

William D. Gropp

Thomas M. Siebel Chair in Computer Science
Department of Computer Science
Director and Chief Scientist, National Center for Supercomputing Applications
University of Illinois at Urbana-Champaign
Urbana, IL 61801

Education:

Stanford University, Stanford, CA
Ph.D. in Computer Science (January 1982)
M.S. in Computer Science (June 1980)

University of Washington, Seattle, WA
M.S. in Physics (June 1978)

Case Western Reserve University, Cleveland, OH
B.S. in Mathematics (May 1977)

Professional Experience:

University of Illinois
Professor
October 2007 to present

Deputy Director for Research, Institute for Advanced Computing Applications
and Technologies
September 2008 to June 2014

Director, Parallel Computing Institute
March 2011 to present

Interim Chair, NCSA Technology Council
September 2011 to March 2012

Chief Scientist, NCSA
May 2015 to present

Acting Director, NCSA
August 2016 to present

Argonne National Laboratory
Senior Computer Scientist
March 1996 to October 2007

Computer Scientist
March 1990 to March 1996

Fellow of the Argonne Accelerator Institute
February 2007 to October 2007

Associate Division Director
March 2000 to March 2006

Deputy Scientific Director of the High-Performance Computing Research Facility

September 1990 to April 1997

University of Chicago

Senior Scientist, Computer Science Department
2000 to 2007 (joint appointment with Argonne)

Senior Fellow, Computation Institute of Argonne National Laboratory
and the University of Chicago
1999 to 2007

Yale University

Associate Professor of Computer Science
July 1988 to February 1990

Assistant Professor of Computer Science
January 1982 to July 1988

Awards, Honors, and Patents:

Elected Member, National Academy of Engineering

SIAM Fellow

IEEE Fellow

ACM Fellow

ACM/IEEE-CS Ken Kennedy Award, 2016

SIAM/ACM Prize in Computational Science and Engineering, to PETSc Core Development Group,
2015

SIAM Activity Group on Supercomputing (SIAG/SC) Career Prize, 2014

IEEE TCSC Medal for Excellence in Scalable Computing, 2010

IEEE-CS Sidney Fernbach Award, 2008

R&D100 for PETSc in 2009

R&D100 for MPICH2 in 2005

U.S. Patent 7076553, awarded July 11, 2006.

Beale-Orchard-Hays Honorable Mention, 2000, with Jorge Moré

Gordon Bell Prize, 1999, with Anderson, Kaushik, Keyes, and Smith

ACM Recognition of Service Award, 2009

IEEE Computer Society, Certificate of Appreciation, 2002

HPCWire People To Watch 2013

Tau Beta Pi Daniel C. Drucker Eminent Faculty Award, 2013

EuroMPI16 Best Paper, with V. Dang and M. Snir, 2016

ISPA'16 Best Paper, with Y. Chen et al, 2016

EuroMPI'15 Best Paper, with Tarun Prabhu, 2015

PPoPP'12 Best Paper, with Paul Sack, 2012

ISC'09 Paper Award

Euro PVMMPI 2009 Outstanding Papers (2)

Euro PVMMPI 2008 Outstanding Papers (1)

Euro PVMMPI 2007 Outstanding Papers (2)

Euro PVMMPI 2006 Best Papers (2)

SC2003 Best Poster Award, with Suren Byna, Rajeev Thakur, and Xian-He Sun

Recent Professional Activities:

Conference General Chair:

ACM/IEEE SC2013, IWOMP 2011 (joint with Kalyan Kumaran)

Conference Deputy General Chair:

ACM/IEEE SC2012

Conference Vice Chair:

ACM/IEEE SC2017

Conference Organizing Committee Chair:

SIAM Parallel Processing 2006 (joint with Charbel Farhat)

Conference Technical Program Chair:

IEEE Cluster 2002, IEEE Cluster 2006, WoCo9 2006, ACM/IEEE SC2009, IWOMP 2011

Conference Technical Program Vice Chair:

IEEE Cluster 2009

Conference Finance Chair:

