

Suzanne M. Shontz

Curriculum Vitae

Dept. of Computer Science and Engineering
The Pennsylvania State University
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Education

Cornell University

- 2005 Ph.D. in Applied Mathematics (Completed December 2004)
Dissertation: *Numerical Methods for Problems with Moving Meshes*
Stephen A. Vavasis, advisor
Minors: Computer Science and Mathematics
- 2002 M.S. in Computer Science
M.S. in Applied Mathematics

University of Northern Iowa

- 1999 B.A. in Mathematics (Summa cum laude)
B.S. in Chemistry (Summa cum laude)
Minor: Physics

Research Interests

Parallel scientific computing with a focus on unstructured mesh and numerical optimization methods and their applications to computational medicine, imaging sciences, materials, and electronic circuits.

Appointments

- 2006- **The Pennsylvania State University**
Assistant Professor, Computer Science and Engineering Department
Affiliated with the Computational Science Graduate Program
Affiliated with the Institute for Cyberscience
- 2009-09 **ASEE Contractor to Naval Research Laboratory**
Office of Naval Research Summer Faculty Fellow
- 2004-06 **University of Minnesota**
Postdoctoral Associate working with Yousef Saad, Computer Science and Engineering
- 1999-04 **Cornell University**
NPSC Fellow working with Stephen A. Vavasis, Computer Science Department
- 2004 **Cornell University**
Summer Research Assistant for Stephen A. Vavasis, Computer Science Department
- 2003 **Cornell University**
Summer Research Assistant for Stephen A. Vavasis, Computer Science Department
- 2003 **Sandia National Laboratories**
Summer research intern in the Computer Science Research Institute
- 2002 **Cornell University**
Instructor for COM S 322: Introduction to Scientific Computing
- 2002 **Cornell University**
Teaching assistant for COM S 322: Introduction to Scientific Computing

- 2001-02 **Argonne National Laboratory**
 Summer research intern in the Mathematics and Computer Science Division
- 1999-00 **Sandia National Laboratories**
 Summer research intern in the Computational Sciences and Mathematics Research Division

Students

Current Ph.D. Students

- Shankar Prasad Sastry, Ph.D. in Computer Science and Engineering, Expected August 2012;
 Passed comprehensive exam in August 2010
- Jibum Kim, Ph.D. in Computer Science and Engineering, Expected December 2012;
 Passed comprehensive exam in September 2011
- Jeonghyung Park, Ph.D. in Computer Science and Engineering, Expected August 2013
- Thap Panitanarak, Ph.D. in Computer Science and Engineering, Expected December 2013

Former Masters Students

- Nicholas Voshell, “Models for Applications and Cache Performance”, Master of Engineering,
 Computer Science and Engineering, December 2010.
- Jeonghyung Park, “Derivative-Free Algorithms for Mesh Quality Improvement”, Master of Science,
 Computer Science and Engineering, August 2009.

Current Masters Students

- Ken Czuprynski, M.S. in Computer Science and Engineering (Co-advised with John Fahnlne,
 PSU Applied Research Laboratory), Expected May 2012
- Dragos (Mihai) Nistor, B.S. Honors/M.S. student, Computer Science and Engineering, Expected
 May 2012; Recipient of PSU Undergraduate Summer Discovery Grant, Summer 2010.

Former Undergraduate Students

- Kyle Wray, Supervision of research project on the use of thin plate splines for cloth modeling
 in computer graphics, 2008-10, Bachelor of Science, Computer Science, December 2009.
- Georga Slota, Supervision of honors project in CMPSC/Math 451, Numerical Computations, 2009.
- Patrick Kasting, “Model reduction and a performance evaluation of stiff ODE solvers for a
 photochemical model of the haze formation in the early atmosphere”, Bachelor of Science,
 Computer Science (with honors), May 2007.

Current Undergraduate Student

- Rachel Fuehrer, B.S. Student, Computational Mathematics, B.S. Expected May 2012.

