact, future, or fantasy?"

Invited panelist in the 7th SIAM Conference on Parallel Programming for Scientific Computing on the panel on "Is Scalable Parallel Computing a Myth?", San Francisco, February 1995.

Panel Chair, Future Directions in High Performance Computing, International Conference on High performance Computing, December 1995, New Delhi.

Invited panelist in the Fourth International Conference on Foundations of Data Organization and Algorithms, Evanston, Illinois, USA, October 1993.

Invited panelist on the panel "Scalability Analysis of Large Parallel Systems", 10th Army Math Conference, West Point, New York, June 1992.

Invited panelist on the panel "Applications of Parallel Symbolic Computing" at InfoJapan'90, Tokyo October 1990.

Served on numerous Advisory Panels and Site Visit Panels for National Science Foundation.

#### **INVITED PLENARY/KEYNOTE TALKS at CONFERENCES and WORKSHOPS:**

International Conference on Data Mining (ICDM) December 8, 2009, Miami.

The Second International Conference on Contemporary Computing (IC3 2009), August 19, 2009, Noida, India.

The 2008 International Conference on Computational Science and Applications (ICCSA 2008), June 30 - July 3, 2008, University of Perugia, Perugia (Italy).

International Conference on High Performance Computing (HiPC), December 18-21, 2007. Goa, India

International Conference on Information Systems, Technology and Management, March 12-13, 2007, New Delhi.

The IEEE International Conference in Sensor Networks, Ubiquitous and Trustworthy Computing (SUTC 2006), June 5th-7th, 2006, Taichung, Taiwan.

17th International Conference on Parallel and Distributed Computing Systems (PDCS-2004), September 15-17, 2004, San Francisco, CA, USA.

17th International Parallel and Distributed Processing Symposium, Nice, France, April 24, 2003.

5th International Conference on High Performance Computing in Computational Sciences (VECPAR-2002), Porto, Portugal, June 27, 2002

The Sixth Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD-02), Taipei, May 7, 2002.

International Parallel Computing Conference (ParCo2001), Naples, Italy, September 2001

Workshop on Patterns - Trends - Predictions, Delray Beach, FL, May 2001

IRREGULAR'00, Cancun, Mexico, May 2000.

PAREO'98, Versaille, France, July 1998.

Petaflops Algorithms Workshop, Williamsburg, April 1997.

Stratagem'96, Nice, France, July 1996.

Parallel Optimization Colloquium, Universite of Versaille, France, March 1996.

Symposium on Parallel Algorithms for Irregular Problems (Irregular'94), Geneva, September 1994.

16th IFIP Conference on System Modeling and Optimization, France, July 1993.

10th Army Mathematics Conference, U.S. Military Academy, West Point, New York, June 1992.

#### **INVITED TALKS:**

NSF Workshop on New Generation Data Mining, November 1, 2009, Baltimore.

CompSust09: 1st International Conference on Computational Sustainability, June 8, 2009, Cornell University.

Distinguished Speaker Series, EECS Department, Northwestern University, June 3, 2009.

Distinguished Speaker Series, Oak Ridge national lab, May 18, 2009.

Conference on Intelligent Data Understanding (CIDU), September 9, 2008.

Mathematics for Analysis of Petascale Data, June 2, 2008.

IEEE Data Mining Forum 2008, Hong Kong, May 28-29, 2008.

Honeywell ACS Fellows Symposium, Minneapolis, October 3, 2007.

New Generation Data Mining Workshop, Baltimore, October 10-12, 2007.

Distinguished Speaker Series, University of Central Florida, May 2007

NOAA Interdisciplinary Scientific Environmental Technology Center (ISET), NCAT, Greensboro, April 2007.

IBM T.J. Watson Research Center, August 12, 2006

NSF workshop on Cyber infrastructure in Materials Science, August 4, 2006

Workshop on Edge Computing using New Commodity Architectures, UNC Chapel Hill, May 23-24, 2006.

2006 AMS-IMS-SIAM Summer Conference on Machine and Statistical Learning, June 24-28, 2006,

Snowbird, Utah.