ACM/IEEE SC2011

Conference Technical Program Papers Chair:

ACM/IEEE SC2006 (joint with Daniel Reed), EuroMPI 2017 (joint with Rajeev Thakur)

Conference Technical Program Papers Area Chair:

CCGrid 2012

Conference Technical Program Invited Speakers Chair:

ACM/IEEE SC2016

Conference Program Committees (since 2002):

ACM/IEEE SC 2002, 2003, 2004, 2005, 2008, 2010, 2011

BDSE-2014, BigSystem 2014, BigSystem 2015, IEEE CCGrid 2011, 2012, 2013, 2014, 2016

EuroPVMMPI 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009

EuroMPI 2010, 2011, 2012, 2013, 2014, 2015

ICS 2010, 2011

IEEE Cluster 2003, 2004, 2014, 2015, 2016

IPDPS 2004, 2008, 2014, 2015

SIAM Parallel Processing 2004, 2014

ISHPC02, WIMPS02, IWIA03, IWIA07, ICPP 2003, ICPP 2015, SciDAC 2005, Frontiers of Extreme Computing 2005, CESC2006, ParCo 2007, HPCC07, MHSN2007, PGAS2009, PPOPP'11, IWOMP 2012, EASC 2014, EASC 2015, EASC 2016, EuroPar15, ICPP 2015, PACT 2015, PACT 2016, ParCo2015,

Conference Tutorials Committee Chair:

ISC 2016

Conference Tutorials Committee:

ISC 2012, 2013, 2014, 2015

Series editor:

MIT Press Scientific and Engineering Computation

Editorial boards:

Concurrency and Computation

International Journal of High Performance Computing Applications

Advisory Panels:

ISC Steering Committee (2016–)

External Advisory Panel, Comprehensive Digital Transformation (CDT), NASA Langley Research Center (2015–)

SC Conference Steering Committee (2011–2015), chair (2014)

PCAST NITRD Review Working Group (2010)

Institute for Computing in Science www.icis.anl.gov (Steering committee) (2010–2012)

Panel on Digitization and Communications Science, National Academies, (2008–2010)

Scientific Advisory Board, Aachen Institute for Advanced Study in Computational Engineering Science (AICES) (2007–current)

Advisory Board, Argonne Leadership Computing Facility (ALCF) (2008)

Computation Directorate External Review Committee, Lawrence Livermore National Laboratory (2009–2012)

Gordon Bell Prize Committee:

Member (2002, 2006), Chair (2003–2005)

IEEE Computer Society Seymour Cray Award Committee (2004, 2009)

IEEE Computer Society Sidney Fernbach Award Committee (2009)

IFIP Working Group 2.5 (Numerical Software), 2003–2012

Membership in professional societies:

AAAS, ACM, IEEE, SIAM

Offices held in professional societies:

AAAS Member-at-large for Section T (Information, Computing and Communication) (2013–2017)

Chair, SIAM Activity group on Supercomputing (2003–2006)

ACM SIGHPC:

Cofounder of SIGHPC (Established 2011)

Newsletter editor (2011–2015)

SC Steering committee liason (2015)

Teaching and Mentoring

Ph.D. Students Graduated:

Paul Sack, University of Illinois at Urbana-Champaign, 2011

Hormozd Gahvari, University of Illinois at Urbana-Champaign, 2014

Vivek Kale, University of Illinois at Urbana-Champaign, 2015

Xin Zhao, University of Illinois at Urbana-Champaign, 2016

Ph.D. Dissertation Committees:

John Ellis, Yale University, Department of Computer Science, 1985

Kai Li, Yale University, Department of Computer Science, 1986

Ye-Yang Sun, Yale University, Department of Engineering and Applied Science, 1987

Leslie Greengard, Yale University, Department of Computer Science, 1987

Elizabeth Jessup, Yale University, Department of Computer Science, 1989

Zhijing George Mou, Yale University, Department of Computer Science, 1990

Ali Ecdar, Yale University, Department of Engineering and Applied Science, 1992

Nickolas S. Jovanovic, Yale University, Department of Engineering and Applied Science, 1997

