

VITA

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Research Interests

Scientific and Parallel Computation, Computer Modeling and Simulation,
Application Software Development, Numerical Analysis

Education

Ph.D. Applied Mathematics, 1989, Michigan State University
M.S. Applied Mathematics, 1985, Michigan State University
B.S. Mathematics, 1982, Beijing Normal University

Experience

Consultant, Mathematics and Computer Science Div., Argonne National Laboratory, 9/2004-present.

Research Professor, Dept. of Computer Science, Illinois Institute of Technology, 8/2000 - present.

Sr. Scientific Programmer, Mathematics and Computer Science Div., Argonne National Laboratory, 9/2001-9/2004.

Software developer, Lucent Technologies, 1-8/2001.

Visiting Scientist, Mathematics and Computer Science Div., Argonne National Laboratory, 8/1999-12/2000.

Tenured Associate Professor, Dept. of Mathematics, Louisiana State Univ., 1997-2000;

Tenured Associate Professor, Dept. of Mathematical Sciences, Clemson Univ., 1996-1997.

NSF VPW Visiting Professor, Dept. of Mathematics, Louisiana State Univ., 1/1996-7/1997.

Visiting Scientist, Institute for Computer Applications in Science and Engineering (ICASE), NASA Langley Research Center, 9/1992-8/1994, 7-8/1995, 7-8/1996.

Visiting Assistant Professor, Dept. of Mathematics, Iowa State Univ., 5-8/1991.

Assistant Professor, Dept. of Mathematical Sciences, Clemson Univ., 8/1989-8/1996.

Teaching Assistant, Dept. of Mathematics, Michigan State Univ., 9/1983-6/1989.

Research Assistant, Electrical Eng. Systems Science, Michigan State Univ., 12/1987-9/1988.

Lecturer, Capital Univ. of Economics and Business, Beijing, China, 2/1982-8/1983.

Awards and Acknowledgments

1. 2009 R&D 100 Award Winner, as a PETSc developer.
2. Acknowledgement from the Alpha Lambda Delta Freshman Honor Society for Superior Instruction of Freshman Students, Fall, 1998.

3. Award for Faculty Excellence, Clemson University, 1996.

Software Research and Development

- Portable, Extensible Toolkit for Scientific Computation (PETSc), <http://www.mcs.anl.gov/petsc>, 1999 - present.
- Framework Application for Core-Edge Transport Simulations (FACETS), <https://www.facetsproject.org>, 2006 - 2011.

Research Publications

Journal Articles:

1. "Analysis and Practical Use of Flexible BiCGStab," (J. Chen, L. C. McInnes, H. Zhang), preprint, ANL/MCS-P3039-0912.
2. "Hierarchical and Nested Krylov Methods for Extreme-Scale Computing," (L. C. McInnes, B. Smith, H. Zhang, R. Tran Mills), submitted to *Parallel Computing*, ANL/MCS-P2097-0512.
3. "PETSc's Software Strategy for the Design Space of Composable Extreme-Scale Solvers," (B. Smith, L.C. McInnes, E. Constantinescu, M. Adams, S. Balay, J. Brown, M. Knepley, H. Zhang), preprint ANL/MCS-P2059-0312, *DOE Exascale Research Conference*, April 16-18, 2012, Portland, OR.
4. "Improving parallel scalability for edge plasma transport simulations with neutral gas species," (M. McCourt, T. D. Rognlien, L. C. McInnes, H. Zhang), *Computational Science and Discovery*, 2012, vol. 5, num. 014012, doi 10.1088/1749-4699/5/1/014012.
5. "Sparse Triangular Solvers for ILU Revisited: Data Layout Crucial to Better Performance," (B. Smith and H. Zhang), *International Journal of High Performance Computing Applications*, Vol. 25, Num. 4, 2010, pp.386-391
6. "Concurrent, Parallel, Multiphysics Coupling in the FACETS Project," (J R Cary, J Candy, J Cobb, R H Cohen, T Epperly, D J Estep, S Krasheninnikov, A D Malony, D C McCune, L McInnes, A Pankin, S Balay, J A Carlsson, M R Fahey, R J Groebner, A H Hakim, S E Kruger, M Miah, A Pletzer, S Shasharina, S Vadlamani, D Wade-Stein, T D Rognlien, A Morris, S Shende, G W Hammett, K Indireskumar, A Yu Pigarov, H Zhang), *DOE SciDAC09*, 2009.
7. "First Results from Core-Edge Parallel Composition in the FACETS Project", (J. Cary and J. Candy and R. Cohen and S. Krasheninnikov and D. McCune and D. Estep and J. Larson and A. Malony and A. Pankin and P. Worley and J. Carlsson and A. Hakim and P. Hamill and S. Kruger and M. Miah and S. Muzsala and A. Pletzer and S. Shasharina and D. Wade-Stein and N. Wang and S. Balay and L. McInnes and H. Zhang and T. Casper and L. Diachin and T. Epperly and T. Rognlien and M. Fahey and J. Cobb and A. Morris and S. Shende and G. Hammett and K. Indireskumar and D. Stotler and A. Pigarov), *J. Phys.: Conf. Ser.*, ol. 125, 2008, pp. 012040, <http://www.iop.org/EJ/abstract/1742-6596/125/1/012040>.
8. "SIPs: Shift-and-Invert Parallel Spectral Transformations," (H. Zhang, B. Smith, M. Sternberg and P. Zapol), *ACM Transactions on Mathematical Softwar(TOMS)*, Vol. 33, Num. 2, 2007.