Distinguished Speaker Series, University of California, Davis, February 16, 2006.

Indian Institute of Technology, Roorkee, December 27, 2005.

Indian Institute of Technology, Delhi, December 22, 2005.

School of Computer Engineering, Nanyang Technological University, May 10, 2005.

The Air Force Research Laboratory (AFRL), Wright Patterson Air Force Base, Dayton, Ohio, September 30, 2004.

Transformation and Operations in Cyberspace (TOPS in Cyberspace) Conference Hamilton College, Clinton, NY and AFRL/IF in Rome, NY, June 15-17, 2004.

NSF Workshop on Information Technology, Islamabad, Pakistan, December 23-24, 2003.

IBM India Research Laboratory, New Delhi, December 17, 2003.

ExxonMobil's Corporate Strategic Research Laboratories, October 3, 2003.

Workshop on Satellite Data Applications and Information Extraction, August 20-21, 2003.

Minnesota High-Technology Association, Minneapolis, June 18, 2003.

NSF Workshop on Next Generation Data Mining, November 1-2, 2002.

University of Maryland, Baltimore, March 22, 2002.

IPAM, UCLA, January 2002.

IEEE International Conference on Cluster Computing (Cluster 2001), Newport Beach, October 8-11, 2001.

Ohio State University, November 8, 2001.

Joint Statistical Meetings, 2001, session on large-scale scientific data mining, Atlanta, August 2001

Sixth U.S. National Congress on Computational Mechanics, Minisymposium on Dynamic Load Balancing for Adaptive Computations, August 1-4, 2001

The 2001 International Conference on Computational Science, session on Novel Models for Parallel Computation, May 2001, San Francisco, 2001

University of Florida, January 2001

Illinois Institute of Technology, December 2000

ECE Department, University of Minnesota, November 2000

First SIAM Conference on Computational Science and Engineering, Washington DC, September, 2000

Minisymposium on parallel adaptive computation, Washington University, St. Louis, May 2000.

IMA Workshop Resource Recovery, Minneapolis, February 2000

Virginia Tech, Blacksburg, January 2000

International Bioinformatics Conference, Seattle, September 1999.

Summer Institute on Advanced Computation, Dayton, Ohio, August 1999.

KDD Workshop on Parallel and Distributed Data Mining, August, 1999.

University of Illinois, August, 1999

ARL Tech Advisory Board Review, June 1999

Carlson School of Management, University of Minnesota, February 26, 1999

Petaflops II Conference, Santa Barbara, CA, February 18, 1999

NASA Goddard Space Flight Center, December 4, 1998

University of California, Riverside, November 23, 1998

Lawrence Livermore National Lab, CASC Group, November 5, 1998

Lawrence Livermore National Lab, Dyna3D Group, October 23, 1998

Workshop on Advances in Parallel and Distributed Systems, Purdue University, October 20, 1998