Dinesh Kaushik, Old Dominion University, 2002

Jeffrey Evans, Illinois Institute of Technology, 2005

Pierre Lemarinier, Universite Paris Sud, 2006

Angelo Duarte, University Autonoma de Barcelona, 2007

Michael Wolf, University of Illinois at Urbana-Champaign, 2009
Jacob Schroder, University of Illinois at Urbana-Champaign, 2010
Abhinav Bhatele, University of Illinois at Urbana-Champaign, 2010
Filippo Gioachin, University of Illinois at Urbana-Champaign, 2010
James Brodman, University of Illinois at Urbana-Champaign, 2010
Sara Baghsorskhi, University of Illinois at Urbana-Champaign, 2011
Adam Reichert, University of Illinois at Urbana-Champaign, 2011
Mark Gates, University of Illinois at Urbana-Champaign, 2011
Jehanzeb Hameed, University of Illinois at Urbana-Champaign, 2011
Ramon Calderer, University of Illinois at Urbana-Champaign, 2012
James Lai, University of Illinois at Urbana-Champaign, 2012
David Kunzman, University of Illinois at Urbana-Champaign, 2012
Nana Arizumi, University of Illinois at Urbana-Champaign, 2012
Minh Ngoc Dinh, Monash University, 2012
Abhishek Verma, University of Illinois at Urbana-Champaign, 2012
Joseph Sloan, University of Illinois at Urbana-Champaign, 2013
Xing Zhou, University of Illinois at Urbana-Champaign, 2013
I-Jui Sung, University of Illinois at Urbana-Champaign, 2013
Steven Dalton, University of Illinois at Urbana-Champaign, 2014
Lukasz Wesolowski, University of Illinois at Urbana-Champaign, 2014
Houng Luu, University of Illinois at Urbana-Champaign, 2015
Babak Behzad, University of Illinois at Urbana-Champaign, 2015
Ana Gainaru, University of Illinois at Urbana-Champaign, 2015
Yanhua Sun, University of Illinois at Urbana-Champaign, 2015
Wooil Kim, University of Illinois at Urbana-Champaign, 2015
Nikhil Jain, University of Illinois at Urbana-Champaign, 2016

Post Doctoral Students Supervised:

David Keyes, Yale University
Barry Smith (Wilkinson Fellow), Argonne National Laboratory
Lois Curfman McInnes, Argonne National Laboratory
Rajeev Thakur, Argonne National Laboratory
Dinesh Kaushik, Argonne National Laboratory
Robert Ross, Argonne National Laboratory
Darius Buntinas, Argonne National Laboratory
Pavan Balaji, Argonne National Laboratory
Paul Sack, University of Illinois at Urbana-Champaign
Gopalakrishnan Santhanaraman, University of Illinois at Urbana-Champaign
Abhinav Bhatele, University of Illinois at Urbana-Champaign
Vivek Kale, University of Illinois at Urbana-Champaign

Classes Taught at the University of Illinois:

CS554 Parallel Numerical Algorithms (Spring 2008)
CS499 Senior Thesis (Spring 2008, Fall 2009, Spring 2011)
CS598 Architectures, Algorithms, and Programming Models (Fall 2008)
CS357 Numerical Analysis (Spring 2009, 2010)
CS457 Numerical Analysis II (Spring 2011)
CS598 Designing and Building Applications for Extreme Scale Systems (Spring 2015, Spring 2016)

Selected Tutorials Taught:

