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RESEARCH INTERESTS

Broad topics: high performance computing, combinatorial scientific computing, and biomedical informatics.

In particular: runtime systems for high performance computing, data-intensive computing, parallel algorithms for scientific applications, grid computing, scheduling, graph and hypergraph partitioning, workload and data decomposition for irregular applications, matrix partitioning and ordering for iterative and direct solvers, parallel graph and hypergraph algorithms, data mining, and large scale genomic and biomedical applications.

EDUCATION

Ph.D. Computer Engineering and Information Science, 2000, Bilkent University, Turkey

Thesis: Hypergraph Models for Sparse Matrix Partitioning and Reordering

M.S. Computer Engineering and Information Science, 1994, Bilkent University, Turkey

B.S. Computer Engineering and Information Science, 1992, Bilkent University, Turkey

PROFESSIONAL EXPERIENCE

Oct 2007-	Associate Professor	Dept. of Biomedical Informatics, Dept. of Electrical and Computer Engineering, The Ohio State University
Jan 2006 – Sep 2007	Assistant Professor	Dept. of Electrical and Computer Engineering, The Ohio State University
Oct 2001 – Sep 2007	Assistant Professor	Dept. of Biomedical Informatics, The Ohio State University
Dec 1999 – Sep 2001	Research Associate	Dept. of Pathology, Division of Informatics, Johns Hopkins Medical Institutions
Dec 1999 – Sep 2001	Visiting Research Scientist	UMIACS, University of Maryland, College Park
Sep 1992 – Nov 1999	Teaching and Research Assistant	Department of Computer Engineering and Information Science, Bilkent University, Turkey

AWARDS, HONORS AND RECOGNITION

- SBS Excellence in Research and Teaching Award, The Ohio State University, College of Medicine, 2008.
- NSF CAREER Award, 2007.
- Best paper award in Algorithms track of the 2007 International Parallel and Distributed Processing Symposium (IPDPS 2007).
- Bilkent University Scholarship, 1992 to cover full tuition and a stipend for the duration of graduate study.
- Bilkent University Scholarship, 1987 to cover full tuition and a stipend for the duration of undergraduate study.
- TUBITAK (The Scientific and Technical Research Council of Turkey) Second Prize in High School Math Contest in Marmara Region, 1987
- TUBITAK (The Scientific and Technical Research Council of Turkey) Third Prize in High School Chemistry Contest in Marmara Region, 1987

GRANTS/CONTRACTS

A. CURRENT:

1. “Taming the scale explosion in nuclear structure calculations”, *National Science Foundation* OCI- 0904809, OSU Principal Investigator, jointly with J.P. Draayer (PI, Louisiana State), J.P. Vary (PI, Iowa State) and M. Sosonkina, 9/1/09 – 8/31/14, \$1,398,413 (OSU total \$330,402).
2. “Enabling Breakthrough Kinetic Simulations of the Magnetosphere via Multi-zone Petascale Computing”, *National Science Foundation* OCI-0904802, OSU Principal Investigator, jointly with H. Karimabadi (PI, UC San Diego), A. Majumdar, Y.A. Omelchenko, K.B. Quest, 8/1/09 – 7/31/13, \$1,457,694 (OSU total \$310,240).

3. “Informatics methods for identifying breast cancer control genes and proteins”, *National Institutes of Health / National Cancer Institute R01CA141090*, multi-PI, jointly with K. Huang, J. D. Parvin, 6/1/2009 - 4/30/2014, \$2,387,430.
4. “High-Performance Radar Signal Processing on Emerging Architectures”, AFRL/DAGSI Ohio Student-Faculty Fellowship program, Faculty PI, jointly with T. Hartley, F. Ozguner, 7/1/08-6/30/10, \$127,043.
5. “CAREER: Scalable Combinatorial Scientific Computing”, *National Science Foundation CNS-0643969*, Principal Investigator, 3/1/07-2/28/12, \$400,000.
6. “SciDAC Institute: Combinatorial Scientific Computing and Petascale Simulations (CSCAPES)”, *US Department of Energy DE-FC02-06ER25775*, OSU Principal Investigator, (Alex Pothen, SciDAC Institute PI, Old Dominion University), 9/15/06-9/14/11, \$7 million (OSU total \$717,900).
7. “High-End Computing and Networking Research Testbed for Next Generation Data Driven, Interactive Applications”, *National Science Foundation CNS-0403342*, Investigator, jointly with D.K. Panda (PI), G. Agrawal, P. Sadayappan, J.H. Saltz, H.-W. Shen, S. Ahalt, H. Ferhatosmanoglu, H.-W. Jin, T.M. Kurç, M. Lauria, D. Lee, R. Machiraju, S. Parthasarathy, P. Sinha, D. Stredney, A. E. Stutz, and P. Wyckoff, 9/1/04-8/30/10, \$3,014,063 (\$1,529,997 from NSF + \$1,484,066 from Ohio Board of Regents and OSU).