West Publishing Company, Eagan, September 9, 1998

PAREO'98, Versailles, France, July 8, 1998

Petaflops systems Operations Working Review Workshop, Bodega Bay, June 1998

DIMACS Workshop on Performance Data Mining, Princeton, April 27, 1998

State University of New York, Buffalo, April 17, 1998  
ICPP Panel on "Wide-spread acceptance of general-purpose large-scale parallel machines: fact, future, or fantasy?", Chicago, August 1997.  
ASAE Technical Session on Parallel processing and its application for image processing, August 10, 1997.  
NSF Summer School, University of Missouri-Rolla, June 23, 1997.  
GTE Labs, June 13, 1997.  
IMA Workshop on Discrete Optimizations, Minneapolis, May 1997.  
University of Texas, San Antonio, Computer Science Department, May 2, 1997.  
Lawrence Livermore National Lab, April 24, 1997.  
Petaflops Algorithm Workshop, Williamsburg, April 14, 1997.  
SIAM Conference on Parallel Processing, Minisymposium on Message Passing, March 1997.  
Purdue University, Computer Science Department, February 10, 1997.  
IMA Workshop on Data Mining, Minneapolis, November 1996.  
Los Alamos National Lab, September 4, 1996  
Workshop on Parallel Unstructured Grid Computations, Argonne National Lab, September 96  
PetaFlop Software Summer Study, Bodega Bay, CA, June 1996.  
NAS Group, NASA Ames, June 4, 1996  
ICASE Workshop on Computational Electromagnetics and its Applications, Newport News, May 1996.  
University of Iowa, November 1995.  
Minisymposium at the SIAM National Meeting, October 1995.  
RCI Conference, Washington DC, October 30-31, 1995.  
IEEE Chapter, St. Louis, October 1995.  
PetaFlop Workshop, Bodega Bay, CA, August 1995.  
Nordic Summer School on Parallel Processing, Sweden, August 1995.  
ICASE, NASA Langley, July 1995.  
U.S. Army Waterways Experiment Station, Jackson, MS, July 1995.  
TARDEC, Detroit, MI, May 1995.  
IBM T. J. Watson Research Center, Yorktown Heights, June 1994.  
Army Research Lab, Aberdeen, MD, April 1994.  
ARPA Fellows Workshop, Portland, Oregon, November 1993.  
Fall ORSA/TIMS conference in Phoenix, AZ, Nov 1993.  
ICASE, NASA, Norfolk, VA, May 1993.  
Army Research Office Workshop on "Virtual, Distributed, Interactive Simulation", Research Triangle Park, May 1993.  
DIMACS Workshop on Quadratic Problem and Related Problems, Princeton, New Jersey, May 1993.  
Hewlett Packard Research Labs, February 1993.  
Center for Supercomputing Development (CSRSD), University of Illinois, November 1992.  
Siemens Corporate Research Inc., June 1992.  
First International Workshop on Parallel Algorithms for Machine Intelligence, held in conjunction with IJCAI-91, Sydney, August 1991.  
U.S. Army Workshop on the Role of AI and Simulation in Modelling of Complex Systems, Falls Church, Virginia, July 1991.  
Workshop on Distributed Computing, Supercomputing Research Center, Maryland, June 1991.  
Army Artificial Intelligence Center Meeting, University of Pennsylvania, December 1990.  
Institute for New Generation Computing Technology, Tokyo, October 1990.  
US/Japan Panel on Research on Parallel Logic Programming (sponsored by NSF and ICOT), Tokyo, September 1990.

High performance Computing Seminar, sponsored by Concept Analysis Agency, Fals Church, April 1990.  
 Army High performance Computing Research Center, Minneapolis, July 1990.  
 Computer Science Department, Washington University, St. Louis, February 1989.  
 Microelectronics and Computer Technology Corporation, Austin, June 1989.  
 IEEE Computer Society Workshop on Artificial Intelligence for Computer Vision, San Diego, June 1989.  
 US/Japan Panel on Research on Parallel Logic Programming, Argonne National Lab, October 1989.  
 Butterfly Parallel Processing Seminar, Houston, Texas, April 5, 1988.  
 IBM T.J. Watson Research Center, Yorktown Heights, New York, January, 1988.  
 IEEE Computer Society, Dallas Chapter, October 1987.  
 Computer Science Department, University of Maryland, College park, December 1987.