1. P. Balaji, W. Gropp, T. Hoefler, and R. Thakur, “Advanced MPI Programming,” SC2015, Austin, Texas, November 2015.
2. W. Gropp, R. Lusk, and R. Thakur, “MPI for Scalable Computing,” Argonne Training Program in Extreme Scale Computing, St. Charles, IL, August 3–4, 2015.
3. W. Gropp, “MPI and Hybrid Programming Models,” Argonne Training Program in Extreme Scale Computing, St. Charles, IL, August 5, 2015.
4. P. Balaji, W. Gropp, T. Hoefler, and R. Thakur, “Advanced MPI Programming,” SC2014, New Orleans, Louisiana, November 2014.
5. W. Gropp, R. Lusk, and R. Thakur, “MPI for Scalable Computing,” Argonne Training Program in Extreme Scale Computing, St. Charles, IL, August 4–5, 2014.
6. W. Gropp, “MPI and Hybrid Programming Models,” Argonne Training Program in Extreme Scale Computing, St. Charles, IL, August 6, 2014.
7. W. Gropp, R. Lusk, and R. Thakur, “MPI for Scalable Computing,” Argonne Training Program in Extreme Scale Computing, St. Charles, IL, July 29–30, 2013.
8. W. Gropp, “MPI and Hybrid Programming Models,” Argonne Training Program in Extreme Scale Computing, St. Charles, IL, August 2, 2013.
9. E. Lusk, W. Gropp, R. Ross, and R. Thakur, “Advanced MPI: I/O and One-Sided Communication,” SC2012, Salt Lake City, Utah, November 2012.
10. W-M Hwu, D. Kirk, W. Gropp, and I. Gelado, “Programming Heterogeneous Parallel Computing Systems,” VSCSE, July 2012.
11. E. Lusk, W. Gropp, R. Ross, and R. Thakur, “Advanced MPI: I/O and One-Sided Communication,” SC2011, Seattle, WA, November 2011.
12. E. Lusk, W. Gropp, R. Ross, and R. Thakur, “Advanced MPI: I/O and One-Sided Communication,” SC2010, New Orleans, LA, November 2010.
13. E. Lusk, W. Gropp, R. Ross, and R. Thakur, “Advanced MPI: I/O and One-Sided Communication,” SC2009, Portland, OR, November 2009.
14. E. Lusk, W. Gropp, R. Ross, and R. Thakur, “Advanced MPI: I/O and One-Sided Communication,” SC2008, Austin, TX, November 2008.
15. E. Lusk, W. Gropp, R. Ross, and R. Thakur, “Advanced MPI: I/O and One-Sided Communication,” SC2007, Reno, NV, November 2007.
16. E. Lusk, W. Gropp, R. Ross, and R. Thakur, “Advanced MPI: I/O and One-Sided Communication,” SC2006, Tampa, FL, November 2006.
17. W. Gropp and R. Thakur, “MPI on the Grid,” CCGrid 2006, Singapore, May, 2006.
18. E. Lusk, W. Gropp, R. Ross, and R. Thakur, “Advanced MPI: I/O and One-Sided Communication,” SC2005, Seattle, WA, November 2005.