B. COMPLETED:

1. “SOFTWARE: Job Scheduling for Data Centers with Multi-level Storage Systems”, *National Science Foundation CCF-0342615*, Co-Principal Investigator, jointly with P. Sadayappan (PI), J.H. Saltz, T.M. Kurç, 9/15/04-8/31/08, \$548,924.
2. “Massive-Scale Semantic Graphs” *US Department of Energy-Lawrence Livermore National Laboratories (subcontract from University of California #B541059)*, Principal Investigator, 9/1/06-10/31/07, \$158,417.
3. “CSR-AES: Collaborative Research: Intelligent Optimization of Parallel and Distributed Applications (WP2)”, *National Science Foundation CNS-0615155*, Investigator, 8/15/06-8/31/08, \$252,999.
4. “Clustering Streaming Graph Data” *US Department of Energy-Lawrence Livermore National Laboratories (subcontract from University of California #B555676)*, Principal Investigator, 10/1/05-8/31/06, \$88,668.
5. “ITR: Collaborative Research (ASE+EVS)-(dmc+sim): Data Driven Simulation of the Subsurface: Optimization and Uncertainty Estimation”, *National Science Foundation CNS-0426241*, Co-Principal Investigator, 10/01/04-9/30/08, \$200,000.
6. “Multi-constraint and multi-objective partitioning-complex networks”, *Department of Energy-Lawrence Livermore National Laboratories (subcontract from University of California)*, Principal Investigator, 7/1/04-9/30/04, \$39,903.
7. “Parallel Hypergraph Partitioning”, *Department of Energy-Sandia National Laboratories Document No: 283793*, Principal Investigator, 5/1/04-9/30/06, \$329,195.
8. “Center for Grid-Enabled Medical Analysis”, *National Institutes of Health - National Institute for Biomedical Imaging and Bioengineering 1P20EB000591*, Co-Principal Investigator, 07/01/03-07/31/07, \$2,109,730.
9. “GridDB-Lite: Database Support for Data-Driven Scientific Applications in the Grid”, *National Science Foundation ANI 0330612*, Co-Principal Investigator, 10/1/03-9/30/06, \$403,000.
10. “Risk-based On-line Accident Management”, *US Department of Energy-Sandia National Laboratories*, Investigator, T. Aldemir (PI), 11/03/04-9/30/06.
11. “Biomedical Informatics Synthesis Platform”, State of Ohio – BRTT Program, Co-Principal Investigator, 2/1/03-7/31/06, \$6 million.
12. “NGS: An Integrated Middleware and Language/Compiler Framework for Data Intensive Applications in a Grid Environment”, *National Science Foundation ACI 0203846*, Co-Principal Investigator, 9/1/02-8/31/06, \$468,068.
13. “Collaborative telemicroscopy project”, Co-Investigator, J.H. Saltz (PI), Ü.V. Çatalyürek, DARPA/ SAIC/HUBS, 4/2/02-12/28/02, \$249,975.

14. "A Data Intense Challenge: The Instrumented Oilfield of the Future", *National Science Foundation EIA0121177*, Senior Personnel, 10/1/01-9/30/04, \$225,000.
15. "NPACI – Programming Tools and Environment Thrust Area, NPACI – Data Intensive Computing Thrust Area", *National Science Foundation – PACI Program ACI 9619020*, Co-Principal Investigator, 10/01/01-09/30/04, \$877,000.
16. "DataCutter: Software support for generating data products from very large datasets", *Department of Energy-Lawrence Livermore National Laboratories (subcontract from University of California)*, Co-Principal Investigator, 06/01/01-05/31/04, \$750,000.

SCHOLARLY PUBLICATIONS

A. BOOK CHAPTERS

1. Ü.V. Çatalyürek, T. Hartley, O. Sertel, M. Ujaldón, A. Ruiz, J.H. Saltz, and M.N. Gurcan, "Processing of Large-Scale Biomedical Images on a Cluster of Multi-Core CPUs and GPUs", *High Performance and Large Scale Computing*, IOS Press, Editors W. Gentsch, L. Grandinetti, G. Joubert, to appear.
2. Ü.V. Çatalyürek, D. Bozdağ, E.G. Boman, K.D. Devine, R. Heaphy and L.A. Riesen, "Hypergraph-based Dynamic Partitioning and Load Balancing", *Advanced Computational Infrastructures for Parallel/Distributed Adaptive Applications*, Wiley Press, Editors M. Parashar, X. Li, S. Chandra, to appear.
3. Ü.V. Çatalyürek, S. Narayanan, O. Sertel, J. Kong, B.B. Cambazoglu, T. Pan, A. Sharma, S. Hastings, S. Langella, S. Oster, T.M. Kurç, M.N. Gurcan and J.H. Saltz, "Service-based Access to and Processing of Large Scientific Datasets", "High Performance Computing (HPC) and Grids in Action", Vol. 16 *Advances in Parallel Computing*, IOS Press, Editor L. Grandinetti, Mar 2008.
4. M. Ribeiro, T.M. Kurç, T. Pan, K. Huang, Ü.V. Çatalyürek, X. Zhang, S. Langella, S. Hastings, S. Oster, R. Ferreira and J.H. Saltz, "Tools for Efficient Subsetting and Pipelined Processing of Large Scale, Distributed Biomedical Image Data", *Grid Computing: The New Frontier Of High Performance Computing*, 14, Elsevier, Editor L. Grandinetti, 2005.
5. T.C. Pan, D. Cowden, Ü.V. Çatalyürek, S. Jewell, S. Hastings, S. Oster, S. Langella, T.M. Kurç, J.H. Saltz, "Virtual Microscopy: Distributed Image Storage, Retrieval, Analysis, and Visualization", *Parallel Computing in Bioinformatics*, John Wiley & Sons, Editor A. Zomaya, 2005.

B. REFEREED JOURNAL ARTICLES

1. Ü.V. Çatalyürek, C. Aykanat and B. Uçar, "On two-dimensional sparse matrix partitioning: Models, Methods, and a Recipe", *SIAM Journal of Scientific Computing*, to appear.
2. Ü.V. Çatalyürek, B. Rutt, K. Metzroth, A. Hakobyan, T. Aldemir, R. Denning, S. Dunagan and D. Kunsman, "Development of a code-agnostic computational infrastructure for the dynamic generation of accident progression event trees", *Reliability Engineering & System Safety*, to appear.
3. Ü.V. Çatalyürek, E.G. Boman, K.D. Devine, D. Bozdağ, R.T. Heaphy, and L.A. Riesen, "A Repartitioning Hypergraph Model for Dynamic Load Balancing", *Journal of Parallel and Distributed Computing*, Vol. 69, No. 8, pp. 711-724, Aug 2009.
4. N. Vydyanathan, S. Krishnamoorthy, G. Sabin, Ü.V. Çatalyürek, T.M. Kurç, P. Sadayappan, and J.H. Saltz, "An Integrated Approach to Locality Conscious Processor Allocation and Scheduling of Mixed Parallel Applications", *IEEE Transaction on Parallel and Distributed Systems*, Vol. 20, No. 8, pp. 1158-1172, Aug, 2009.
5. D. Bozdağ, F. Ozguner, and Ü.V. Çatalyürek, "Compaction of Schedules and a Two-Stage Approach for Duplication-Based DAG Scheduling", *IEEE Transaction on Parallel and Distributed Systems*, Vol. 20, No. 6, pp. 857-871, Jun 2009.
6. A. Ruiz, O. Sertel, M. Ujaldon, Ü.V. Çatalyürek, J.H. Saltz, and M.N. Gurcan, "Stroma classification for neuroblastoma on graphics processors", *International Journal of Data Mining and Bioinformatics*, Vol. 3, No. 3, pp. 280-298, Jun 2009.
7. O. Sertel, J. Kong, H. Shimada, Ü.V. Çatalyürek, J.H. Saltz, and M.N. Gurcan, "Computer-aided Prognosis of Neuroblastoma on Whole-slide Images: Classification of Stromal Development", *Special Issue of Pattern*

Recognition on Digital Image Processing and Pattern Recognition Techniques for the Detection of Cancer, Vol. 42, No. 6, pp. 1093-1103, 2009.