## LIST OF PUBLICATIONS:

### A. BOOKS:

- [1] Top-10 Algorithms in Data Mining, edited by Xindong Wu and Vipin Kumar, Chapman & Hall/CRC - Data Mining and Knowledge Discovery Series, Spring 2009.
- [2] NEXT GENERATION OF DATA MINING, edited by Hillol Kargupta, Jiawei Han, Vipin Kumar, Rajeev Motwani, and Philip Yu, Chapman & Hall/CRC - Data Mining and Knowledge Discovery Series, 2008.
- [3] Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Addison-Wesley ISBN : 0321321367, April 2005. Chinese translation: 2005, Korean Translation: 2007.
- [4] Managing Cyber Threats: Issues, Approaches and Challenges, edited by V. Kumar, J. Srivastava, and A. Lazarevic, Springer, ISBN 0-387-24226-0, May 2005.
- [5] Introduction to Parallel Computing, (Second Edition) by Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar. Addison-Wesley, 2003. ISBN 0-201-64865-2.  
International Chinese Edition 2003, Chinese translation, China Machine press, 2004.
- [6] Data Mining for Scientific and Engineering Applications, edited by R. Grossman, C. Kamath, W. P. Kegelmeyer, V. Kumar, and R. Namburu, Kluwer Academic Publishers, 2001. ISBN: 1-4020-0033-2.
- [7] Introduction to Parallel Computing: Design and Analysis of Algorithms by Vipin Kumar, Ananth Grama, Anshul Gupta and George Karypis, Benjamin-Cummings Publishing Company, November 1993.
- [8] Parallel Processing for Artificial Intelligence, Volume 1, edited by Laveen Kanal, Vipin Kumar, Hiroaki Kitano and Christian B. Suttner, North-Holland, June 1994.
- [9] Parallel Processing for Artificial Intelligence, Volume 2, edited by Hiroaki Kitano, Vipin Kumar, and Christian B. Suttner, North-Holland, July 1994.
- [10] Parallel Algorithms for Machine Intelligence and Vision edited by V. Kumar, P.S. Gopalkrishnan, and L. Kanal, Springer-Verlag, March 1990.
- [11] Search in Artificial Intelligence, edited by Laveen Kanal and Vipin Kumar, Springer-Verlag, 1988.

## B. SOFTWARE Projects by Kumar's Group

The MINDS (Minnesota Intrusion Detection System) project at the AHPCRC is developing a suite of data mining techniques to automatically detect attacks against computer networks and systems. MINDS is currently being used to monitor over 40,000 computers at the University of Minnesota. In addition, it is an integral part of the Army's Interrogator architecture that is used to analyze network traffic from multiple DOD sites around the country at the Army Research Laboratory's Center for Intrusion Monitoring and Protection. MINDS routinely detects novel intrusions, policy violations and insider abuse that are missed by other widely used tools. A National Science Foundation's (NSF) news clip on MINDS is available at <http://www.nsf.gov/od/lpa/news/04/tip040414.htm>.

PSPASES, an MPI-based portable library for computing Cholesky factorization of large sparse, has been used to solve some of the largest sparse linear systems that have been solved using direct methods.

Metis/ParMetis/hMetis (Serial and parallel graph-partitioning libraries developed by Kumar's group are extensively used world-wide at academic institutions, national research labs (e.g., Los Alamos, Sandia, Lawrence Livermore, Army Research Lab, JPL), and commercial organizations under licensing agreement (e.g., HP, SUN, IBM, SGI, Boeing, Ford, Rockwell, NEC, Centric, Ansys, MSC, HKS, AEA, Adapco, Altair, CSAR, STAR Inc., NAG). These libraries have enabled parallel execution of some of the largest computational simulations performed to date, and are routinely included in various Unix distributions such as FreeBSD and Linux. In Fall 1996, the Army Research Office published a brochure on Metis celebrating its success in technology transfer, and summarizing its research accomplishments.

- [1] Mahesh Joshi, George Karypis, Vipin Kumar, and Anshul Gupta, "PSPASES: Scalable Parallel Direct Solver Library for Sparse Symmetric Positive Definite Systems (Version 0.0beta)". Tech Report 97-059, department of computer science, University of Minnesota, 1997.
- [2] George Karypis, Kirk Schloegel, and Vipin Kumar, "ParMETIS: Parallel Graph Partitioning and Sparse Matrix Ordering Library (Version 1.0)". Tech Report 97-060, department of computer science, University of Minnesota, 1997.
- [3] George Karypis and Vipin Kumar, "METIS: A Software Package for Partitioning Unstructured Graphs, Partitioning Meshes, and Computing Fill-Reducing Orderings of Sparse Matrices (Version 3.0.3)". Tech Report 97-061, department of computer science, University of Minnesota, 1997.