19. W. Gropp and E. Lusk, "Using MPI-2: A Problem-Based Approach," PVMMPI 2005, Sorrento, Italy, 2005.
20. B. Smith, M. Knepley, D. Kaushik, W. Gropp, "Introduction to PETSc," DD16, New York, NY, January, 2005.
21. W. Gropp, E. Lusk, R. Ross, and R. Thakur, "Advanced MPI: I/O and One-Sided Communication," SC2004, Pittsburgh, PA, November, 2004.
22. W. Gropp, E. Lusk, "Using MPI-2: A Problem-Based Approach," PVMMPI 2004, Budapest, Hungary, September, 2004.
23. W. Gropp, E. Lusk, R. Ross, and R. Thakur, "Using MPI-2: A Tutorial on Advanced Features of the Message-Passing Interface Standard," SC2003, Phoenix, AZ, November, 2003.
24. W. Gropp, "Parallel Programming with MPI," Cluster School, Merida, Venezuela, October, 2003.
25. W. Gropp and E. Lusk, "High-Level Programming in MPI," PVMMPI 2003, Venice, Italy, September, 2003.
26. W. Gropp, "PETSc," ACTS Workshop 2003, Berkeley, CA, August, 2003.
27. W. Gropp, D. Keyes, "Introduction to Domain Decomposition with PETSc," Domain Decomposition 15, Berlin, Germany, July, 2003.
28. W. Gropp, E. Lusk, R. Ross, and R. Thakur, "Using MPI-2: A Tutorial on Advanced Features of the Message-Passing Interface Standard," SC2002, Baltimore, MD, November, 2002.
29. W. Gropp, D. Keyes, "PETSc Tutorial," Peking University, Beijing, China, July 2002.
30. W. Gropp, E. Lusk, R. Ross, and R. Thakur, "Using MPI-2: A Tutorial on Advanced Features of the Message-Passing Interface Standard," SC2001, Denver, CO, November, 2001.
31. W. Gropp, "Advanced Cluster Programming with MPI," Cluster 2001, Newport Beach, CA, October, 2001.
32. W. Gropp, E. Lusk, R. Thakur, "Using MPI-2: A Tutorial on Advanced Features of the Message-Passing Interface," SC2000, Dallas, TX, November, 2000.
33. S. Balay, K. Buschelman, W. Gropp, L. Curfman McInnes, and B. Smith, "PETSc Tutorial: Numerical Software Libraries for the Scalable Solution of PDEs," Workshop on the ACTS Toolkit, Berkeley, CA, September, 2000.
34. S. Balay, W. Gropp, L. Curfman McInnes, B. Smith, "Tutorial on the Portable, Extensible Toolkit for Scientific computation (PETSc)," DD13, Lyon, France, October, 2000.
35. W. Gropp, "High Performance MPI," CASC, Lawrence Livermore National Laboratory, May, 2000.
36. W. Gropp, "Short Course on the Portable, Extensible Toolkit for Scientific computation (PETSc)," 4th Annual National Symposium on Computational Science and Engineering (AN-SCSE4), Bangkok, Thailand, March, 2000.

37. W. Gropp, E. Lusk, R. Thakur, "Tuning MPI Applications for Peak Performance," SC99, Portland, OR, November, 1999.
38. W. Gropp, MPI Portion of "How to Run A Beowulf Cluster," (Thomas Sterling organizer), SC99, Portland, OR, November, 1999.
39. W. Gropp, E. Lusk, R. Thakur, "Using MPI-1 and MPI-2," PVMMPI'99, Barcelona, Spain, September, 1999.
40. W. Gropp, "Introduction to the Message Passing Interface," Summer Institute for Advanced Computation, Wright State University, August, 1999.
41. S. Balay, W. Gropp, L. Curfman McInnes, "PETSc Tutorial", Parallel CFD'99, Williamsburg, VA, May, 1999.
42. W. Gropp, "Intermediate MPI," NRL, Monterey, CA, April, 1999.
43. W. Gropp, "PETSc Tutorial," SIAM Parallel Processing, San Antonio, TX, March 1999.
44. W. Gropp, "Introduction to MPI," as part of "High Performance Programming," Technical University of Denmark, Lyngby, Denmark, December 1998.
45. W. Gropp, E. Lusk, R. Thakur, "Tuning MPI Applications for Peak Performance," SC98, Orlando, FL, November, 1998.
46. W. Gropp, "Portable High Performance Parallel I/O and MPI," Utrecht, The Netherlands, February, 1998.
47. W. Gropp, E. Lusk, and R. Thakur, "Introduction to Performance Issues in Using MPI for Communication and I/O," HPDC-7, Chicago, IL, July, 1998.
48. W. Gropp, "PETSc Tutorial," SC97, November, 1997.

Webinars:

1. *Changing How Programmers Think about Parallel Computing*, ACM Webinar, July 2013.

1 Books

- [1] William Gropp, Ewing Lusk, and Anthony Skjellum. *Using MPI: Portable Parallel Programming with the Message-Passing Interface*. MIT Press, Cambridge, MA, 1994.
- [2] B. F. Smith, P. E. Bjørstad, and W. D. Gropp. *Domain Decomposition: Parallel Multilevel Methods for Elliptic Partial Differential Equations*. Cambridge University Press, New York, 1996.
- [3] William Gropp, Steven Huss-Lederman, Andrew Lumsdaine, Ewing Lusk, Bill Nitzberg, William Saphir, and Marc Snir. *MPI - The Complete Reference: Volume 2, The MPI-2 Extensions*. MIT Press, Cambridge, MA, USA, 1998.