9. "Pseudozeros of Multivariate Polynomials," (J. W. Hoffman, J. J. Madden and H. Zhang), *Mathematics of Computation*, Vol. 72, No. 242, 2003, pp.975-1002.
10. "Numerical Condition of Polynomials in Different Forms," (H. Zhang), *Electronic Transactions on Numerical Analysis*, Vol. 12, 2001, pp.66-87.
11. "Computational Modeling of Radical Polymerization of Methyl Methacrylate," (H. Zhang and Y. Tian), *Computer Modeling and Simulation in Engineering*, Vol. 4, no. 4, 1999, pp.290-299.
12. "A Bookkeeping Strategy for Multiple Objective Linear Programs" (A. Aurovillian, H. Zhang and M. Wiecek), *Computers & Operations Research*, Vol. 24, No. 11, 1997, pp.1033-1041.
13. "A Parallel Algorithm for Multiple Objective Linear Programs" (M. Wiecek and H. Zhang), *Computational Optimization and Applications*, Volume 8, No. 1, 1997, pp.41-56.
14. "Fourier-Laplace Analysis of Multigrid Waveform Relaxation Method for Hyperbolic Equations" (S. Ta'asan and H. Zhang), *BIT Numerical Mathematics*, Vol. 36, No. 4, 1996, pp.831-841.
15. "A Note on Windowing for the Waveform Relaxation Method," *Applied Mathematics and Computation*, (H. Zhang), 76, No. 1, 1996, pp.49-63.
16. "On the Multigrid Waveform Relaxation Method" (S. Ta'asan and H. Zhang), *SIAM J. Sci. Comput.*, Vol. 16, No. 5, 1995, pp.1092-1104.
17. "Using Parallel Banded Linear System Solvers in Generalized Eigenvalue Problems" (H. Zhang and W. F. Moss), *Parallel Computing*, Vol. 20, No. 8, August 1994, pp.1089-1105.
18. "Efficient Tridiagonal Solvers on Multicomputers" (X. Sun, H. Zhang and L. M. Ni), *IEEE Trans. on Computers*, Vol. 41, No. 3, March 1992, pp.286-296.
19. "Parallel Homotopy Algorithm for the Symmetric Eigenvalue Problem" (T. Y. Li, H. Zhang and X. Sun), *SIAM J. Sci. Stat. Comput.*, Vol. 12, No. 3, 1991, pp.469-487.
20. "On the Accuracy of the Parallel Diagonal Dominant Algorithm," *Parallel Computing*, (H. Zhang), 17, 1991, pp.265-272.
21. "On the Galerkin Method with Vector Basis Functions" (H. Zhang and X. Min), *Applied Mathematics and Computation*, 42, pp.85-103, 1991.