Research Proposals in Submission

- 07/01/12-06/30/15 **“AF: Small: Generation of Optimal Meshes for PDE Simulations:
 Numerical Algorithms and Theory”**
 (with Du); NSF/CCF; \$499,999; PI.
- 07/01/12-06/30/15 **“CRCNS: A Brain Biomechanical Model-Based Feedback Control
 Framework for the Personalized Treatment of Infantile Hydrocephalus”**
 (with Drapaca, Schiff, Wang); NSF/IIS; \$846,541; PI.
- 05/01/12-04/30/15 **“A Theoretical and Computational Study of the Material Brain:
 Application to Hydrocephalus”**
 (with Drapaca); NSF/CMMI; \$539,970; Co-PI.
- 05/01/12-04/30/13 **“Participant Support for CyberBridges: Developing the Next
 Generation of Cyberinfrastructure Faculty for Computational and
 Data-Enabled Science and Engineering”**
 (with Hacker (Purdue); NSF/OCI; \$94,843; PI.

Research Support

- 02/15/11-02/14/16 **NSF CAREER Award**
“CAREER: Parallel Dynamic Meshing Techniques for Simulation-Assisted Medical Interventions”
 NSF/OCI; \$422,986; PI.
- 08/15/07-07/31/12 **“CSR-SMA: Toward Model-Driven Multilevel Analysis and Optimization of Multicomponent Computer Systems”**
 (with Raghavan, Irwin, Kandemir, Li); NSF/CNS; \$700,000; Co-PI.
- 07/01/08-06/30/12 **“MRI: Acquisition of a Scalable Instrument for Discovery Through Computing”**
 (with Raghavan, Chen, Hudson, Kandemir, Smith); NSF/OCI; \$1,995,000; Senior Personnel
- 07/01/10-06/30/11 **“Participant Support for the 19th International Meshing Roundtable”**
 NSF/CCF; \$22,018; PI.
- 06/03/09-08/12/09 **ONR Summer Faculty Fellowship**
 Office of Naval Research; \$14,000.
- 05/16/09-12/18/09 **“Computational Modeling, Simulation, and Validation of Blood Clot Entrapment by Inferior Vena Cava Filters”**
 (with Manning, Lynch, Medvitz); PSU/Institute for Cyberscience; \$12,640; PI.
- 07/01/07-06/30/08 **“Trapping Blood Clots: Modeling and Simulation of Optimal Inferior Vena Cava Filters”**
 (with Lynch, Singer); PSU/Grace Woodward Foundation; \$25,000; PI.

Educational Support

- 09/01/08-08/31/10 **“CPATH: CDP: Integrating Biology and Computing: Empowering Future Computer Engineers”**
 (with Narayanan, Acharya, Albert, Lesk, Irwin); NSF/CNS; \$149,028; Senior Personnel.

Undergraduate Student Research Support

- 08/11-05/12 **“Development of an Experimentally-Validated Technique for Tracking Deformation of the Inferior Vena Cava”**
 Undergraduate Students: Rachel Fuehrer (Computational Mathematics) and Ali Schwartz (Bioengineering); Faculty Advisors: S.M. Shontz (CSE), K.B. Manning (Bioengineering)); CREU grant; Computing Research Association - Committee on the Status of Women in Computing Research; \$9,000.
- 05/10-08/10 **“Effective Concurrent Mesh Transformation Algorithms”**
 Undergraduate Student: Dragos Mihai Nistor; Faculty Advisor: Suzanne M. Shontz; Undergraduate Summer Discovery Grant from Penn State; \$2,500.

Honors

- 2011 National Science Foundation CAREER Award
- 2009 Office of Naval Research Summer Faculty Fellowship at Naval Research Laboratory
- 2007 Chosen by undergraduate student to be the Computer Engineering Faculty Marshall for the College of Engineering, Spring Commencement

- 2005-06 Minnesota Supercomputing Institute Research Scholarship
 1999-04 National Physical Science Consortium (NPSC) Fellowship
 1999 Honorable Mention, Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate, Association for Women in Mathematics
 1999 Purple and Old Gold Award in Chemistry and Mathematics (the outstanding graduate in each major), University of Northern Iowa
 1998 College of Natural Sciences Dean's Student Award (outstanding student in the college) University of Northern Iowa

Affiliations

Society for Industrial and Applied Mathematics (SIAM)
 Association for Computing Machinery (ACM)
 The Institute of Electrical and Electronics Engineers (IEEE)
 American Mathematical Society (AMS)
 Association for Women in Mathematics (AWM)
 United States Association for Computational Mechanics (USACM)
 American Society for Engineering Education (ASEE)

Publications

Books

S.M. Shontz, Editor. *Proceedings of the 19th International Meshing Roundtable*, Springer-Verlag, p. 510, 2010.