8. S. Erdal, Ü.V. Çatalyürek, P. R. Payne, J. Kamal, J.H. Saltz, and M.N. Gurcan, "A Knowledge-Anchored Integrative Image Search and Retrieval System", *Journal of Digital Imaging*, Vol. 22, No. 2, pp. 166-182, 2009.
9. A. Hakobyan, K. Metzroth, T. Aldemir, R. Denning, S. Dunagan, D. Kunsman, B. Rutt, and Ü.V. Çatalyürek, "Dynamic Generation of Accident Progression Event Trees", *Nuclear Engineering and Design*, Vol. 238, Issue 12, pp. 3457-3467, Dec 2008.
10. O. Sertel, J. Kong, Ü.V. Çatalyürek, G. Lozanski, J.H. Saltz, and M.N. Gurcan, "Histopathological image analysis using model-based intermediate representation and color texture: Follicular Lymphoma grading", *Journal of Signal Processing Systems for Signal, Image, and Video Technology*, 2008.
11. J.H. Saltz, T.M. Kurç, S. Hastings, S. Langella, S. Oster, D. Ervin, A. Sharma, T. Pan, M.N. Gurcan, J. Permar, R. Ferreira, P. Payne, Ü.V. Çatalyürek, E. Caserta, G. Leone, M. C. Ostrowski, R. Madduri, I. Foster S. Madhavan, K. H. Buetow, K. Shanbhag, and E. Siegel, "e-Science, caGrid, and Translational Biomedical Research," *Computer*, Vol. 41, No. 11, pp. 58-66, Nov 2008.
12. D. Bozdağ, A. Gebremedhin, F. Manne, E.G. Boman, and Ü.V. Çatalyürek, "A Framework for Scalable Greedy Coloring on Distributed Memory Parallel Computers," *Journal of Parallel and Distributed Computing*, Vol. 68, No. 4, pp. 515-535, Apr 2008.
13. V. S. Kumar, B. Rutt, T.M. Kurç, Ü.V. Çatalyürek, T. Pan, S. Chow, S. Lamont, M. Martone, and J.H. Saltz. "Large-scale Biomedical Image Analysis in Grid Environments," *IEEE Transactions on Information Technology in Biomedicine*, Vol. 12, No. 2, pp. 154-161, Mar 2008.
14. H. Klie, W. Bangerth, X. Gai, M.F. Wheeler, P.L. Stoffa, M. Sen, M. Parashar, Ü.V. Çatalyürek, J.H. Saltz, and T.M. Kurç, "Models, methods and middleware for grid-enabled multiphysics oil reservoir management", *Engineering with Computers*, Springer Verlag, Vol 22. No. 3, pp. 349-370, 2006.
15. X. Zhang, B. Rutt, Ü.V. Çatalyürek, T.M. Kurç, P. Stoffa, M. Sen, and J.H. Saltz, "Supporting Scalable and Distributed Data Subsetting and Aggregation in Large-Scale Seismic Data Analysis", *The International Journal of High Performance Computing Applications*, Vol. 20, No 3, pp. 423-438, 2006.
16. T.M. Kurç, D.A. Janies, A. Johnson, S. Langella, S. Oster, S. L. Hastings, F. Habib, T. Camerlengo, D.W. Ervin, Ü.V. Çatalyürek, and J.H. Saltz, "An XML-based System for Synthesis of Data from Disparate Databases". *Journal of the American Medical Informatics Association*, Vol. 13, No. 3, May/June, 2006
17. S. Hastings, M. Ribeiro, S. Langella, S. Oster, Ü.V. Çatalyürek, T. Pan, K. Huang, R. Ferreira, J.H. Saltz, and T.M. Kurç: "XML database support for distributed execution of data-intensive scientific workflows", *SIGMOD Record* 34(3): 50-55, September 2005.
18. T.M. Kurç, Ü.V. Çatalyürek, X. Zhang, J.H. Saltz, R. Martino, M. Wheeler, M. Peszynska, A. Sussman, C. Hansen, M. Sen, R. Seifoullaev, P. Stoffa, C. Torres-Verdin, and M. Parashar. "A Simulation and Data Analysis System for Large Scale, Data-Driven Oil Reservoir Simulation Studies", *Concurrency and Computation: Practice and Experience*, John Wiley and Sons, Vol. 17, No 11, pp. 1441-1467, September 2005.
19. S. Hastings, S. Oster, S. Langella, T.M. Kurç, T. Pan, Ü.V. Çatalyürek, and J.H. Saltz, "A Grid Based Image Archival and Analysis System," *Journal of American Medical Informatics Association*, Vol. 12, No. 3, May/June 2005.
20. M. Parashar, H. Klie, Ü.V. Çatalyürek, T.M. Kurç, V. Matossian, J.H. Saltz, and M. Wheeler. "Application of Grid-enabled Technologies for Solving Optimization Problems in Data-Driven Reservoir Studies", *FGCS – The International Journal of Grid Computing: Theory, Methods and Applications*, Elsevier Science Publishers, Vol. 21, Issue 1, pp. 19-26, 2005.
21. C. Aykanat, A. Pinar, and Ü.V. Çatalyürek, "Permuting Sparse Rectangular Matrices into Block-Diagonal Form", *SIAM Journal of Scientific Computing*, Vol. 25, No. 6, pp. 1860-1879, 2004.
22. S. Narayanan, T.M. Kurç, Ü.V. Çatalyürek, and J.H. Saltz. "Database Support for Data-driven Scientific Applications in the Grid", *Parallel Processing Letters*, Vol. 13, No. 2, pp. 245-271, 2003.