Conference Proceedings and Technical Reports

22. "PETSc's Software Strategy for the Design Space of Composable Extreme-Scale Solvers," (B. Smith, L. C. McInnes, E. Constantinescu, M. Adams, S. Balay, J. Brown, M. Knepley, H. Zhang), *DOE Exascale Research Conference*, April 16-18, 2012, Portland, OR, Argonne National Laboratory, ANL/MCS-P2059-0312.
23. "Improving parallel scalability for edge plasma transport simulations with neutral gas species," (M. McCourt and T. D. Rognlien and L. C. McInnes and H. Zhang), *Proceedings of the Twenty Second International Conference on Numerical Simulations of Plasmas*, Sept. 7-9, 2011, Long Branch, NJ, Argonne National Laboratory, ANL/MCS-P2018-0112, 2012

24. "Using PETSc to Develop Scalable Applications for Next-Generation Power Grid," (S. Abhyankar and B. Smith and H. Zhang and A. Flueck), *Proceedings of the 1st International Workshop on High Performance Computing, Networking and Analytics for the Power Grid*, <http://www.mcs.anl.gov/uploads/cels/papers/P1957-0911.pdf>, ACM, 2011.
25. "Concurrent, Parallel, Coupled Core-Edge Simulations of Pedestal Formation Using the FACETS Framework," (J.R. Cary, A. Hakim, A. Pletzer, M. Miah, S. Kruger, S. Shasharina, S. Vadlamani, J. Carlsson, A. Pankin, T. Rognlien, R. Cohen, D. McCune, K. Indireskumar, A. Pigarov, L.C. McInnes, H. Zhang), *Proceedings of the 23rd annual IAEA Fusion Energy Conference (FEC 2010)*, Daejeon, Republic of Korea, Oct 11-16, 2010.
26. "Coupled Whole Device Simulations of Plasma Transport in Tokamaks with the FACETS Code," (A. Hakim, J. Cary, J. Candy, J. Cobb, R. Cohen, T. Epperly, D. Estep, S. Krasheninnikov, A. Malony, D. McCune, L.C. McInnes, A. Pankin, S. Balay, J. Carlsson, M. Fahey, R. Groebner, S. Kruger, M. Miah, A. Pletzer, S. Shasharina, S. Vadlamani, D. Wade-Stein, T. Rognlein, A. Morris, S. Shende, G. Hammett, K. Indareskumar, A. Pigarov, H. Zhang), *Proceedings of SciDAC10*, Chattanooga, TN, July 11-15, 2010.
27. "FACETS: A Framework for Parallel Coupling of Fusion Components," (J. Cary, A. Hakim, M. Miah, S. Kruger, A. Pletzer, S. Shasharina, S. Vadlamani, A. Pankin, R. Cohen, T. Epperly, T. Rognlien, R. Groebner, S. Balay, L. McInnes, and H. Zhang), *Proceedings of Euromicro PDP 2010 (The 18th Euromicro International Conference on Parallel, Distributed and Network-Based Computing)*, Pisa, Italy, Feb. 17-19, 2010.
28. "Orbital Hybridization in Uranium Compounds and its Influence on Electronic Properties," (W. Wang, H. Zhang, G. Liu) *Proceedings of Materials Research Society Meeting*, San Francisco, CA, March 24-28, 2008.
29. "SIPs: Tailored parallelization of the generalized symmetric eigenproblem, (M. Sternberg, P. Zapol, H. Zhang and B. Smith), American Chemical Society, National Meeting, San Francisco, CA, 2006.
30. "Parallel Symbolic and Numeric Algorithm for Polynomial Zeros," (H. Zhang), *Proceedings of the Ninth SIAM Conference on Parallel Processing for Scientific Computing*, 1999.
31. "Pseudospectra of Companion Matrices and Their Potential Impact on Polynomial Algorithms," (S. Flory, J. Luttamaguzi, M. Tisher, and H. Zhang), *Proceedings of the First Southern Symposium on Computing*, Hattiesburg, Mississippi, December 4-5, 1998.
32. "Iterative Refinement for Polynomial Zeros," (H. Zhang), *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications, PDPTA '98*, Las Vegas, Nevada, July 13-16, 1998, vol. I, pp.402-406.
33. "Windowing Estimates for Waveform Relaxation," (H. Zhang), *Proceedings of the 14th. IMACS World Congress on Computation and Applied Mathematics*, Atlanta, Georgia, July 11-15, 1994.
34. "Solving Multiple Objective Linear Programs on the Intel Paragon" (H. Zhang and M. Wiecek), *Proceedings of Mardi Gras '94 Conference: Toward Teraflop Computing and New Grand Challenge Applications*, Baton Rouge, Louisiana, February 10-12, pp. 323-329, 1994.

