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Education

- Ph.D., Applied Mathematics, Cornell University, January 2001
Thesis: *Efficient Iterative Methods for Ill-Conditioned Linear and Nonlinear Network Problems*
Advisor: Stephen A. Vavasis
- M.S., Applied Mathematics, Cornell University, May 1998
- B.A., English Literature, Rutgers University, 1988

Professional Experience

- 2007–present **Texas Tech University**, Lubbock, TX
Assistant Professor, Department of Mathematics & Statistics
- 1998–2007 **Sandia National Laboratories**, Livermore, CA
Senior Member of the Technical Staff, 2000–2007
Graduate Student Summer Intern, summers 1998–1999
- 1995–2000 **Cornell University**, Ithaca, NY
Research Assistant to Dr. Stephen A. Vavasis, 1997–2000
Research Assistant to Dr. Nick Trefethen, 1996–1997
Teaching Assistant, Math and Computer Science Depts., 1995–1997
- 1989–1995 Technical Writer at various companies:
Beam Technologies, Ithaca, NY; All Points Inc., Rochester, NY; Xerox Corporation,
Rochester, NY; ABB Taylor Instruments, Rochester, NY; V.I. Corporation,
Northampton, MA; AT&T, Princeton, NJ

Publications

- H. Elman, V. Howle, J. Shadid, D. Silvester, and R. Tuminaro, "Least Squares Preconditioners for Stabilized Discretizations of the Navier–Stokes Equations," *SIAM Journal on Scientific Computing*, submitted 2006.
- H. Elman, V. Howle, J. Shadid, R. Shuttleworth, and R. Tuminaro, "Block Preconditioners Based on Approximate Commutators," *SIAM Journal on Scientific Computing*, Vol.27, No. 5, pp. 1651–1668, 2006.
- P. Hough and V. Howle, "Fault Tolerance in Large Scale Scientific Computing," invited chapter in the book *Parallel Processing for Scientific Computing*, edited by M. A. Heroux, P. Raghavan, and H. D. Simon, SIAM Press, 2006.
- V. Howle, J. Schroder, R. Tuminaro, "The Effect of Boundary Conditions within Pressure Convection–Diffusion Preconditioners," Sandia Technical Report, 2005.
- M. Heroux, R. Bartlett, V. Howle, R. Hoekstra, J. Hu, T. Kolda, R. Lehoucq, K. Long, R. Pawlowski, E. Phipps, A. Salinger, H. Thornquist, R. Tuminaro, J. Willenbring, A. Williams, and K. Stanley, "An Overview of the Trilinos Project," *ACM Transactions on Mathematical Software*, Vol. 31, No. 3, September 2005.

- V. Howle and S. Vavasis, "An Iterative Method for Solving Complex-Symmetric Systems Arising in Electrical Power Networks," *SIAM Journal on Matrix Analysis and Applications*, Vol. 26, No. 4, pp. 1150–1178, 2005.
- M. Heroux, R. Bartlett, V. Howle, R. Hoekstra, J. Hu, T. Kolda, R. Lehoucq, K. Long, R. Pawlowski, E. Phipps, A. Salinger, H. Thornquist, R. Tuminaro, J. Willenbring and A. Williams, "An Overview of Trilinos," Sandia Technical Report SAND2003-2927, Sandia National Laboratories, Albuquerque, New Mexico, August 2003.
- S. Thomas, P. Boggs, and V. Howle, "A Survey of National Transmission Grid Modeling Capabilities at DOE Laboratories," Sandia Technical Report, SAND2003-8433P, July 2003.
- H. Elman, V. Howle, J. Shadid, and R. Tuminaro, "A Parallel Block Multi-level Preconditioner for the 3D Incompressible Navier-Stokes Equations," *Journal of Computational Physics*, Vol. 187, pp. 504–523, May 2003.
- V. Howle and L. N. Trefethen, "Eigenvalues and Musical Instruments," *J. Comp. Appl. Math*, Vol. 135, No. 1, pp. 23–40, October 1, 2001.
- V. Howle, "Efficient Iterative Methods for Ill-Conditioned Linear and Nonlinear Network Problems," Ph.D. Thesis, Center for Applied Mathematics, Cornell University, January 2001.
- V. Howle, S. Shontz, and P. Hough, "Some Parallel Extensions to Optimization Methods in OPT++," Sandia Technical Report, SAND2000-8877, October 2000.

Selected Presentations

- "Algebraic Least Squares Preconditioners for Incompressible Navier–Stokes," 2006 Copper Mountain Conference on Iterative Methods, Copper Mountain, CO, April 2006.
- "Preconditioners Based on Algebraic Commutators," 2005 International Conference On Preconditioning Techniques For Large Sparse Matrix Problems In Scientific And Industrial Applications, Atlanta, GA, May 19-21, 2005.
- "An Iterative Method for Solving Complex-Symmetric Systems Arising in Electrical Power Modeling," SIAM Conference on Computational Science & Engineering, Orlando, Florida, Feb. 12 - 15, 2005.
- "Block Preconditioners for the Incompressible Navier-Stokes Equations," 2004 Copper Mountain Conference on Iterative Methods, Copper Mountain, CO, March 2004.
- "Fault Tolerant Linear Algebra with Flexible Krylov Methods," 2004 SIAM Conference on Parallel Processing for Scientific Computing, San Francisco, CA, February 2004.
- "Career Development Opportunities in Mathematical Sciences: Sandia National Labs," Society for Advancement of Chicanos and Native Americans in Science (SACNAS) Annual Meeting, October, 2003.
- "Fault Tolerant Linear Algebra with FCG," 2003 SIAM Conference on Applied Linear Algebra, Williamsburg, VA, July 2003.
- "Solving 3D Incompressible Navier-Stokes Problems via Parallel Block Preconditioning," 2002 Copper Mountain Conference on Iterative Methods, Copper Mountain, CO, March 2002.
- "Accurate Integration of the Transient Stability Equations in Electrical Power Modeling," Preconditioning 2001 Conference, Tahoe City, CA, April 2001.
- "Parallel Block Preconditioning of the Linearized Incompressible Navier-Stokes Equations," Copper Mountain Conference on Multigrid Methods, Copper Mountain, CO, April 2001.
- "Optimization with Sensitivities," CSMR Technical Seminar, Sandia National Labs, Livermore, CA, August 1998.
- "Preconditioning Complex-symmetric Systems for Electrical Power Modeling," Copper Mountain Conference on Iterative Methods, Copper Mountain, CO, April 1998.

- "Eigenvalues and Musical Instruments," Mathematics Department Seminar, Hobart and William Smith Colleges, Geneva, NY, March 1998.

Software

Meros: a block preconditioning package within the Trilinos solver framework.
Released LGPL, 2006.

Awards

2004 R&D 100 Award winner for Trilinos software project
Super Computing 2004 HPC Software Challenge Award Winner for Trilinos

Service & Professional Activities

- Secretary, SIAM Activity Group on Linear Algebra (term 2007–2009)
- Organizer of Sandia seminar series, Computational Sciences Research Opportunities and Collaborations Seminar (CSROCS) (2006–2007)
- Chair, Association for Women in Mathematics Essay Contest Committee, *Biographies of Contemporary Women in Mathematics* (2001–present)
- Member, Association for Women in Mathematics Nominating Committee (2005)
- Minisymposium co-organizer, Fault Tolerance in Large-Scale Scientific Computing, SIAM Parallel Processing (2004)
- Organizing Committee, Bay Area Scientific Computing Day (2002)
- Co-organizer, Math & Music Seminar, Cornell University (1997-1998)