## C. REFEREED JOURNAL ARTICLES

- [1] Varun Chandola, Arindam Banerjee, and Vipin Kumar, "Anomaly Detection - A Survey" **ACM Computing Surveys** Vol. 41(3), July 2009
- [2] Gaurav Pandey, Chad L. Myers, and Vipin Kumar, "Incorporating Functional Inter-relationships into Protein Function Prediction Algorithms", **BMC Bioinformatics**, 2009, 10:142.
- [3] Brian Van Ness, Christine Ramos, Majda Haznadar, Antje Hoering, Jeff Haessler, John Crowley, Susanna Jacobus, Martin Oken, Vincent Rajkumar, Philip Greipp, Bart Barlogie, Brian Durie, Michael Katz, Gowtham Atluri, Gang Fang, Rohit Gupta, Michael Steinbach, Vipin Kumar, Richard Mushlin, David Johnson, Gareth Morgan, "Genomic Variation in Myeloma: Design, content, and initial application of the Bank On A Cure SNP Panel to analysis of survival", **BMC Medicine**, 2008, \*6:\*26doi:10.1186/1741-7015-6-26
- [4] Hui Xiong, Michael Steinbach, Arifin Ruslim, Vipin Kumar "Characterizing Pattern Preserving Clustering", **the Knowledge and Information Systems (KAIS) journal** 2008.

- [5] Christopher Potter, Shyam Boriah, Michael Steinbach, Vipin Kumar and Steven Klooster (2007), "Terrestrial vegetation dynamics and global climate controls", **Climate Dynamics** 2008.
- [6] C. Potter, S. Boriah, M. Steinbach, V. Kumar, and S. Klooster, "Terrestrial Vegetation Dynamics and Global Climate Controls in North America: 2001--2005", **Earth Interactions** 2008.
- [7] Varun Chandola and Vipin Kumar, "Summarization: Compressing Data into an Informative Representation", **Knowledge and Information Systems (KAIS)**, August 2007, Vol 12(3).
- [8] Michael Steinbach and Vipin Kumar, "Generalizing the Notion of Confidence", **Knowledge and Information Systems (KAIS)**, August 2007, Vol 12(3).
- [9] Hui Xiong, Michael Steinbach, and Vipin Kumar, "Privacy Leakage in Multi-relational Databases: A Semi-supervised Learning Perspective", **The VLDB Journal** (Special Issue on Privacy Preserving Data Management), VLDB JOURNAL 15 (4): 388-402 NOV 2006.
- [10] Hui Xiong Pang-Ning Tan, and Vipin Kumar, "Hyperclique Pattern Discovery", **Data Mining and Knowledge Discovery (DMKD)**, 13 (2): 219-242 SEP 2006.
- [11] Hui Xiong, Shashi Shekhar, Pang-Ning Tan, and Vipin Kumar, "TAPER: A Two-Step Approach for All-strong-pairs Correlation Query in Large Databases", **IEEE Transactions on Knowledge and Data Engineering (TKDE)**, Volume 18, Number 4, pp. 493-508, April 2006.
- [12] Hui Xiong, Gaurav Pandey, Michael Steinbach, Vipin Kumar, "Enhancing Data Analysis with Noise Removal", **IEEE Transactions on Knowledge and Data Engineering (TKDE)**, vol. 18, no. 3, pp. 304-319, March, 2006.
- [13] Jieping Ye, Qi Li, Hui Xiong, Haesun Park, Ravi Janardan, Vipin Kumar, "IDR/QR: an incremental dimension reduction algorithm via QR decomposition", **IEEE Transactions on Knowledge and Data Engineering (TKDE)**, Vol. 17, No. 9, pp. 1208-1222, September 2005.
- [14] Potter, C., S. Klooster, P. Tan, M. Steinbach, V. Kumar and V. Genovese, "Variability in terrestrial carbon sinks over two decades: Part 2 - Eurasia", **Global and Planetary Change**, 49, 177-186, December 2005.
- [15] C. Potter, P. Ta, V. Kumar, C. Kucharik, S. Klooster, V. Genovese, W. Cohen, S. Healey, "Recent History of Large-Scale Ecosystem Disturbances in North America Derived from the AVHRR Satellite Record", **Ecosystems**, Vol. 8, pp. 808-824, 2005.
- [16] C. Potter, S. Klooster, M. Steinbach, P. Tan, V. Kumar, S. Shekhar, and C. Carvalho, "Understanding Global Teleconnections of Climate to Regional Model Estimates of Amazon Ecosystem Carbon Fluxes", **Global Change Biology**, Vol 10, pages 693-703, 2004.
- [17] Christopher Potter, Pusheng Zhang, Steven Klooster, Vanessa Genovese, Shashi Shekhar, Vipin Kumar "Understanding the Controls of Historical River Discharge Data on Largest River Basins ", **Earth Interactions**, Volume 8 (2), 2004.
- [18] Pang-Ning Tan, Vipin Kumar, Jaideep Srivastava, "Selecting the right objective measure for association analysis" **Information Systems**, Special Issue of selected papers from KDD 2002. Volume 29, Number 4, pp. 293-313, 2003.
- [19] C. Potter, S. Klooster, M. Steinbach, P. Tan, V. Kumar, S. Shekhar, R. Nemani, and R. Myneni, "Global Teleconnections of Ocean Climate to Terrestrial Carbon Flux", **J. of Geophysical Research**, Vol. 108, No. D17, September 2003.
- [20] C. Potter, S. Klooster, M. Steinbach, P. Tan, V. Kumar, R. Myneni, V. Genovese, "Variability in Terrestrial Carbon Sinks Over Two Decades: Part 1-North America", *ft B Earth Interactions*, Vol. 7 (12), 2003.