23. Ü.V. Çatalyürek, M. D. Beynon, C. Chang, T.M. Kurç, A. Sussman, and J.H. Saltz. “The Virtual Microscope”, IEEE Transactions on Information Technology in Biomedicine, Vol. 7, No. 4, pp. 230-248, 2003.
24. M. Beynon, C. Chang, Ü.V. Çatalyürek, T.M. Kurç, A. Sussman, H. Andrade, R. Ferreira, and J.H. Saltz. “Processing large-scale multidimensional data in parallel and distributed environments”, Parallel Computing, Vol. 28, No. 5, pp. 827-859, Special issue on Data Intensive Computing, May 2002.
25. M. D. Beynon, T.M. Kurç, Ü.V. Çatalyürek, C. Chang, A. Sussman, and J.H. Saltz. “Distributed Processing of Very Large Datasets with DataCutter”, Parallel Computing, Vol. 27, No. 11, pp. 1457-1478, October 2001.
26. T.M. Kurç, Ü.V. Çatalyürek, C. Chang, A. Sussman, and J.H. Saltz. “Exploration and Visualization of Very Large Datasets with the Active Data Repository”, IEEE Computer Graphics & Applications, Vol. 21, No. 4, pp. 24–33, July/August, 2001.
27. Ü.V. Çatalyürek and C. Aykanat. “Hypergraph-Partitioning Based Decomposition for Parallel Sparse-Matrix Vector Multiplication”, IEEE Transaction on Parallel and Distributed Systems, Vol. 10, No. 7, pp. 673-693, 1999.

C. REFEREED CONFERENCE PAPERS

1. B. Uçar and Ü.V. Çatalyürek, “On scalability of hypergraph models for sparse matrix partitioning”, Proceedings of the PDP 2010: 18th Euromicro International Conference on Parallel, Distributed and Network-Based Computing, to appear.
2. G. Teodoro, R. Sachetto, O. Sertel, M.N. Gurcan, W. Meira Jr., Ü.V. Çatalyürek, and R. Ferreira, “Coordinating the Use of GPU and CPU for Improving Performance of Compute Intensive Applications”, Proceedings of the 2009 IEEE International Conference on Cluster Computing, 2009.
3. T.D.R. Hartley, A.R. Rasih, C.A. Berdanier, F. Özgüner, and Ü.V. Çatalyürek, “Investigating the Use of GPU-Accelerated Nodes for SAR Image Formation”, Proceedings of the 2009 IEEE International Conference on Cluster Computing, Workshop on Parallel Programming on Accelerator Clusters (PPAC), 2009.
4. T. Hartley and Ü.V. Çatalyürek, “A Component-Based Framework for the Cell Broadband Engine”, Proceedings of 23rd International Parallel and Distributed Processing Symposium (IPDPS’09), The 18th Heterogeneous Computing Workshop (HCW 2009), May 2009.
5. D. Bozdağ, J. D. Parvin, and Ü.V. Çatalyürek, “A Biclustering Method to Discover Co-regulated Genes Using Diverse Gene Expression Datasets”, Proceedings of First International Conference on Bioinformatics and Computational Biology (BICoB), 2009.
6. H. G. Ozer, D. Bozdağ, T. Camerlengo, J. Wu, Y.W. Huang, T. Hartley, J. Parvin, T. Huang, Ü.V. Çatalyürek, and K. Huang, “A Comprehensive Analysis Workflow for Genome-Wide Screening Data from ChIP-Sequencing Experiments”, Proceedings of First International Conference on Bioinformatics and Computational Biology (BICoB), 2009.
7. D. Bozdağ, C.C. Barbacioru, and Ü.V. Çatalyürek, “Parallel Short Sequence Mapping for High Throughput Genome Sequencing”, Proceedings of 23rd IEEE International Parallel & Distributed Processing Symposium (IPDPS’09), May 2009. *Acceptance rate 23%*.
8. S. Narayanan, Ü.V. Çatalyürek, T.M. Kurç, and J.H. Saltz, “Parallel materialization of large ABoxes”, Proceedings of the 2009 ACM Symposium on Applied Computing (SAC), Honolulu, Hawaii, USA, pp. 1257-1261, 2009.
9. G. Khanna, Ü.V. Çatalyürek, T.Kurç, R. Kettimuthu, P. Sadayappan, I. Foster, and J.H. Saltz, “Using Overlays for Efficient Data Transfer over Shared Wide-Area Networks”, Proceedings of SC2008 High Performance Computing, Networking, and Storage Conference, Nov 2008. *Acceptance rate 21%*.
10. N. Vydyanathan, Ü.V. Çatalyürek, T.M. Kurç, J.H. Saltz, and P. Sadayappan, “A Duplication Based Algorithm for Optimizing Latency Under Throughput Constraints for Streaming Workflows”, 2008 International Conference on Parallel Processing, pp. 254-261, Sep 2008.
11. T. Hartley, Ü.V. Çatalyürek, A. Ruiz, F. Igual, R. Mayo, and M. Ujaldón, “Biomedical Image Analysis on a Cooperative Cluster of GPUs and Multicores”, Proceedings of 22nd ACM International Conference on Supercomputing (ICS’08), Jun 2008. *Acceptance rate 26%*.