- [4] William Gropp, Ewing Lusk, and Anthony Skjellum. *Using MPI: Portable Parallel Programming with the Message Passing Interface*, 2nd edition. MIT Press, Cambridge, MA, 1999.
- [5] William Gropp, Ewing Lusk, and Rajeev Thakur. *Using MPI-2: Advanced Features of the Message-Passing Interface*. MIT Press, Cambridge, MA, 1999.
- [6] Jack Dongarra, Ian Foster, Geoffrey Fox, William Gropp, Ken Kennedy, Linda Torczon, and Andy White, editors. *Sourcebook of Parallel Computing*. Morgan Kaufmann, 2003.
- [7] William Gropp, Ewing Lusk, and Thomas Sterling, editors. *Beowulf Cluster Computing with Linux*. MIT Press, 2nd edition, 2003.
- [8] Barbara M. Chapman, William D. Gropp, Kalyan Kumaran, and Matthias S. Müller, editors. *OpenMP in the Petascale Era – 7th International Workshop on OpenMP, IWOMP 2011, Chicago, IL, USA, June 13-15, 2011. Proceedings*, volume 6665 of *Lecture Notes in Computer Science*. Springer, 2011.
- [9] William Gropp, Torsten Hoefler, Rajeev Thakur, and Ewing Lusk. *Using Advanced MPI: Modern Features of the Message-Passing Interface*. MIT Press, Nov. 2014.
- [10] William Gropp, Ewing Lusk, and Anthony Skjellum. *Using MPI: Portable Parallel Programming with the Message-Passing Interface*, 3rd edition. MIT Press, Nov. 2014.
- [11] National Research Council. *Future Directions for NSF Advanced Computing Infrastructure to Support U.S. Science and Engineering in 2017–2020: Interim Report*. The National Academies Press, Washington, DC, 2014.
- [12] National Academies of Sciences, Engineering, and Medicine. *Future Directions for NSF Advanced Computing Infrastructure to Support U.S. Science and Engineering in 2017–2020*. The National Academies Press, Washington, DC, 2016.

2 Book Chapters

- [1] William Gropp and Rajeev Thakur. MPI. In Pavan Balaji, editor, *Programming Models for Parallel Computing*. MIT Press, 2015.
- [2] Brett Bode, Michelle Butler, Thom Dunning, Torsten Hoefler, William Kramer, William Gropp, and Wen-mei Hwu. The Blue Waters super-system for super-science. In Jeffrey S. Vetter, editor, *Contemporary High Performance Computing: From Petascale Toward Exascale*, volume 1 of *CRC Computational Science Series*, pages 339–366. Taylor and Francis, Boca Raton, 1 edition, 2013.
- [3] William Gropp. Parallel computer architectures. In Jack Dongarra, Ian Foster, Geoffrey Fox, William Gropp, Ken Kennedy, Linda Torczon, and Andy White, editors, *Sourcebook of Parallel Computing*, pages 15–42. Morgan Kaufmann, 2003.
- [4] Ian Foster, William Gropp, and Carl Kesselman. Message passing and threads. In Jack Dongarra, Ian Foster, Geoffrey Fox, William Gropp, Ken Kennedy, Linda Torczon, and Andy White, editors, *Sourcebook of Parallel Computing*, pages 313–329. Morgan Kaufmann, 2003.