Book Chapters

Shankar P. Sastry, Jibum Kim, Suzanne M. Shontz, Brent Craven, Frank C. Lynch, Keefe B. Manning, and Thap Panitanarak, "*Patient-specific model generation and simulation for pre-operative surgical guidance for pulmonary embolism treatment*", Invited submission to Image-Based Geometric Modeling and Mesh Generation, Accepted, January 2012.
 Jeonghyung Park, Suzanne M. Shontz, and Corina S. Drapaca, *A combined level set/mesh warping algorithm for tracking brain and cerebrospinal fluid evolution in hydrocephalic patients*", Invited submission to Image-based Modeling and Mesh Generation, Accepted, January 2012.

Refereed Journal Publications In Submission

Shankar Prasad Sastry, Suzanne M. Shontz, and Stephen A. Vavasis, *A Log-Barrier Method for Mesh Quality Improvement and Untangling*, Invited submission to Engineering with Computers; Submitted, March 2012.
 Jibum Kim, Thap Panitanarak, and Suzanne M. Shontz, *A Multiobjective Framework for Mesh Optimization*, Submitted to the International Journal for Numerical Methods in Engineering, Revised, April 2012.

Refereed Journal Publications

Petko Kitanov, Odile Marcotte, Wil Schilders, and Suzanne M. Shontz, *A vertex cut algorithm for model order reduction of parasitic resistive networks*, COMPEL: The International Journal for Computation and Mathematics in Electrical and Electronic Engineering, Accepted, December 2011.
 Jibum Kim, Shankar Prasad Sastry, and Suzanne M. Shontz, *A numerical investigation on the interplay among geometry, meshes, and linear algebra in the finite element solution of elliptic PDEs*. Invited submission, Engineering with Computers, Published online, August 31, 2011.

- Shankar P. Sastry and Suzanne M. Shontz, *Performance characterization of nonlinear optimization methods for mesh quality improvement*. Invited submission, Engineering with Computers, Published online, July 9, 2011.
- Suzanne M. Shontz and Stephen A. Vavasis, *A robust solution procedure for hyperelastic solids with large boundary deformation*. Engineering with Computers, 28(2): 135-147, 2012.
- Suzanne M. Shontz, Stephen A. Vavasis, *Analysis of and workarounds for element reversal for a finite element-based algorithm for warping triangular and tetrahedral meshes*. BIT, Numerical Mathematics, 50(4) : 863 – 884, December 2010.
- Yousef Saad, James R. Chelikowsky, and Suzanne M. Shontz, *Numerical methods for electronic structure calculations*, SIAM Review, 52(1) : 3 – 54, March 2010.
- Lori Diachin, Patrick Knupp, Todd Munson, and Suzanne M. Shontz, *A comparison of two optimization methods for mesh quality improvement*, Invited submission, Engineering with Computers 22(2) : 61 – 74, May 2006.