12. F. Igual, R. Mayo, T. Hartley, Ü.V. Çatalyürek, A. Ruiz, and M. Ujaldón. "Optimizing co-occurrence matrices on graphics processors using sparse representations", 9th International Workshop on State-of-the-Art in Scientific and Parallel Computing. Trondheim, Norway, May 2008. To appear in Lecture Notes in Computer Science.
13. G. Khanna, Ü.V. Çatalyürek, T.M. Kurç, R. Kettimuthu, P. Sadayappan, and J.H. Saltz, "A Dynamic Scheduling Approach for Coordinated Wide-Area Data Transfers using GridFTP", Proceedings of 22nd IEEE International Parallel & Distributed Processing Symposium (IPDPS'08), Apr 2008.
14. O. Sertel, J. Kong, G. Lozanski, Ü.V. Çatalyürek, J.H. Saltz, and M.N. Gurcan, "Texture classification using non-linear color quantization: Application to histopathological image analysis", Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2008), 2008.
15. O. Sertel, J. Kong, H. Shimada, Ü.V. Çatalyürek, J.H. Saltz, and M.N. Gurcan, "Computer-aided prognosis of neuroblastoma: classification of stromal development on whole-slide images", Proceedings of SPIE Medical Imaging, Feb 2008.
16. O. Sertel, J. Kong, Ü.V. Çatalyürek, J.H. Saltz, M.N. Gurcan, and G. Lozanski, "Computerized microscopic image analysis of follicular lymphoma", Proceedings of SPIE Medical Imaging, Feb 2008.
17. A. Ruiz, O. Sertel, M. Ujaldon, Ü.V. Çatalyürek, J.H. Saltz, and M.N. Gurcan, "Pathological Image Analysis Using the GPU: Stroma Classification for Neuroblastoma", Proceedings IEEE Intl. Conference on Bioinformatics and BioMedicine (BIBM'07), pp. 78-85, Nov 2007.
18. M.N. Gurcan, J. Kong, O. Sertel, B. B. Cambazoglu, J.H. Saltz, and Ü.V. Çatalyürek, "Computerized Pathological Image Analysis For Neuroblastoma Prognosis", 2007 AMIA Annual Symposium, 2007.
19. V. S. Kumar, T.M. Kurç, J. Kong, Ü.V. Çatalyürek, M.N. Gurcan, and J.H. Saltz, "Performance vs. Accuracy Trade-offs for Large-scale Image Analysis", Proceedings of the IEEE Cluster 2007, 2007.
20. L. Weng, Ü.V. Çatalyürek, T.M. Kurç, G. Agrawal, and J.H. Saltz, "Optimizing Multiple Queries on Scientific Datasets with Partial Replicas", Proceedings of the 8th IEEE/ACM International Conference on Grid Computing (GRID 2007), Sep 2007.
21. G. Khanna, Ü.V. Çatalyürek, T.M. Kurç, P. Sadayappan, and J.H. Saltz, "Scheduling File Transfers for Data-Intensive Jobs on Heterogeneous Clusters", Proceedings of Euro-Par, Aug 2007. *Acceptance rate 27%*.
22. N. Vydyanathan, Ü.V. Çatalyürek, T.M. Kurç, J.H. Saltz, and P. Sadayappan, "Toward Optimizing Latency under Throughput Constraints for Application Workflows on Clusters", Proceedings of Euro-Par, Aug 2007. *Acceptance rate 27%..*
23. B. B. Cambazoglu, O. Sertel, J. Kong, J.H. Saltz, M.N. Gurcan, and Ü.V. Çatalyürek, "Efficient Processing of Pathological Images Using the Grid: Computer-Aided Prognosis of Neuroblastoma", Proceedings of the International Workshop on Challenges of Large Applications in Distributed Environments (CLADE'07), Jun 2007.
24. T. Tavares, G. Teodoro, T.M. Kurç, R. Ferreira, D. O. G. Neto, W. Meira Jr., Ü.V. Çatalyürek, S. Hastings, S. Oster, S. Langella, and J.H. Saltz, "An Efficient and Reliable Scientific Workflow System", CCGRID 2007, pp. 445-452, May 2007.
25. T.M. Kurç, X. Zhang, M. Parashar, H. Klie, M. F. Wheeler, Ü.V. Çatalyürek, and J.H. Saltz, "Dynamic Data-Driven Systems Approach for Simulation Based Optimizations", International Conference on Computational Science (1) 2007, Lecture Notes in Computer Science 4487 Springer 2007, pp. 1213-1221, May 2007.
26. Ü.V. Çatalyürek, E.G. Boma, K.D. Devine, D. Bozdağ, R. Heaphy, and L.A. Riesen, "Hypergraph-based Dynamic Load Balancing for Adaptive Scientific Computations", Proceedings of 21st IEEE International Parallel & Distributed Processing Symposium (IPDPS'07), April 2007. *Won best paper award in the Algorithms track.*
27. S. Erdal, Ü.V. Çatalyürek, J.H. Saltz, J. Kamal, and M.N. Gurcan, "Flexible patient information search and retrieval framework: Pilot Implementation", PACS and Imaging Informatics, SPIE Symposium on Medical Imaging, 2007.
28. S. Krishnamoorthy, Ü.V. Çatalyürek, J. Nieplocha, A. Rountev, and P. Sadayappan, "Hypergraph Partitioning for Automatic Memory Hierarchy Management", Proceedings of SC2006 High Performance Computing, Networking, and Storage Conference, Nov 2006. *Acceptance rate 23%*.

29. V. S. Kumar, B. Rutt, T.M. Kurç, Ü.V. Çatalyürek, S. Chow, S. Lamont, and J.H. Saltz, “Large Image Correction and Warping in a Cluster Environment”, Proceedings of SC2006 High Performance Computing, Networking, and Storage Conference, Nov 2006. *Acceptance rate 23%*.
30. T. Hartley, Ü.V. Çatalyürek, F. Özgüner, A. Yoo, S. Kohns and K. Henderson, “MSSG: A Framework for Massive Scale Semantic Graphs”, Proceedings of 2006 IEEE International Conference on Cluster Computing, Sep 2006.
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TEACHING

I. CURRICULUM DEVELOPMENT

Since the inception of the Department of Biomedical Informatics at the Ohio State University, I have been heavily involved with the curriculum development in the BMI department. Together with Profs. Saltz and Kurc, we have designed Bioinformatics Track in Integrated Biomedical Science Graduate Program (IBGP), and developed three new courses (IBGP/BMI 705, BMI 730 and BMI 731).

As the Chair of BMI Curriculum Committee, I am spearheading the development of a comprehensive doctoral and masters-level training program in Biomedical Informatics. We have developed 9 new courses, including new introductory courses, advanced theory and methods courses, as well as seminar series in the department’s specialization areas. The new introductory courses will be taught starting Fall 2009.

In ECE, I have revised ECE 864 Advanced Computer Design and developed and taught a new course ECE 694J Scientific Computing on Emerging Architectures.