35. "Homotopy Algorithm for Symmetric Eigenvalue Problem and Its Implementation," (H. Zhang), *Technical report #628, Department of Mathematical Sciences, Clemson University, May, 1993.*
36. "Solution of Generalized Eigenvalue Problems Using a Parallel Subspace Iteration Algorithm" (H. Zhang and W. F. Moss), *Proceedings of the Fifth SIAM Conference on Parallel Processing for Scientific Computing*, D.Sorensen Ed., pp.117-122, SIAM, 1992.
37. "The Error Analysis of a Tridiagonal Solver," (H. Zhang), *Proceedings of the Fifth Distributed Memory Computing Conference*, D.Stout Ed., pp.351-355, IEEE Computer Society Press, 1991.
38. "Parallel Algorithms for Solution of Tridiagonal Systems on Multicomputers" (X. Sun, H. Zhang and L. M. Ni), *Proceedings of the 1989 ACM International Conference on Supercomputing*, Crete, Greece, June 5-9, 1989, pp.303-312.

Book Chapter:

39. "Mathematical Modeling and Computer Simulation of Polymerization Process", (H. Zhang and Y. Tian), in *Applied Mathematical Modeling - A Multidisciplinary Approach*, D. Shier and K.T. Wallenius Ed., CRC Press, 1999.

Software Manual:

40. "PETSc Users Manual," (S. Balay, J. Brown, K. Buschelman, V. Eijkhout, W. Gropp, D. Kaushik, M. Knepley, L. C. McInnes, B. Smith, and H. Zhang), MCS Technical Report, ANL-95-11, Revision 3.4, May 2013.

Symposium Organization

1. "Parallel Implicit Approaches in Magnetic Fusion Applications, (L. C. McInnes, T. D. Rognlien and H. Zhang), SIAM Conference on Parallel Processing for Scientific Computing, March 12-14, 2008, Atlanta, Georgia.
2. "Numerical Computation Using Portable, Extensible Toolkit for Scientific Computation (PETSc), (H. Zhang), Zurich, Switzerland, 6th International Congress on Industrial and Applied Mathematics, July 16-20, 2007.

Invited Talks

1. "PETSc: Hight-Performance Software for Engineering and Science," Shell Global Solutions International, Rijswijk, Netherlands, May 15, 2013.
2. "Advanced Scientific Computing," SIAM Student Chapter, Math Dept. Illinois Inst. of Tech, April. 19, 2012.
3. "What is new in PETSc," Institute of Software, Chinese Academy of Sciences, Beijing, May 25, 2011.
4. "Life in National Laboratory," SIAM Student Chapter, Math Dept. Illinois Inst. of Tech, Feb. 16, 2011.
5. "Portable, Extensible Toolkit for Scientific Computation,

- Dept of Mathematics, Beijing Normal University, China, May 18, 2011.
 - Dept of Scientific & Engineering Computing, School of Mathematical Sciences, Peking University, China, June 10, 2010.
 - Institute of Software, Chinese Academy of Sciences, June 9, 2010.
 - School of Computer Science and Engineering, Beihang University, China, June 8, 2010.
 - CINECA Consortium of universities, Casalecchio di Reno, Italy, May 22, 2009.
 - Math Dept, Australian National Univ., May 12, 2008
 - School of Aerospace, Mechanical and Mechatronic Engineering, Univ. of Sydney, Australia, May 8, 2008
 - Math Dept, Michigan State Univ., Mar 21, 2008
 - Center for Computation & Technology, Louisiana State Univ., April, 2007.
6. “PETSc and its Ongoing Research and Development, CScADS Workshop on Libraries and Algorithms for Petascale Applications, Snowbird Utah, Aug., 2007
 7. “Design, Implementation and Applications of PETSc-MUMPS Interface, the MUMPS Users Day, Lyon France, Oct 24, 2006.
 8. “Eigenvalue Problems in Nanoscale Materials Modeling,”
 - Mathematics Colloquium, Mathematics Dept., Louisiana State Univ., April, 2007.
 - Mathematics Colloquium, Dept. of Math., Clemson Univ., March 13, 2006.
 - Applied Mathematics Colloquium, Dept. of Applied Math., Illinois Institute of Technology, Oct. 3, 2005.
 - Mathematics and Applications Seminar, Dept. of Mathematics, Statistics and Computer Science, Univ. of Illinois at Chicago, April 13, 2005.
 - International Symposium on Dynamical System and Numerical Analysis, Taiwan, May 12, 2005.
 - Supercomputing Center, Chinese Academy of Science, May 18, 2005.
 9. “Solving Polynomial Systems,”
 - Xian JiaoTong University, China, June 6, 2000.
 - College of Information Science, Beijing Normal University, China, June 12, 2000.
 - Institute of Systems Science, Chinese Academy of Science, June 14, 2000.
 10. “Advances in Parallel Computation,” Capital University of Economics and Business, China, June 18, 1996.
 11. “Modeling and Simulation of Polymerization Process,”
 - Math. Dept. Colloquium, Beijing Normal University, China, June 14, 1996.
 - Computer Science Dept. Colloquium, Tsinghua University, China, June 19, 1996.
 12. “Waveform Multigrid Relaxation Methods for Time-dependent PDEs,” Math. Dept. Colloquium, University of Southwestern Louisiana, Feb. 17, 1994.

