

## Steven R. Seidel

September 10, 2012

- EDUCATION:** Ph.D. 1979 Computer Science      University of Iowa  
M.S. 1975 Computer Science      Iowa City, Iowa
- B.A. 1973 Mathematics      St. Olaf College  
Northfield, Minnesota
- EXPERIENCE:** Professor of Computer Science      Aug., 2007 – present  
Associate Professor of Comp. Sci.      Sept., 1991 – Aug., 2007  
Assistant Professor of Comp. Sci.      Aug., 1984 – Sept., 1991  
Department of Computer Science  
Michigan Technological University
- Sabbatical Leave      Sept., 2003 – May, 2004  
High Performance Technical Computing Division  
Hewlett-Packard Company  
Nashua, New Hampshire
- Sabbatical Leave      Sept., 1992 – May, 1993  
Mathematical Sciences Section  
Engineering Physics and Mathematics Division  
Oak Ridge National Laboratory
- Assistant Professor of Comp. Sci.      Aug., 1979 – May, 1984  
Instructor of Comp. Sci.      Aug., 1978 – Aug. 1979  
Mathematical Sciences Department  
Virginia Commonwealth University

### RESEARCH INTERESTS:

Parallel computing, especially interprocessor communication algorithms and performance analysis on clusters, SMP's and massively parallel platforms. Unified Parallel C (UPC) language support, including run time system development and collective communication specification, implementation, and performance.

### PUBLICATIONS:

Wallace, C., S. Seidel, and A. Ebneenasir, A Programmer-friendly UPC memory model specification, *PGAS 12: Proceedings of the Sixth Conference on Partitioned Global Address Space Programming Models*, October, 2012 (to appear).

G. Howell and S. Seidel (eds.) *Proceedings of the 2012 Spring Simulation Multiconference, High Performance Computing Symposium 2012 (HPC 2012)*, Society for Modeling and Simulation International, Vista, CA, March, 2012.

- L. T. Watson, G. Howell, W. I. Thacker, and S. Seidel (eds.) *Proceedings of the 2011 Spring Simulation Multiconference, High Performance Computing Symposium 2011 (HPC 2011)*, Society for Modeling and Simulation International, Vista, CA, April, 2011, iv+174 pages.
- Vormwald, S., W. Wang, S. Carr, S. Seidel, and Z. Wang, Predicting remote reuse distance patterns in UPC applications, *PGAS 10: Proceedings of the Fourth Conference on Partitioned Global Address Space Programming Models* (Workshop), October, 2010.
- Franklin, B., and S. Seidel, A Parallel longest common subsequence algorithm in UPC, (Best Paper award), *Proceedings of the 2010 Spring Simulation Multiconference, High Performance Computing Symposium 2010 (HPC 2010)*, Society for Modeling and Simulation International, Vista, CA, April, 2010.
- El-Ghazawi, T. and S. Seidel (eds.), *PGAS 09: Proceedings of the Third Conference on Partitioned Global Address Space Programming Models*, ACM, New York, NY, 2009.
- Simonton, E., B. Choi, and S. Seidel, Using gossip for dynamic resource discovery, *Proc. of the International Conference on Parallel Processing (ICPP)*, August, 2006.
- Zhang, Z., and S. Seidel, A Performance model for fine-grain accesses in UPC, *Proc. of the International Parallel and Distributed Processing Symposium (IPDPS)*, April, 2006.
- Zhang, Z., J. Savant, and S. Seidel, A UPC runtime system based on MPI and POSIX threads, *Proc. of the 14th Euromicro Conf. on Parallel, Distributed and Network-based Processing*, Feb., 2006.
- Zhang, Z., and S. Seidel, Performance benchmarks of current UPC systems, *IPDPS Workshop on Performance Modeling, Evaluation, and Optimization of Parallel and Distributed Systems*, April, 2005.
- Seidel, S., D. Greenberg, and E. Wiebel, UPC collectives operation specification (V1.0), Appendix B in *UPC: Distributed Shared-Memory Programming*, El-Ghazawi *et al.*, Wiley, 2005, 183-201.
- Park, S., and S. Seidel, Fault-tolerant broadcasting in wormhole-routed torus networks, *Proc. of the International Parallel and Distributed Processing Symposium (IPDPS)*, April, 2002.
- VanVoorst, B., and S. Seidel, Comparison of MPI implementations on a shared memory architecture, *IPDPS Workshop on Embedded/Distributed HPC Systems and Applications*, appearing in *Lecture Notes in Computer Science 1800*, Jose Rolim *et al.* (Ed.), Springer, April 2000, 847-854.
- Seidel, S. R., and M. Davis, Global synchronization algorithms for the Intel iPSC/860, *International Journal of High Speed Computing* 6, 4 (Dec. 1994), 537-556.
- Takkella, S. S., and S. R. Seidel, Complete exchange and broadcast algorithms for meshes, *Proc. of the Scalable High Performance Computing Conf.*, May 1994, 422-428.
- VanVoorst, B., S. R. Seidel and E. Barszcz, Profiling the communication workload of an iPSC/860, *Proc. of the Scalable High Performance Computing Conf.*, May 1994, 221-228.