Refereed Conference Publications

- Shankar P. Sastry, Suzanne M. Shontz, Stephen A. Vavasis, *A log-barrier method for mesh quality improvement*, Proc. of the 2011 International Meshing Roundtable, p. 329-346, October 2011. Shankar's poster on this project won the Best Student Poster Award at IMR 2011.
- Matthew L. Staten, Steve J. Owen, Suzanne M. Shontz, Andrew G. Salinger, Todd S. Coffey, *A comparison of mesh morphing methods for 3D shape optimization*, Proc. of the 2011 International Meshing Roundtable, p. 293-312, October 2011.
- Thap Panitanarak and Suzanne M. Shontz, *MDEC: MeTiS-based domain decomposition for parallel 2D mesh generation*, Proceedings of the 2011 International Conference on Computational Science, Procedia Computer Science, Volume 4, Issue 1, June 2011, p. 302-311.
- Jeonghyung Park and Suzanne M. Shontz, *An alternating mesh quality metric scheme for efficient mesh quality improvement*, Proceedings of the 2011 International Conference on Computational Science, Procedia Computer Science, Volume 4, Issue 1, June 2011, p. 292-301.
- Jibum Kim, Suzanne M. Shontz, *An improved shape matching algorithm for deformable objects using a global image feature*, Proceedings of the 2010 International Symposium on Visual Computing, Las Vegas, NV, November 2010, Part III, LNCS 6455, pp. 119-128, 2010.
- Jibum Kim, Shankar P. Sastry, and Suzanne M. Shontz, *Efficient solution of elliptic partial differential equations via effective combination of mesh quality metrics, preconditioners, and sparse linear solvers*. Proceedings of the 19th International Meshing Roundtable Conference, October 2010, Chattanooga, TN, p. 103-120.
- Sanjukta Bhowmick, Suzanne M. Shontz, *Towards high-quality, untangled meshes via a force-directed graph embedding approach*. Proceedings of the 2010 International Conference on Computational Science, Procedia Computer Science, Volume 1, Issue 1, May 2010, p. 357-366.
- Jeonghyung Park, Suzanne M. Shontz, *Two derivative-free optimization algorithms for mesh quality improvement*. Proceedings of the 2010 International Conference on Computational Science, Procedia Computer Science, Volume 1, Issue 1, May 2010, p. 387-396.
- Nicholas Voshell, Suzanne Shontz, Lori Diachin, Patrick Knupp, Todd Munson, *A patch-based mesh optimization algorithm for partitioned meshes*, 9th International Workshop on State-of-the-Art in Scientific and Parallel Computing, 2008, Accepted October 2009.
- Shankar Prasad Sastry and Suzanne M. Shontz, *A comparison of gradient- and Hessian-based optimization methods for tetrahedral mesh quality improvement*, in Proceedings of the 18th International Meshing Roundtable, October 2009, Salt Lake City, UT, p. 631-648.
- Suzanne M. Shontz, Victoria E. Howle, and Patricia D. Hough, *Experience with approximations in the trust-region parallel direct search algorithm*, in Proceedings of the 2009 International Conference on Computational Science, May 2009, p. 501-510.

- Suzanne M. Shontz and Patrick Knupp, *The effect of vertex reordering on 2D local mesh optimization efficiency*, in Proceedings of the 17th International Meshing Roundtable, October 2008, Pittsburgh, PA, p. 107-124.
- Lori Diachin, Patrick Knupp, Todd Munson, and Suzanne M. Shontz, *A comparison of inexact Newton and coordinate descent mesh optimization techniques*, in Proceedings of the 13th International Meshing Roundtable, September 2004, Williamsburg, VA, p. 243-254.
- Suzanne M. Shontz and Stephen A. Vavasis, *A mesh warping algorithm based on weighted Laplacian smoothing*, in Proceedings of the 12th International Meshing Roundtable, September 2003, Santa Fe, NM, p. 147-158.
- Lori Freitag, Patrick Knupp, Todd Munson, and Suzanne M. Shontz, *A survey of numerical optimization software for nonlinear, constrained mesh quality objective functions*, in Proceedings of the 11th International Meshing Roundtable, September 2002, Ithaca, NY, p. 19-40.

Nonrefereed Journal Publications

- Suzanne M. Shontz, *Computing homoclinic bifurcations*, The Pentagon, Volume 60, Number 2, Spring 2001, p. 3-15.
- Beth Koch, Suzanne M. Shontz, and Gary Spieler, *A is not for achievement*, The Pentagon, Volume 58, Number 2, Spring 1999, p. 14-22.
- Suzanne M. Shontz, *Molecules and their symmetries: Determining the hybridization of a central atom using point groups*, The Pentagon, Volume 56, Number 2, Spring 1997, p. 38-46.

Nonrefereed Conference Publications

- R. Anderssen, P.G. Hjorth, A.S. Kane, P. Kitanov, K. Ladipo, O. Marcotte, B. Orser, W. Schilders, S.M. Shontz, W. Sun, and B.A. Wane. *Model order reduction for electronic circuits: Mathematical and physical approaches*, edited by P.G. Hjorth and S.M. Shontz, in Proceedings of the 2008 Fields-MITACS Industrial Problem-Solving Workshop, Fields Institute, University of Toronto, March 2009.
- D. Aruliah, C. Bowman, G. Fan, R. Melnick, S. Shontz, S. Wang, and J. Zhu. *Nonlinear dimension reduction for microarray data (Small n and large p)*, edited by S. Shontz, in Proceedings of the 2006 Fields-MITACS Industrial Problem-Solving Workshop, Fields Institute, University of Toronto, November 2006.