13. "On the Waveform Relaxation Method," Oak Ridge National Laboratory, Oak Ridge TN, Oct. 24, 1993.
14. "A Parallel Algorithm for Generalized Eigenvalue Problems," IMSL, Houston TX, Mar. 22, 1991.
15. "Introduction to Parallel Matrix Computation," Math. Dept. Colloquium, Iowa State University, Feb. 12, 1991.

Contributed Talks

1. "Exploiting Hierarchies in Algorithms, Software, and Applications," L. C. McInnes, T. Munson, J. Chen, and H. Zhang, minisymposium introductory presentation, SIAM Conference on Computational Science and Engineering, Boston, MA, Feb. 25 - March 1, 2013.
2. "Flexible BiCGStab and Its Use in Practice," J. Chen, L. C. McInnes, and H. Zhang, invited minisymposium presentation, SIAM Conference on Computational Science and Engineering, Boston, MA, Feb. 25 - March 1, 2013.
3. "Recent PETSc Functionality in Linear Operators and Solvers," H. Zhang, SIAM Conference on Applied Linear Algebra, Valencia Spain, June 2012.
4. "PETScs Software Strategy for the Design Space of Composable Extreme-Scale Solvers," B. Smith, L.C. McInnes, E. Constantinescu, M. Adams, S. Balay, J. Brown, M. Knepley, H. Zhang, invited presentation, DOE Exascale Research Conference, Portland, OR, April 16-18, 2012.
5. "Progress in Parallel Implicit Methods For Tokamak Edge Plasma Modeling," M. McCourt, L. C. McInnes, H. Zhang, B. Dudson, S. Farley, T. Rognlien, M. Umansky, American Physical Society 52th Annual Meeting of the Division of Plasma Physics, Chicago, IL Nov. 8-12, 2010.
6. "Three Phase Instantaneous Time Domain Simulation of Electrical Power Systems Using PETSc," B.F. Smith, H. Zhang, and S. Abhyankar, SIAM Annual Meeting, Denver, Co, July 2009.
7. "Implicit Nonlinear Solvers in Coupled Core-Edge Fusion Models," Cary, Balay, Cohen, Epperly, Estep, Groebner, Hakim, Kruger, Malony, McInnes, Miah, Morris, Pankin, Pletzer, Rognlien, Shasharina, Shende, Vadlamani and H. Zhang, SIAM Annual Meeting, Denver, Co, July 2009.
8. "Progress in Parallel Implicit methods for Tokamak Edge Plasma Modeling," H. Zhang, L.C. McInnes, T. Rognlien, M. Umansky and S. Farley, SIAM Conference on Computational Science and Engineering (CSE09), Miami, FL, March 2009.
9. "Issues in Software for Coupled Multiphysics PDEs," L.C. McInnes, B.F. Smith, and H. Zhang, SIAM Annual Meeting, July 2008.
10. "Solving Multivariate Polynomials," H. Zhang, 1001st AMS Meeting, Northwestern University, IL, Oct. 23-24, 2004.
11. "Pseudozeros of Polynomials and Their Potential Impact on Polynomial Algorithms," H. Zhang, First Southern Symposium on Computing, Hattiesburg, Mississippi, December 4-5, 1998.