J. COURSES TAUGHT

Graduate Courses

1. BMI 731 Advanced Topics in Biomedical Data Management, Wi’04, Wi’05, Wi’06, Wi’07.
2. ECE 864 Advanced Computer Design, Wi’06, Wi’07.
3. ECE 694J Scientific Computing on Emerging Architectures, Wi’09.

Others

1. Combinatorial Scientific Computing Summer School for High School Students, Aug 2008.

K. STUDENT SUPERVISION

Postdoctoral Students

1. Doruk Bozdağ, January 2009-present
2. Erik Saule, January 2009-present

Ph.D. Students

2. Doruk Bozdağ, “Graph Coloring and Clustering Algorithms for Science and Engineering Applications”, December 2008.
3. Olcay Sertel (co-advising with Metin Gurcan), September 2006-present.
4. Timothy Hartley, January 2007-present.
5. Ayat Dawood-Hatem, September 2009-present

MS Students with Thesis

6. Doruk Bozdağ, ECE (co-advised with Füsün Özgüner), “A Task Duplication Based Scheduling Algorithm Using Partial Schedules”, December 2004.
7. Elif Sariarslan, ECE (co-advised with Füsün Özgüner), “Matching Algorithms in Multilevel Hypergraph Partitioning”, May 2005.
8. Timothy Hartley, ECE (co-advised with Füsün Özgüner), “MSSG: A Framework for Massive-Scale Semantic Graphs”, November 2006.
9. Ashwin Shiv Kumar, CSE, September 2008-present.
10. Lakshmi Prabha Kumarasamy, ECE, September 2009-present.
11. Kemal Eren, CSE, September 2009-present.

12. Arun C. Sundaram, CSE, September 2009-present.

MS Students non-Thesis

1. Arun Cecil, ECE, March 2009.

L. GRADUATE EXAMINATION COMMITTEES

PhD Candidacy & Dissertation

1. Nilgun Ferhatosmanoglu (advisor Theodore T. Allen), ISWE, June 2006.
2. Gokhan Korkmaz (advisor Eylem Ekici), ECE, Dissertation, September 2006.
3. Li Weng (advisor Gagan Agrawal), CSE, May 2005, Dissertation October 2006.
4. Aram Hakobyan (advisor Tunc Aldemir), Nuclear Eng., March 2006, Dissertation, August 2006.
5. Justin Teller (advisor Füsün Özgüner), ECE, Dissertation, September 2007, Dissertation, May 2008.
6. Nagavijayalakshmi Vydyanathan (advisor P. Sadayappan), CSE, May 2007, Dissertation, May 2008.
7. Gaurav Khanna (advisor P. Sadayappan), CSE, June 2007, Dissertation, June 2008,
8. Sivaramakrishnan Narayanan (advisor Joel H. Saltz), CSE, December 2006, Dissertation, August 2008.
9. Marianne Lee (advisor Ralf Bundschuh), Biophysics, August 2006, Dissertation, March 2009.
10. Duygu Uçar, CSE (advisor Srinivasan Parthasarathy), Dissertation, August 2009.
11. Veronika Rehn-Sonigo, ENS Lyon and Universitat Passau (advisors: Herald Kosch and Yves Robert), Dissertation, July 2009.
12. Vijay Kumar, CSE, April 2009.
13. Boangoat Jarupan, ECE, June 2009.
14. Selnur Erdal, ECE, August 2009.

MS

1. Yaoyao Gu, ECE, May 2006.
2. Kyle Metzroth, Nuclear Eng, December 2007,
3. Mansoor Khan, ECE, Feb 2009.

RESEARCH SOFTWARE DISTRIBUTIONS

1. *Zoltan*: Parallel Partitioning, Load Balancing and Data-Management Services. Contributed to the design and development of parallel hypergraph partitioner and distributed memory distance-1 and distance-2 graph coloring algorithms. Zoltan is an open source project: <http://www.cs.sandia.gov/Zoltan/>
2. *STORM* (a.k.a. GridDB-Lite): STORM is a services-oriented middleware that is designed to provide basic database support for data selection queries on flat-file distributed datasets. STORM is an open source project and part of NSF Middleware Initiative, since Release 5. <http://storm.bmi.ohio-state.edu>
3. *DataCutter*: A component-based framework that allows users to execute their applications in distributed and heterogeneous environments. DataCutter is an open source project: <http://datacutter.osu.edu>
4. *PaToH*: PaToH (Partitioning Tools for Hypergraph) is a fast multilevel hypergraph-partitioning tool. Binary distribution also includes open source *PaToH Matlab Interface* that provides sparse matrix partitioning routines in Matlab. <http://bmi.osu.edu/~umit/software.html>

PROFESSIONAL SERVICE & ACTIVITIES

A. EDITORIAL

- Subject Area Editor, Parallel Computing, Elsevier, 2008-

B. ORGANIZING COMMITTEES:

- Workshops Chair, 24th IEEE International Parallel & Distributed Processing Symposium (IPDPS 2010).
- Organizer, Minisymposium on Parallel Algorithms and Software for Massive Graphs, SIAM Conference on Parallel Processing & Scientific Computing (PP10), Seattle, WA, Feb 25, 2010.
- Workshops Vice-Chair, 23rd IEEE International Parallel & Distributed Processing Symposium (IPDPS 2009).

- Co-Chair, Networks, Parallel and Distributed Computing track of the 24th International Symposium on Computer and Information Sciences (ISCIS 2009).
- Organizing Committee Member, Minisymposium on Combinatorial Scientific Computing and CS&E, SIAM Conference on Computational Science & Engineering (CSE09), Miami, FL, March 2, 2009.
- Organizing Committee Member, Minisymposium on Parallel Sparse Matrix Computations and Enabling Algorithms, SIAM Conference on Computational Science & Engineering (CSE09), Miami, FL, March 2, 2009.
- Organizing Committee Member, Workshop on Combinatorial Scientific Computing & Petascale Simulations, Santa Fe, NM, June 10-13, 2008.