Technical Reports

- Jeonghyung Park, Patrick Knupp, and Suzanne M. Shontz, *Static vertex reordering schemes for local mesh quality improvement*, CSRI Summer Proceedings, Sandia National Laboratories, 2010.
- Victoria E. Howle, Suzanne M. Shontz, and Patricia D. Hough, *Some parallel extensions to optimization methods in OPT++*, Sandia Technical Report SAND 2000-8877, October 2000.

Ph.D. Thesis

- Suzanne Michelle Shontz, *Numerical Methods for Problems with Moving Meshes*, Ph.D. Thesis, Cornell University, December 2004.

Software

- FEMWARP: A finite element-based mesh warping algorithm (developed in collaboration with Stephen Vavasis and published in our 2010 BIT, Numerical Mathematics paper.)
The software is in use by various researchers. Featured users of the software include:
Dr. Gary Zientara, Associate Professor of Radiology at Brigham and Women's Hospital and Harvard Medical School (generation of dynamic abdomen and whole-body meshes);
Drs. Matthew Staten, Senior Member of the Technical Staff at Sandia National Laboratories and Steve Owen, Principal Member of the Technical Staff at Sandia National Laboratories (generation of dynamic meshes for shape optimization).

Public Speaking

Invited Presentations (Selected)

- February 2013 **Advances in Computational Mechanics, A Conference Celebrating the 70th Birthday of Thomas J.R. Hughes**
Title: TBD
- March 2012 **Mathematics, Statistics, and Physics Seminar**
Wichita State University, Wichita, KS
“A Dynamic Meshing Framework with Applications to Patient-Specific Medical Interventions”
- March 2012 **Fariborz Maseeh Mathematics and Statistics Seminar**
Portland State University, Portland, OR
“A Dynamic Meshing Framework with Applications to Patient-Specific Medical Interventions”
- March 2012 **Mathematics and Statistics Seminar**
Mississippi State University, Mississippi State, MS
“A Dynamic Meshing Framework with Applications to Patient-Specific Medical Interventions”
- March 2012 **Mathematics and Computer Science Seminar**
Clarkson University, Potsdam, NY
“A Dynamic Meshing Framework with Applications to Patient-Specific Medical Interventions”
- February 2012 **Mathematics, Computer Science, and Radiology Seminar**
Emory University, Atlanta, GA
“An Image-Based, Parallel Dynamic Meshing Framework for Patient-Specific Medical Interventions”
- January 2012 **Mathematics and Applied Mathematics Seminar**
Virginia Commonwealth University, Richmond, VA
“A Dynamic Meshing Framework with Applications to Patient-Specific Medical Interventions”
- December 2011 **Mathematical Sciences/Operations Research Seminar**
Florida Institute of Technology, Melbourne, FL
“A Dynamic Meshing Framework with Applications to Patient-Specific Medical Interventions”
- April 2011 **Scientific Computing Seminar**
Brown University, Providence, RI
“Towards a Parallel Dynamic Meshing Framework”
- March 2011 **SIAM Computational Science and Engineering Conference**
Reno, NV
“Vertex Reordering for Local Mesh Quality Improvement of Tetrahedral Meshes”
- November 2010 **Computer Science Department**
University of Nebraska, Omaha, NE
“Effective Anisotropic Mesh Generation for Finite Element Solution of Partial Differential Equations”
- October 2010 **Electrical Engineering and Computer Science Department**
University of Tennessee, Knoxville, TN
“Meshing Techniques for Numerical Solution of Partial Differential Equations and Shape Matching”