- [5] Rajeev Thakur and William Gropp. Parallel I/O. In Jack Dongarra, Ian Foster, Geoffrey Fox, William Gropp, Ken Kennedy, Linda Torczon, and Andy White, editors, *Sourcebook of Parallel Computing*, pages 331–355. Morgan Kaufmann, 2003.
- [6] William Gropp. The 2-d Poisson problem. In Jack Dongarra, Ian Foster, Geoffrey Fox, William Gropp, Ken Kennedy, Linda Torczon, and Andy White, editors, *Sourcebook of Parallel Computing*, pages 469–480. Morgan Kaufmann, 2003.
- [7] Satish Balay, William Gropp, Lois Curfman McInnes, and Barry F. Smith. Software for the scalable solution of partial differential equations. In Jack Dongarra, Ian Foster, Geoffrey Fox, William Gropp, Ken Kennedy, Linda Torczon, and Andy White, editors, *Sourcebook of Parallel Computing*, pages 621–647. Morgan Kaufmann, 2003.
- [8] William Gropp. So you want to use a cluster. In William Gropp, Ewing Lusk, and Thomas Sterling, editors, *Beowulf Cluster Computing with Linux*, pages 1–17. MIT Press, 2003.
- [9] Ewing Lusk, William Gropp, and Ralph Butler. An introduction to writing parallel programs. In William Gropp, Ewing Lusk, and Thomas Sterling, editors, *Beowulf Cluster Computing with Linux*, pages 171–206. MIT Press, 2003.
- [10] William Gropp and Ewing Lusk. Parallel programming with MPI. In William Gropp, Ewing Lusk, and Thomas Sterling, editors, *Beowulf Cluster Computing with Linux*, pages 207–243. MIT Press, 2003.
- [11] William Gropp and Ewing Lusk. Advanced topics in MPI programming. In William Gropp, Ewing Lusk, and Thomas Sterling, editors, *Beowulf Cluster Computing with Linux*, pages 245–278. MIT Press, 2003.
- [12] Rajeev Thakur, William Gropp, and Ewing Lusk. ADIO: A framework for high-performance, portable parallel I/O. In Daniel A. Reed, editor, *Scalable Input/Output*, pages 111–134. MIT Press, 2004.
- [13] William D. Gropp. Issues in accurate and reliable use of parallel computing in numerical programs. In Bo Einarsson, editor, *Accuracy and Reliability in Scientific Computing*. SIAM, 2005.
- [14] Ricky A. Kendall, Masha Sosonkina, William D. Gropp, Robert W. Numrich, and Thomas Sterling. Parallel programming models applicable to cluster computing and beyond. In Are Magnus Bruaset and Aslak Tveito, editors, *Numerical Solution of Partial Differential Equations on Parallel Computers*, number 51 in Lecture Notes in Computational Science and Engineering, pages 3–54. Springer, 2006.
- [15] William D. Gropp and Andrew Lumsdaine. Parallel tools and environments: A survey. In Michael A. Heroux, Padma Raghavan, and Horst D. Simon, editors, *Parallel Processing for Scientific Computing*, pages 223–232. SIAM, 2006.
- [16] Boyana Norris, Albert Hartono, and William Gropp. Annotations for productivity and performance portability. In *Petascale Computing: Algorithms and Applications*, Computational Science. Chapman & Hall / CRC Press, Taylor and Francis Group, 2007. Preprint ANL/MCS-P1392-0107.