12. "Iterative Refinement for Polynomial Zeros," H. Zhang, International Conference on Parallel and Distributed Processing Techniques and Applications, PDPTA'98, Las Vegas, Nevada, July 13-16, 1998.
13. "Modeling and Simulation of Polymerization Process," H. Zhang, SIAM Annual Southeast Atlantic Section Meeting, Clemson, SC, March 28-30, 1996.
14. "Modeling and Computer Simulation of Molecular Weight Distribution of Polymerization," H. Zhang, SIAM 1995 Annual Meeting, Charlotte, NC, October 23-26, 1995.
15. "Recent Advances in a Parallel Algorithm for Multiple Objective Linear Programs," H. Zhang, SIAM 1995 Annual Meeting, Charlotte, NC, October 23-26, 1995.
16. "Windowing Estimates for Waveform Relaxation," H. Zhang, the 14th. IMACS World Congress on Computation and Applied Mathematics, Atlanta, GA, July 11-15, 1994.
17. "Analysis of Waveform Multigrid Method," H. Zhang, SIAM 1993 Annual Meeting, Philadelphia, PA, July 12-16, 1993.
18. "Multigrid Waveform Relaxation Methods for Time-Dependent PDEs," H. Zhang, Sixth SIAM Conference on Parallel Processing, Norfolk, VA, March 22-24, 1993.
19. "A Parallel Banded System Solver," H. Zhang, Second International Conference on Industrial and Applied Mathematics, Washington, D.C., July 8-12, 1991.
20. "A Parallel Algorithm for Generalized Eigenvalue Problems," H. Zhang, Fifth SIAM Conference on Parallel Processing, Houston TX, March 25-27, 1991.
21. "Recent Parallelization and Vectorization of Homotopy Algorithm for Symmetric Eigenvalue Problems," H. Zhang, SIAM 1990 Annual Meeting, Chicago, IL, July 16-20, 1990.
22. "Parallel Homotopy Algorithm for Symmetric Tridiagonal Eigenvalue Problem," H. Zhang, SIAM 1989 Annual Meeting, San Diego, CA, July 17-21, 1989.
23. "Analysis of the Galerkin Method with Vector Basis Functions," H. Zhang, IEEE Antennas and Propagation Society International Symposium and URSI Radio Science Meeting, Syracuse, NY, June 6-10, 1988.

Poster Presentations

1. "Improving Scalability for Edge Plasma Transport with Neutral Gas Species," M. McCourt, T. Rognlien, L. C. McInnes, and H. Zhang, SIAM Computational Science and Engineering, Reno, NV, Feb 28-March 4, 2011.
2. "Recent Advances in BOUT++," S. Farley, B. Dudson, L. C. McInnes, and H. Zhang, SIAM Computational Science and Engineering, Reno, NV, Feb 28-March 4, 2011.

Other Professional Activities

- Journal Review:
 - SIAM Journal on Scientific Computing
 - ACM Transactions on Mathematical Software

- Numerical Algorithms
- Parallel Computing
- Journal of Parallel and Distributed Computing
- Computers & Mathematics
- Advances in Computational Mathematics
- Computational and Applied Mathematics
- Mathematics in Computer Science
- Proposal Review: DOE SBIR-STTR.
- Book Review:
 - Programming Abstractions in C++, Addison-Wesley, 2003
 - Afterschool goes to Graduate School, SIAM, 1998.
 - Applied Numerical Analysis 4/E, Addison-Wesley
- Conference Proceedings Review:
 - The 12th Annual IEEE International Conference on High Performance Computing, 2005.
 - Super Computing, 2004.
 - International Symposium on Symbolic and Algebraic Computation (ISSAC), 2003.
 - The 1998 International Conference on Parallel and Distributed Processing Techniques and Applications.
 - The 10th International Conference on Domain Decomposition, 1998.
- Colloquium Series Organize: Mathematical Modeling, Computation and Applications, 1996-1997.

Courses Taught

- C++ Plus Data Structure
- Object-Oriented Analysis and Design
- Multivariable Calculus, Calculus, Pre-Calculus, College Algebra and Trigonometry
- Discrete Methods, Finite Mathematics with Application
- Applied Matrix Algebra
- Numerical Analysis, Advanced Scientific Computing, Numerical Linear Algebra

Community Service

Member of Advisory Board, Aspiritech, a non-profit organization in metropolitan Chicago which provides employment opportunities to individuals with Asperger's syndrome, May 2009 - present.