- September 2010 **3rd Workshop on Grid Generation for Numerical Computations
(Tetrahedron III Workshop)**
Swansea University, Swansea, Wales, UK
(1 out of 5 Americans invited to present their research)
“Towards an Improved Understanding of the Connections Between Geometry Discretization, Anisotropic Mesh Quality Improvement, and the Numerical Solution of Elliptic PDEs”
- August 2010 **DARPA Grid II Workshop**
Washington, D.C.
“Parallel Streaming Progressive Meshes”
- June 2010 **16th U.S. National Congress of Theoretical and Applied Mechanics**
State College, PA
“Insight on the Correlation Between Geometry, Mesh Quality Improvement, and Elliptic PDE Solution”
- April 2010 **SIAM Student Chapter**
The Pennsylvania State University, University Park, PA
“Derivative-Free Optimization Algorithms for Mesh Quality Improvement”
- January 2010 **Social, Life, and Engineering Sciences Imaging Center**
The Pennsylvania State University, University Park, PA
“Biomedical Mesh Generation Techniques for Cardiovascular Applications”
- March 2009 **SIAM Computational Science and Engineering Conference**
Miami, FL
“Efficiency of Static Vertex Reordering Schemes for Local Mesh Optimization”
- July 2008 **REU Program, Mathematics and Statistics Department**
James Madison University, Harrisonburg, VA
“Mesh Warping Algorithms with Applications to Cardiology”
- July 2008 **REU Program, Mathematics and Statistics Department**
James Madison University, Harrisonburg, VA
“A Patch-based Mesh Smoothing Algorithm”
- May 2008 **9th International Workshop on State-of-the-Art in Scientific and
Parallel Computing**
Trondheim, Norway
“A Patch-Based Mesh Optimization Algorithm for Partitioned Meshes”
- May 2008 **SIAM Optimization Conference**
Boston, MA
“Experience with Gradient-Based Optimization Methods in Electronic Structure Calculations”
- April 2008 **Computational Visualization Center**
Institute for Computational Engineering and Sciences
University of Texas, Austin, TX
“A Comparison of Vertex Relocation Strategies for Mesh Quality Improvement”
- March 2008 **SIAM Parallel Processing for Scientific Computing Conference**
Atlanta, GA
“Parallel Mesh Quality Improvement Techniques for Blood Clot Entrapment”
- March 2008 **Garfield Thomas Water Tunnel Seminar**
**Applied Research Laboratory, The Pennsylvania State University,
University Park, PA**
“The Development of an Efficient Geometric Mesh Quality Improvement Method via Vertex Reordering and Elemental Patches”

- September 2007 **Science Today Seminar**
State University of New York (SUNY) Oswego, Oswego, NY
 “Generation and Adaptation of Computational Meshes for Biomedical Applications”
- April 2007 **Industrial Engineering Seminar**
The Pennsylvania State University, University Park, PA
 “Experience with Approximations in the TRPDS Algorithm”
- April 2007 **PDE and Applied PDE Seminar**
The Pennsylvania State University, Altoona, PA
 “M4: Mesh Smoothing, Mesh Node Reordering, and Mesh Warping for Medical Applications”
- March 2007 **Institute for Computational Science Seminar**
The Pennsylvania State University, University Park, PA
 “Mesh Warping Techniques with Applications to Cardiology and Nonlinear Elasticity”
- March 2007 **Industrial and Professional Advisory Committee Presentation**
The Pennsylvania State University, University Park, PA
 “Optimal Meshes with Applications to Graphics and Bioengineering”
- February 2007 **SIAM Computational Science and Engineering Conference**
Costa Mesa, CA
 “The Effect of Node Reordering on 2D Local Mesh Smoothing Efficiency with Application to Mesh Warping”
- September 2006 **Computational and Applied Mathematics Colloquium**
The Pennsylvania State University, University Park, PA
 “Optimization Techniques for Mesh Warping and Nonlinear Elasticity”
- March 2006 **Colloquium, Mathematical Sciences Department**
Rensselaer Polytechnic Institute, Troy, NY
 “Optimization Techniques for Mesh Warping and the Geometry of Materials”
- February 2006 **Colloquium, Mathematical Sciences Department**
George Mason University, Fairfax, VA
 “Optimization Techniques for Mesh Warping and the Geometry of Materials”
- February 2006 **Colloquium, Mathematics Department**
University of Northern Iowa, Cedar Falls, IA
 “Optimization Techniques for Mesh Warping and the Geometry of Materials”
- February 2006 **Colloquium, Computer Science and Engineering Department**
The Pennsylvania State University, State College, PA
 “Optimization Techniques for Mesh Warping and the Geometry of Materials”
- February 2006 **Jr. Colloquium, Mathematics Department**
University of Minnesota, Minneapolis, MN
 “Optimization Techniques for Mesh Warping and the Geometry of Materials”
- February 2006 **Colloquium, Mathematics and Statistics Department**
University of Maryland – Baltimore County, Baltimore, MD
 “Numerical Methods for Problems in Electronic Structure Calculations”
- December 2005 **Colloquium, Mathematics Department**
University of Iowa, Iowa City, IA
 “Numerical Methods for Problems in Electronic Structure Calculations”
- December 2005 **Numerical Analysis Seminar, Mathematics Department**
University of Iowa, Iowa City, IA
 “A Tetrahedral Meshing Warping Algorithm with Applications to Cardiology”
- April 2005 **Colloquium, Mathematics Department**
University of Northern Iowa, Cedar Falls, IA
 “Algorithms for Mesh Warping with Applications to Cardiology”