Graham, S. W., and S. R. Seidel, The cost of broadcasting on star graphs and  $k$ -ary hypercubes, *IEEE Transactions on Computers* 42, 6 (June 1993) 756-759.

Seidel, S. R., and M. Davis, A Global synchronization algorithm for the Intel iPSC/860, *Proc. of the Scalable High Performance Computing Conference*, April 1992, 220-223.

Seidel, S. R., M. Lee and S. Fotedar, Concurrent bidirectional communication on the Intel iPSC/860 and iPSC/2, *Proc. of the Sixth Distributed Memory Computing Conference*, April 1991, 283-286.

Seidel, S. R., and T. E. Schmiermund, Refining the communication model for the Intel iPSC/2, *Proc. of the Fifth Distributed Memory Computing Conference*, April 1990, 1334-1342.

Seidel, S. R., Circuit-switched vs. store-and-forward solutions to symmetric communication problems, *Proc. of the Fourth Conference on Hypercubes, Concurrent Computers and Applications: Vol I*, March 1989, 253-255.

Seidel, S. R., and W. L. George, A binsorting algorithm for hypercubes, *Proc. of the 1988 Array Conference*, Dallas, Tex., April 1988, 133-141.

Seidel, S. R., and W. L. George, Binsorting on hypercubes with  $d$ -port communication, *Proc. of the Third Conference on Hypercube Concurrent Computers and Applications: Vol II – Applications*, ACM Press, 1988, 1455-1461.

Seidel, S. R., The FPS T-Series as a  $k$ -ary hypercube, *Proc. of the 1987 Array Conference*, Montreal, April 1987, 139-144.

Seidel, S. R., and L. R. Ziegler, Sorting on hypercubes, *Proc. of the Second Conference on Hypercube Multiprocessors*, SIAM, Philadelphia, 1987.

Morris, J. R., Scott, S., Seidel, S. R., and Wood, J. A., Using CAI to supplement audio-tutorial algebra instruction: A case study, *Collegiate Microcomputer* 4, 3 (Aug. 1986), 243-253.

Seidel, S. R., QuadSurf: A Graphics System for 3-Dimensional Halftone Images, *Proc. Third Annual Symposium on Small Computers in the Arts*, Philadelphia, Pa., October, 1983, 41-47.

Seidel, S. R., Plotting Curves on Low Resolution Graphics Systems, *Proc. 21st Southeast Region ACM Conference*, Durham, N.C., April 1983, 51-54.

Seidel, S. R., Scanning on the Fly: An Approach to the User Interface, *Computers and Education* 7, 3 (March, 1983), 153-165.

## **Erdős number: 2**

## **OTHER WORK:**

Song, L., and S. Seidel, User defined data distributions in UPC, *PGAS 12: Proceedings of the Sixth Conference on Partitioned Global Address Space Programming Models*, (Poster and abstract) October, 2012 (to appear).

Song, L., and S. Seidel, A Fast longest common subsequence algorithm for finding similar sequences in a genome database, (Presentation), Great Lakes Bioinformatics Conference, May, 2011.

S. Seidel, One-sided UPC collectives, (Poster), Partitioned Global Address Space Programming Models Conference, Oct., 2006.

El-Ghazawi, T., S. Seidel, and P. Merkey, High performance parallel programming with Unified Parallel C (UPC), (Tutorial), Supercomputing '05, Nov., 2005,  
[https://crd.lbl.gov/UPC/index.php/Language\\_Tutorials](https://crd.lbl.gov/UPC/index.php/Language_Tutorials).

Savant, J., S. Seidel, and B. Wibecan, The MuPC run time system for UPC, (Poster), Supercomputing '02, Nov., 2002.