C. PROGRAM COMMITTEE MEMBER

- IPDPS 2010 PhD Forum, April 2010.
- 39th International Conference on Parallel Processing (ICPP-2010), 2010.
- PAPP 2010, Seventh International Workshop on Practical Aspects of High-level Parallel Programming, May 2010.
- 15th IEEE International Conference on Parallel and Distributed Systems (ICPADS'09), December 2009.
- SC Doctoral Research Showcase Committee, 2009.
- 16th IEEE International Conference on High Performance Computing (HiPC 2009), December 2009.
- The Forth SIAM Workshop on Combinatorial Scientific Computing (CSC'09), Oct 2009.
- PAPP 2009, Sixth International Workshop on aPplications of declArative and object-oriented Parallel Programming, May 2009.
- IPDPS 2009 TCPP PhD Forum, May 2009.
- Ohio Collaborative Conference on Bioinformatics (OCCBIO'09), June 2009.
- High Performance Computation Conference (HPCC'09), June 2009.
- High Performance Computing Symposium (HPC 2008), March 2009.
- 15th IEEE International Conference on High Performance Computing (HiPC 2008), December 2008.
- 14th IEEE International Conference on Parallel and Distributed Systems (ICPADS'08), December 2008.
- 22nd IEEE International Parallel & Distributed Processing Symposium (IPDPS'08), April 2008.
- High Performance Computation Conference (HPCC'08), September 2008.
- Ohio Collaborative Conference on Bioinformatics (OCCBIO'08), June 2008.
- Challenges of Large Applications in Distributed Environments (CLADE'08), June 2008.
- High Performance Computing Symposium (HPC 2008), April 2008.
- PAPP 2008, Fifth International Workshop on aPplications of declArative and object-oriented Parallel Programming, June 2008.
- High Performance Computation Conference (HPCC'07), Sep 2007.
- Challenges of Large Applications in Distributed Environments (CLADE'07), June 2007.
- High Performance Computing Symposium (HPC 2007), March 2007.
- 21st IEEE International Parallel & Distributed Processing Symposium (IPDPS'07), Apr 2007.
- Challenges of Large Applications in Distributed Environments (CLADE'06), June 2006.
- High Performance Computing Symposium (HPC 2006), April 2006.
- The 6th IEEE/ACM International Workshop on Grid Computing (Grid 2005), November 2005.
- Challenges of Large Applications in Distributed Environments (CLADE'05), June 2005.
- High Performance Computing Symposium (HPC 2005), April 2005.
- The 19th International Symposium on Computer and Information Sciences (ISCIS'04), October 2004.
- Challenges of Large Applications in Distributed Environments (CLADE'04), June 2004.

D. REFEREE

Proposals:

- NIH Go Grants, ARRA Special Emphasis Panel, Aug 2009.
- NSF-OCI Strategic Technologies For CI (STCI), 2007.

Journals:

- Bioinformatics
- SIAM Journal on Scientific Computing
- IEEE Transactions on Parallel and Distributed Systems
- IEEE Transactions on Computational Biology and Bioinformatics
- Journal of Parallel and Distributed Computing,
- Parallel Computing
- Cluster Computing

Publishers:

- Cambridge University Press
- John Wiley & Sons, Inc.

Conferences:

- IPDPS: International Parallel & Distributed Processing Symposium
- HPDC: High Performance Distributed Computing
- SC: International Conference for High Performance Computing, Networking, Storage and Analysis
- Grid: International Workshop on Grid Computing
- Cluster: Cluster Computing
- CLADE: Challenges of Large Applications in Distributed Environments
- High Performance Computing Symposium

E. SESSION CHAIR

- The Forth SIAM Workshop on Combinatorial Scientific Computing (CSC'09), Oct 29-31, 2009.
- 21st IEEE International Parallel & Distributed Processing Symposium (IPDPS'07), Apr 2007.
- The 6th IEEE/ACM International Workshop on Grid Computing (Grid 2005), November 2005.
- Workshop on Combinatorial Scientific Computing & Petascale Simulations, Santa Fe, NM, Jun 2008.

F. PROFESSIONAL MEMBERSHIPS

- Association for Computing Machinery (ACM).
- Institute for Electrical and Electronics Engineers (IEEE).
- Institute for Electrical and Electronics Engineers Computer Society (IEEE-CS).
- Society for Industrial and Applied Mathematics (SIAM) and SIAM activity groups on Supercomputing, and Computational Science and Engineering

G. UNIVERSITY SERVICE

Biomedical Informatics Department

- Executive Committee, 2007-present, Chair.
- P&T Committee, 2007-2009, Member, 2009-present, Chair.
- Curriculum Committee, 2001-2006, Member, 2007-present, Chair.
- Faculty Recruiting Committee, 2001-present, Member.
- Systems Committee, 2004-2006, Chair.
- Operations Committee, 2004-2007, Member.

Electrical and Computer Engineering

- Graduate Recruiting & Financial Aid, 2008-2010, Member.

College

- Graduate Education Committee, College of Medicine and Public Health, 2003-2006, Member.
- IBGP Graduate Studies Committee, College of Medicine, 2007-2008, Member.
- OSUMC Research Committee, 2007-present, Member.