- [21] Potter, Christopher, Steven Klooster, Ranga Myneni, Vanessa Genovese, Pang-Ning Tan, and Vipin Kumar, "Continental-scale comparisons of terrestrial carbon sinks estimated from satellite data and ecosystem modeling 1982-1998, *Global and Planetary Change*," Volume 39, 2003, 201-213.
- [22] D. J. Challou, M. Gini, V. Kumar, and G. Karypis, "Predicting the Performance of Randomized Parallel Search: An Application to Robot Motion Planning" **Journal of Intelligent and Robotic Systems** Vol. 38, No. 1, pp 31--53, September 2003.
- [23] A. Migdalas, G. Toraldo, and V. Kumar, "Nonlinear Optimization and Parallel Computing", **Parallel Computing**, Volume 29, Number 4, 375-391, April 2003.
- [24] C. Potter, P. Tan, M. Steinbach, S. Klooster, V. Kumar, R. Myneni, V. Genovese, "Major Disturbance Events in Terrestrial Ecosystems Detected using Global Satellite Data Sets", **Global Change Biology** 9 (7), 1005-1021, 2003.
- [25] J. Han, R. B. Altman, V. Kumar, H. Mannila, and D. Pregibon, "Emerging Scientific Applications in Data Mining", **Communications of the ACM** Volume 45, Number 8, pp 54-58, August 2002.
- [26] Pang Tan and Vipin Kumar, Discovery of Web Robot Sessions Based on their Navigational Patterns, **Data Mining and Knowledge Discovery** Volume 6, Number 1, pp 9-35, 2002.
- [27] Kirk Schloegel, George Karypis and Vipin Kumar, Parallel Multilevel Algorithms for Multi-constraint Graph Partitioning **Concurrency Practice & Experience** Volume 14, Issue 3, pages 219-240, 2002. A short version of the paper received the **Distinguished Paper Award** from Euro-Par' 2000.
- [28] Kirk Schloegel, George Karypis and Vipin Kumar, Wavefront Diffusion and LMSR: Algorithms for Dynamic Repartitioning of Adaptive Meshes, **IEEE Transactions on Parallel and Distributed Systems** Volume 12, Number 5, pages 451-466, May 2001.
- [29] Scalable Parallel Data Mining for Association Rules, E.H. Han and G. Karypis and V. Kumar, **IEEE Transactions on Knowledge and Data Engineering**, Volume 12, Number 3, May/June 2000, pp 337-352.
- [30] D. Boley, M. Gini, R. Gross, E. Han, K. Hastings, G. Karypis, V. Kumar, B. Mobasher, and J. Moore, Web Page Categorization and Feature Selection Using Association Rule and Principal Component Clustering, **Decision Support System**, Decision Support Systems, Vol 27, No. 3, pp 329-341, 1999
- [31] G. Karypis, E.H. Han, and V. Kumar, Chameleon: A Hierarchical Clustering Algorithm Using Dynamic Modeling, **IEEE Computer, Special Issue on Data Analysis and Mining**, Volume 32, Number 8, August 1999, pp 68-75. Also appears as Technical Report TR-99-007, Department of Computer Science, University of Minnesota, Minneapolis.
- [32] George Karypis and Vipin Kumar, Parallel Multilevel K-way Partitioning Scheme for Irregular Graphs, **SIAM Review**, Volume 41, Number 2, 1999.
- [33] Ananth Grama and Vipin Kumar, Parallel Search Methods - State-of-the-Art, **IEEE Transactions on Knowledge and Data Engineering** Volume 11, Number 1, 1999, pp 28-35.