### **SOFTWARE:**

Savant, J., Z. Zhang, and S. Seidel, MuPC UPC run time system,  
<http://www.upc.mtu.edu/software/MuPC-1.1.2-beta.tar.gz>, Oct., 2005.

Seidel, S., UPC collectives reference implementation,  
<http://www.gwu.edu/~upc/downloads/UPC-Coll-RefImp.tar>, Feb., 2004.

### **INVITED ADDRESSES:**

“How can the partitioned global address space model be relevant to mainstream computing?”, Invited panelist with William Carlson (IDA), John Gustafson (Intel), and Kathy Yelick (University of California, Berkeley) at PGAS 10: Fourth Conference on Partitioned Global Address Space Programming Models, October, 2010.

“One-Sided and Extended UPC Collectives”, IBM T. J. Watson Research Center, Hawthorne, New York, May, 2008.

“An Overview of UPC”, Honeywell Laboratories, Minneapolis, Minn., May, 2006.

“Collective Functions in UPC”, Hewlett-Packard Company, Nashua, New Hamp., Mar. 2003.

“Broadcasting on Linear Arrays and Meshes”, UT-ORNL Parallel Seminar, University of Tennessee, Knoxville, Tenn., Apr., 1993.

“Broadcasting on Linear Arrays and Meshes”, Seminar, Oak Ridge National Laboratory, Oak Ridge, Tenn., Mar., 1993.

“Concurrent Bidirectional Communication on the Intel iPSC/860 and iPSC/2”, NASA Ames Research Center, Moffet Field, Calif., May, 1991.

“Communication Algorithms for d-Port Hypercubes”, Clemson University, Clemson, South Carolina., Jan., 1987

“Computer Science Research at MTU’s Center for Experimental Computation”, Clemson University, Clemson, South Carolina, October, 1986

## SELECTED REPORTS:

Ryne, Z., and S. Seidel, Specifications for one-sided collective operations in UPC, v0.2, [https://crd.lbl.gov/UPC/index.php/Proposed\\_Specifications\\_and\\_Draft\\_Standards](https://crd.lbl.gov/UPC/index.php/Proposed_Specifications_and_Draft_Standards), 2005.

Ryne, Z., and S. Seidel, UPC extended collective operations specification, v0.3, [https://crd.lbl.gov/UPC/index.php/Proposed\\_Specifications\\_and\\_Draft\\_Standards](https://crd.lbl.gov/UPC/index.php/Proposed_Specifications_and_Draft_Standards), 2005.

Ryne, Z., and S. Seidel, A Specification of the extensions to the collective operations of Unified Parallel C, *Tech. Rep. 05-08*, Michigan Tech., Dept. of Computer Science, 2005.

Dhamne, P., and S. Seidel, Implementing UPC's MYSYNC synchronization mode using pairwise synchronization of threads, *Tech. Rep. 05-07*, Michigan Tech., Dept. of Computer Science, 2005.

Begum, K., and S. Seidel, Implementing sort in UPC: performance and optimization, *Tech. Rep. 05-06*, Michigan Tech., Dept. of Computer Science, 2005.

Mishra, A., and S. Seidel, High performance Unified Parallel C (UPC) collectives for Linux/Myrinet platforms, *Tech. Rep. 04-05*, Michigan Tech., Dept. of Computer Science, 2004.

Wiebel, E., D. Greenberg, and S. Seidel, UPC Collective operations specifications v1.0, [http://www.gwu.edu/~upc/docs/UPC\\\_Coll\\\_Spec\\\_v1.0.pdf](http://www.gwu.edu/~upc/docs/UPC\_Coll\_Spec\_v1.0.pdf), Dec., 2003.

Savant, J., and S. Seidel, MuPC: A Run time system for Unified Parallel C, *Tech. Rep. 02-03*, Michigan Tech., Dept. of Computer Science, 2002.

Shirley, H., Reynolds, R., and Seidel, S.R., Communication on the Intel Paragon, *Tech. Rep. 95-07*, Michigan Tech., Dept. of Computer Science, 1995.

Seidel, S. R., Broadcasting on linear arrays and meshes, *Tech. Rep. ORNL/TM-12356*, Engineering Physics and Mathematics Division, Oak Ridge National Laboratory, March, 1993.

Takkella, S. S., and S. R. Seidel, Complete exchange and broadcast algorithms for meshes, *Tech. Rep. 93-04*, Michigan Tech., Dept. of Computer Science, 1993.