- [17] W. D. Gropp and D. E. Keyes. Domain decomposition on parallel computers. In T. F. Chan, R. Glowinski, J. Périaux, and O. B. Widlund, editors, *Domain Decomposition Methods*, pages 260–288. SIAM, Philadelphia, 1989.
- [18] D. E. Keyes and W. D. Gropp. Domain decomposition techniques for nonsymmetric systems of equations: examples from computational fluid dynamics. In T. F. Chan, R. Glowinski, J. Périaux, and O. B. Widlund, editors, *Domain Decomposition Methods*, pages 321–339. SIAM, Philadelphia, 1989.
- [19] William D. Gropp and Martin H. Schultz. High performance parabolic equation solvers. In D. Lee, A. Cakmak, and R. Vichnevetsky, editors, *Computational Acoustics*, volume 1. Elsevier Science Pub., 1990.
- [20] William D. Gropp and David E. Keyes. Domain decomposition as a mechanism for using asymptotic methods. In H. G. Kaper and M. Garbey, editors, *Asymptotic and Numerical Methods for Partial Differential Equations with Critical Parameters*, pages 93–106. Kluwer, Dordrecht, 1992.
- [21] William D. Gropp and David E. Keyes. Semi-structured refinement and parallel domain decomposition methods. In P. Mehrotra et al., editor, *Unstructured Scientific Computation on Multiprocessors*, pages 187–203. MIT Press, 1992.
- [22] W. D. Gropp, D. E. Keyes, and M. D. Tidriri. Parallel implicit solvers for steady, compressible aerodynamics. In *Parallel Computational Fluid Dynamics*, pages 391–399. Elsevier Science Publishers B.V. (North-Holland), Amsterdam, 1995.
- [23] William D. Gropp and Barry Smith. Parallel domain decomposition software. In D. E. Keyes, Youcef Saad, and Donald G. Truhlar, editors, *Domain-Based Parallelism and Problem Decomposition Methods in Computational Science and Engineering*. SIAM, Philadelphia, 1995.
- [24] S. Balay, W. D. Gropp, L. C. McInnes, and B. F. Smith. Efficient management of parallelism in object-oriented numerical software libraries. In E. Arge, A. M. Bruaset, and H. P. Langtangen, editors, *Modern Software Tools in Scientific Computing*, pages 163–202. Birkhauser Press, 1997.
- [25] William D. Gropp. An introduction to performance debugging for parallel computers. In D. Keyes, A. Sameh, and V. Venkatakrisnan, editors, *Parallel Numerical Algorithms*, pages 369–382. Kluwer Academic Publishers, 1997.
- [26] Désiré Nuentza Wakam, Jocelyne Erhel, and William D. Gropp. Parallel adaptive deflated GMRES. In Randolph Bank, Michael Holst, Olof Widlund, and Jinchao Xu, editors, *Domain Decomposition Methods in Science and Engineering XX*, volume 91 of *Lecture Notes in Computational Science and Engineering*, pages 631–638. Springer Berlin Heidelberg, 2013.

3 Workshop and Meeting Reports

- [1] David Keyes, Philip Colella, Thom H. Dunning, and William D. Gropp. A science-based case for large-scale simulation, volume 1, July 2003. Office of Science, U.S. Department of Energy.
- [2] Hans P. Zima, editor. Workshop on high-productivity programming languages and models, 2004. Report of the workshop.

- [3] Jennifer M. Schopf, editor. Grid performance workshop 2004 report, 2004.
- [4] International workshop on advanced computational materials science: Application to fusion and generation-IV fission reactors, 2004. Also ORNL/TM-2004/132.
- [5] David Keyes, Philip Colella, Thom H. Dunning, and William D. Gropp. A science-based case for large-scale simulation, volume 2, September 2004. Office of Science, U.S. Department of Energy.
- [6] David Brown, John Bell, Donald Estep, William Gropp, Bruce Hendrickson, Sallie Keller-McNulty, David Keyes, J. Tinsley Oden, Linda Petzold, and Margaret Wright. Applied Mathematics at the U.S. Department of Energy: Past, Present and a View to the Future, May 2008. Ed. by David Brown.
- [7] David Keyes and Valerie Taylor. NSF-ACCI task force on software for science and engineering, December 2010.

4 Journal Articles

- [1] William D. Gropp. A test of moving mesh refinement for 2-D scalar hyperbolic problems. *SIAM Journal on Scientific and Statistical Computing*, 1(2):191–197, June 1980.
- [2] William D. Gropp. Solving PDEs on loosely-coupled parallel processors. *Parallel Computing*, 5(1-2):165–173, July 1987. Proceedings of the international conference on vector and parallel computing—issues in applied research and development (Loen, 1986).
- [3] David E. Keyes and William D. Gropp. A comparison of domain decomposition techniques for elliptic partial differential equations and their parallel implementation. *SIAM Journal on Scientific and Statistical Computing*, 8(2):S166–S202, March 1987. Reprinted in Selected Papers from the Second Conference on Parallel Processing for Scientific Computing (C. W. Gear & R. G. Voigt, eds., SIAM, 1987).
- [4] William D. Gropp. Local uniform mesh refinement with moving grids. *SIAM Journal on Scientific and Statistical Computing*, 8(3):292–304, May 1987.
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