PRESENTATIONS

A. NATIONAL/INTERNATIONAL MEETINGS

- “Partitioning Sparse Matrices”, Minisymposium on Combinatorial Scientific Computing and CS&E, SIAM Conference on Computational Science & Engineering (CSE09), Miami, FL, March 2, 2009.
- “Parallel Short Sequence Mapping for High Throughput Genome Sequencing”, Dagstuhl Combinatorial Scientific Computing Seminar, Wadern, Germany, Feb 5, 2009.
- “Using Overlays For Efficient Data Transfer Over Shared Wide-Area Networks”, Supercomputing 2008 Austin, TX, Nov 20, 2008.
- “Service Oriented access to HPC Resources: A case study – OSC Bioscience Cluster”, SC’08 Workshop on Supercomputing, Multicore Architectures, and Biomedical Informatics, in conjunction with Supercomputing 2008 Austin, TX, Nov 17, 2008.
- “Processing of Large-Scale Biomedical Images on a Cluster of Multi-Core CPUs and GPUs”, International Advanced Research Workshop on High Performance Computing and Grids, July 4, 2008, Cetraro, Italy.
- “Dynamic Load Balancing & Matrix Partitioning”, Workshop on Combinatorial Scientific Computing & Petascale Simulations, Santa Fe, NM, Jun 10, 2008.
- “Tutorial: The Zoltan Toolkit”, with Karen Devine and Cedric Chevalier, Workshop on Combinatorial Scientific Computing & Petascale Simulations, Santa Fe, NM, Jun 12, 2008.
- “Multi-Objective Scheduling of Streaming Workflows”, 2nd “Scheduling in Aussois” Workshop, Aussois, French Alps. May 21, 2008.
- “Hypergraph-based Dynamic Load Balancing for Adaptive Scientific Computations”, Minisymposium on Combinatorial Scientific Computing, 6th International Congress on Industrial and Applied Mathematics (ICIAM’07), Zurich, Switzerland, Jul 16th 2007.
- “Dynamic Load Balancing for Adaptive Scientific Computations via Hypergraph Partitioning”, 21st IEEE International Parallel & Distributed Processing Symposium (IPDPS’07), Long Beach, California, March 28, 2007.
- “How Scalable is Your Load Balancer?”, Minisymposium on Combinatorial Scientific Computing and Petascale Simulations, SIAM Conference on Computational Science and Engineering (SIAM CSE’07), Costa Mesa, California, February 19-23, 2007.
- “Application of Grid Technology in Cancer Research: Middleware and Tools”, International Advance Research Workshop on High Performance Computing and Grids, Cetraro, Italy, July 6th, 2006
- “Distributed Dynamic Event Tree Generation for Reliability and Risk Assessment”, the International Workshop on Challenges of Large Applications in Distributed Environments (CLADE’06), Paris, France, June 19th, 2006.
- “Parallel Hypergraph Partitioning for Scientific Computing”, 20th IEEE International Parallel & Distributed Processing Symposium (IPDPS’06), Rhodes, Greece, Apr 2006.
- “Scheduling of Tasks with Batch-shared I/O on Heterogeneous Systems”, 20th International Parallel and Distributed Processing Symposium (IPDPS), The 15th Heterogeneous Computing Workshop (HCW 2006), Rhodes, Greece, Apr 2006.
- "STORM", Second DIALOGUE Workshop: Applications-Driven Issues in Data Grids, Edinburgh, UK, Feb 10th, 2006.
- “Servicing Seismic and Oil Reservoir Simulation Data”, VLDB Workshop on Data Management in Grids, Trondheim, Norway, Sep 2005.

- "STORM - Overview", First DIALOGUE Workshop: Applications-Driven Issues in Data Grids, Columbus OH, Aug 2nd, 2005.
- "A Hypergraph Partitioning Based Approach for Scheduling of Tasks with Batch-shared I/O", Cluster Computing and Grid 2005 (CCGrid05), Cardiff, Wales, UK, May 2005.
- "Servicing Range Queries on Multidimensional Datasets with Partial Replicas", Cluster Computing and Grid 2005 (CCGrid05), Cardiff, Wales, UK, May 2005.
- "Supporting Large Scale Data Driven Science in Distributed Environments", Minisymposium on Distributed Data Management Infrastructures for Scalable Computational Science and Engineering Applications, SIAM Conference on Computational Science and Engineering (SIAM CSE'05), February 12-15, 2005.
- "Hypergraph Models for Load Balancing Irregular Applications, " mini-symposium on Load Balancing for Emerging Applications, in SIAM Conference on Parallel Processing for Scientific Computing, February 2004.
- "A Component-based Implementation of Multiple Sequence Alignment", 18th ACM Symposium on Applied Computing (SAC2003) Bioinformatics Track, Melbourne, FL, March 2003.
- "Executing Multiple Pipelined Data Analysis Operations in the Grid", 2002 ACM/IEEE SC2002 Conference. Baltimore, MD, November 2002.
- "A Hypergraph-Partitioning Approach for Coarse-Grain Decomposition", 2001 ACM/IEEE SC2001 Conference, Denver, CO, November 2001.
- "A Fine-Grain Hypergraph Model for 2D Decomposition of Sparse Matrices", International Parallel and Distributed Processing Symposium (IPDPS), 8th International Workshop on Solving Irregularly structured Problems in Parallel (Irregular 2001), San Francisco, CA, April 2001.

B. OTHER ACADEMIC INSTITUTIONS

- "Combinatorial Scientific Computing on Petascale Machines", Petascale Applications Symposium, Pittsburgh Supercomputing Center, June 22-23, 2007.
- "Parallel Hypergraph Partitioning for Scientific Computing", Mathematics Institute, Utrecht University, the Netherlands, August 16, 2005.
- "Runtime and Compiler Support for Large Scale Data Driven Science", Lawrence Livermore National Laboratory, Institute for Scientific Computing Research, November 17, 2004.
- "Middleware Infrastructure for Large-Scale Data Management", ASC VIEWS Alliance Forum, Salt Lake City, Utah, July 2004.
- "Hypergraph-Partitioning Approaches for Workload Decomposition", Discrete Algorithms and Mathematics Department, Sandia National Laboratories, July 2002.

C. OHIO STATE

- "Processing of Large-Scale Biomedical Images on a Cluster of Multi-Core CPUs and GPUs", Ohio Supercomputer Center Workshop on Accelerating simulations with NVIDIA GPU hardware, Feb 19, 2009.
- "Parallel Short Sequence Mapping for High Throughput Genome Sequencing", Dept. of Biomedical Informatics Research In Progress Meeting, Jan 22nd, 2009.
- "Service Oriented Bioscience Cluster at OSC", Software Applications and Codes Meeting for the Ohio Supercomputer Center Bioscience Cluster Expansion, April 4th, 2008.
- "Task Scheduling for Data-Intensive Tasks with Batch-shared I/O", Department of Industrial, Welding and Systems Engineering, April 25th, 2007.
- "Parallel Hypergraph Partitioning and its Applications", Department of Electrical and Computer Engineering, June 27th, 2005.
- "Improving Performance of Multiple Sequence Alignment Analysis in Multi-client Environments", Medical Informatics Group, June 13, 2002.
- "Virtual Microscope", Department of Anatomy & Medical Education, February 13, 2002.