Seidel, S. R., and M. Davis, Global synchronization algorithms for the Intel iPSC/860, *Tech. Rep. RNR-92-027*, Applied Research Branch, NASA Ames Research Center, August, 1992.

Seidel, S., Lee, M.-H., and Fotedar, S., Concurrent communication bidirectional communication on the Intel iPSC/860 and iPSC/2, *Tech. Rep. 90-06*, Computer Science Dept., Michigan Technological Univ., Nov., 1990.

Seidel, S. R., Language Recognition and the Synchronization of Cellular Automata. *Tech. Rep. 79-02* (Ph.D. Dissertation), Computer Science Dept., University of Iowa, May, 1979.

## **GRANTS and CONTRACTS:**

DoD Advanced Computing Initiative (pending): “Scaling Up User-Defined Data Distributions in Unified Parallel C”, S. Seidel (PI), Jan. 2013 - Jan. 2015, (\$249,668).

DoD Advanced Computing Initiative (pending): “Understanding and Exploring Relaxed Memory Consistency through Interactive Visualization”, C. Wallace (PI) and S. Seidel (Co-PI), Aug. 2013 - Aug. 2015, (\$200,408).

NSF CCF-0950-678: “EAGER: Towards the Model Checking of Partitioned Global Address Space (PGAS) Applications”, A. Ebneenasir (PI) and Seidel (Co-PI), Aug. 2009-Jan. 2011, (\$106,600).

NSF CCF-0833-082: “A Performance Model for Partitioned Global Address Space Languages”, Seidel (PI), S. Carr and Z. Wang (Co-PIs), Aug., 2008 - Aug. 2009, (\$70,000).

DoD MDA904-03-C-0483: “Enhancing UPC technology”, Seidel (PI), P. Merkey and C. Wallace (Co-PIs), Sept., 2003 - Mar., 2007, (\$890,600).

Hewlett-Packard: “Sabbatical leave for UPC Technology Development”, Sept. 1, 2003 - Aug. 31, 2004, (\$52,000).

Hewlett-Packard: “UPC Technology Development”, Seidel (PI), P. Merkey and C. Wallace (Co-PIs), July 1, 2002 - June 30, 2004, (\$161,300).

Compaq Computer Corporation: “Reference Implementation of Unified Parallel C”, S. Seidel (PI) and P. Merkey (Co-PI), June 1, 2001 - June 30, 2002, (\$46,890).

NASA Goddard Space Flight Center NAG5-8796: “Earth and Space Sciences Support for NASA High Performance Computing and Communication Program”, P. Merkey (PI) and S. Seidel (Co-PI), Oct. 1999 - Sept. 2002, (\$758,000).

NSF MRI-9871133: “Acquisition of Computational Facilities for Michigan Tech’s Computational Science and Engineering Program”, Seidel (PI), C. Friedrich, J. Jaszczak and A. Mayer (Co-PIs), Sept. 1998 - Aug. 2001, (NSF: \$260,246; MTU: \$157,000).

Oak Ridge Institute for Science and Education, Faculty Research Participation Program, Sept. 1992–May 1993, (\$33,453).

NASA Ames Research Center NAG 2-757: “Applications and Development of Communication Models for the Touchstone GAMMA and DELTA Prototypes”, Jan.–Dec., 1992, (\$43,573).

NSF CDA-8820841: “CISE Research Instrumentation”, Seidel (PI), J. Francioni, D. Poplawski, and L. Ziegler (Co-PIs), April, 1989–Sept., 1991, (NSF: \$113,500; MTU: \$75,700).

NSF/NIE SED 80-12447: “Applications of Computer Graphics to Graphing in Algebra and Trigonometry”, J. R. Morris (PI), Seidel and J. A. Wood (Sr. Assoc.), January, 1981–June, 1982 (\$73,000).

## **EQUIPMENT DONATIONS:**

Office of Naval Research: Cray T3E computer to support contract MDA904-03-C-0483, (with Phillip Merkey), November, 2005, (Government stated value \$150,000).

Intel Scientific Computers: Equipment to support NSF CISE Research Instrumentation program, June 1990, (Intel stated value \$72,480).