- [34] A. Srivastava, E.H. Han, V. Kumar, and V. Singh, Parallel Formulations of Decision-Tree Classification Algorithms, **Data Mining and Knowledge Discovery: Special Issue on Scaling Data Mining Algorithms, Applications and Systems** Volume 3, Issue 3, September 1999; pp. 237-261.
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- [38] George Karypis and Vipin Kumar, A Parallel Algorithm for Multilevel Graph partitioning and Sparse Matrix Ordering, **Journal of Parallel and Distributed Computing** Volume 48, Number 1, January 10, 1998, pp 71-95.
- [39] George Karypis and Vipin Kumar, Multilevel K-way Partitioning Scheme for Irregular Graphs. **Journal of Parallel and Distributed Computing** Volume 48, Number 1, January 10, 1998, pp 96-129.
- [40] Ananth Y. Grama, Vipin Kumar and Ahmed Sameh, Scalable Parallel Formulations of the Barnes-Hut Method for n-Body Simulations, **Parallel Computing**, Volume 24, Number 5-6, June 1998, pp797-822.
- [41] Kirk Schloegel, George Karypis and Vipin Kumar, Multilevel Diffusion Schemes for Repartitioning of Adaptive Meshes **Journal of Parallel and Distributed Computing** Volume 47, Number 2, Dec 15, 1997, pp 109-124.
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- [43] Anshul Gupta, George Karypis and Vipin Kumar, A Highly Scalable Parallel Algorithm for Sparse Matrix Factorization, **IEEE Transactions on Parallel and Distributed Systems** Volume 8, Number 5, May, 1997, pp 502-520. A short version of this paper won the Outstanding Student Paper Award from the Supercomputing 94 conference.
- [44] S. Shekhar, S. Ravada, V. Kumar, G. Turner, and D. Chubb, Declustering and Load Balancing methods for Parallelizing Geographical Information Systems, **IEEE Transactions on Knowledge and Data Engineering** Volume 10, Number 4, pp 632-655, July 1998.
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- [47] Ananth Y. Grama and Vipin Kumar, A Survey of Parallel Search Algorithms for Discrete Optimization Problems, **ORSA Journal of Computing** vol.7, no.4, pp. 365-85, 1995.
- [48] George Karypis and Vipin Kumar, "Unstructured Tree Search on SIMD Parallel Computers", **IEEE Transactions on Parallel and Distributed Systems** Volume 5, Number 10, pp. 1057-1072, October 1994.
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- [50] Vipin Kumar, Shashi Shekhar and Minesh Amin, A Highly Parallel Formulation of Backpropagation on Hypercubes: **IEEE Transactions on Parallel and Distributed Systems** Volume 5, Number 10,

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  - [58] V. Kumar and V. Singh, Scalability of Parallel Algorithms for the All-Pairs Shortest Path Problem, **Journal of Parallel and Distributed Computing (special issue on massively parallel computation)**, Vol 13, #2, 1991, 124-138.
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  - [66] Kumar, V. and Rao, V.N. Parallel Depth-First Search on Multiprocessors Part II: Analysis **International Journal of Parallel Programming** Volume 16, #6, 1987, 501-519.
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#### D. REFEREED CONFERENCE and WORKSHOP PAPERS

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