## **COURSES TAUGHT AT MICHIGAN TECH:**

### **Semester courses (2000 to present)**

- CS 2311: Discrete Structures
- CS 2321: Foundations I
- CS 3000: Ethical and Social Aspects of Computing
- CS 4000: Senior Seminar
- CS 4321: Introduction to Algorithms
- CS 4331: Parallel Programming
- CS 5311: Computation Theory
- CS 5321: Advanced Algorithms
- CS 5331: Parallel Algorithms
- CS 6091: UPC Seminar

### **Quarter courses (1984 - 2000)**

- CS 210: Discrete Structures
- CS 305: Human Computer Interfaces
- CS 311: Introduction to Theoretical Computer Science
- CS 320: Computers and Society
- CS 340: Systems Programming
- CS 411: Introduction to Computation Theory
- CS 420: Programming Languages
- CS 425: Introduction to Algorithms
- CS 430: Compiler Construction
- CS 465: Software Engineering
- CS 515: Design and Analysis of Algorithms
- CS 535: Advanced Programming Language Concepts
- CS 550: Software Engineering

## **GRADUATE STUDENTS:**

### **Ph.D. major advisor**

- B. DePew, B. Franklin, L. Song (CS, current)
- Z. Zhang (CS, 2006)

### **Ph.D. committee member**

- L. Thimm (CS&E, current)
- A. Thorsen, O. Thorsen (CS, current)
- S. Guo (CS&E, 2003)

### **M.S. major advisor**

- 15 thesis option, 8 report option

**M.S. committee member**

19 thesis option, 15 report option, 6 of these as an outside member

**SELECTED SERVICE ACTIVITIES:****Referee**

*IEEE International Conference on Parallel Processing  
Supercomputing*  
*IEEE Transactions on Computers*  
*IEEE Transactions on Parallel and Distributed Systems*  
*Journal of Parallel and Distributed Computing*  
*Parallel Computing*  
*Lecture Notes in Pure and Applied Mathematics*  
*Conference on Parallel Processing and Applied Mathematics*  
*Conference on Parallel Architectures and Compilation Techniques*  
*Conference on Massively Parallel Computing Systems*  
*Concurrency: Practice and Experience*  
*Scalable High Performance Computing Conference*  
*Workshop on Language-Based Parallel Programming Models*  
Reviewed 6 textbooks since 2000.

**External**

Program Chair, High Performance Computing Symposium (March, 2012)  
Program Co-Chair, High Performance Computing Symposium (April, 2011)  
General Program Chair, 3rd Conference on Partitioned Global Address  
Space Programming Models, (Oct., 2009)  
Panelist, NSF CISE (May, 2008)  
Panelist, NSF Graduate Research Fellowship Program (2003-05)  
Panelist, UPC Birds of a Feather, Supercomputing (2004)  
Moderator, UPC Collective Operations Working Group (2002-present)  
Member, IEEE and IEEE Computer Society

**University**

Co-Chair, Strategic Faculty Hiring Initiative II:  
Computational Discovery and Innovation (2008-2009)  
Committee for Cultural Enrichment (1994-present)  
Graduate Dean Search Committee (2004-05)  
University Senate (2000-03)  
Director, Computational Science & Engineering Ph.D. program (1996-2002)  
Research Excellence Fund (2002, 2008)  
General Education Committee (1997-99)  
General Education Task Force (1997-99)  
General Education Council (1998-99)  
Non-Departmental Studies Committee (1998-99)  
President, Graduate Faculty Council (1998-99)



Graduate Faculty Council (1994-99, 2010-)  
Security, Privacy, and Ethics in Computing Task Force (1995-97)  
Curriculum Review Committee (1993-95)

Invited talks at MTU:

Internet 2 Day (2000)  
Sigma Xi (1999)  
Michigan Council of Graduate Deans (1998)  
Computational Research Workshop (1995)

### **College of Engineering**

Master of Science, Engineering Oversight Committee (1998-03)

### **College of Sciences and Arts**

Promotion and Tenure Committee (1993-97)  
Chair, Promotion and Tenure Committee (1993-95)

### **Computer Science Department**

Chair, Department Chair Search Committee (2010-2011)  
Popular talks about computing given annually for:  
Women in Computer Science (IBM)  
Department Open House  
Chair, Promotion, Tenure, and Reappointment Committee (2004-06)  
Promotion, Tenure, and Reappointment Committee (1994-)  
Building Committee, Rekhi Computer Science Hall (2003-05)  
Graduate Committee (1987-99)  
Director of Graduate Studies (1987-96)  
Chair, Department Head Search Committee (1991-93)

### **CONTACT INFORMATION:**

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