- April 2004 **NA Seminar, Computer Science and Engineering Department
University of Minnesota, Minneapolis, MN**
“Algorithms for Mesh Warping with Applications to Cardiology”
- April 2004 **NA Seminar, Applied Physics and Applied Mathematics Department
Columbia University, New York, NY**
“Algorithms for Mesh Warping with Applications to Cardiology”
- March 2004 **SCOREC Seminar, Scientific Computation Research Center
Rensselaer Polytechnic Institute, Troy, NY**
“Algorithms for Mesh Warping with Applications to Cardiology”
- March 2004 **Mathematical Sciences Seminar, Center for Applied Mathematics
Cornell University, Ithaca, NY**
“Algorithms for Mesh Warping with Applications to Cardiology”
- March 2004 **Colloquium, College of Engineering
Virginia Polytechnic Institute and State University, Blacksburg, VA**
“Algorithms for Mesh Warping with Applications to Cardiology”
- February 2004 **Colloquium, Mathematics and Statistics Department
Miami University, Oxford, OH**
“Algorithms for Mesh Warping with Applications to Cardiology”
- February 2004 **Colloquium, Mathematics Department
Western Illinois University, Macomb, IL**
“Algorithms for Mesh Warping with Applications to Cardiology”
- February 2004 **Colloquium, Mathematics and Statistics Department
Texas Tech University, Lubbock, TX**
“Algorithms for Mesh Warping with Applications to Cardiology”
- February 2004 **Research Seminar
Sandia National Laboratories, Albuquerque, NM**
“Algorithms for Mesh Warping with Applications to Cardiology”
- February 2004 **Numerical Analysis Seminar, Courant Institute
New York University, New York, NY**
“Algorithms for Mesh Warping with Applications to Cardiology”
- January 2004 **Applied and Computational Mathematics Seminar
The Pennsylvania State University, State College, PA**
“Algorithms for Mesh Warping with Applications to Cardiology”
- January 2004 **Seminar, Center for Cardiovascular Bioinformatics and Modeling
Johns Hopkins University, Baltimore, MD**
“Algorithms for Mesh Warping with Applications to Cardiology”
- February 2003 **SIAM Computational Science and Engineering Conference
San Diego, CA**
“A Mesh Warping Algorithm Based on Weighted Laplacian Smoothing”

Other Presentations (Selected)

- February 2012 **2012 SIAM Conference on Parallel Processing
for Scientific Computing
Savannah, GA**
“Streaming GPU-Based Triangular Surface Mesh Compression”
- June 2011 **2011 International Conference on Computational Science
Singapore**
“MDEC: MeTiS-based Domain Decomposition for Parallel 2D Mesh Generation”

- June 2011 **2011 International Conference on Computational Science
Singapore**
“An Alternating Mesh Quality Metric Scheme for Efficient Mesh Quality Improvement”
- November 2010 **2010 International Symposium on Visual Computing
Las Vegas, NV**
“An Improved Shape Matching Algorithm for Deformable Objects Using a Global Image Feature” (Poster Presentation)
- July 2010 **SIAM Annual Meeting
Pittsburgh, PA**
“Static Vertex Reordering Schemes for Local Mesh Quality Improvement”
- June 2010 **2010 International Conference on Computational Science
Amsterdam, The Netherlands**
“Towards High-quality, Untangled Meshes via a Force-directed Graph Embedding Approach”
- June 2010 **2010 International Conference on Computational Science
Amsterdam, The Netherlands**
“Two Derivative-free Optimization Algorithms for Mesh Quality Improvement”
- October 2009 **SIAM Workshop on Combinatorial Scientific Computing
Seaside, CA**
“Obtaining High-Quality Untangled Meshes Through Force-Directed Graph Embedding”
Poster Presentation: Presented by Sanjukta Bhowmick
- October 2009 **18th International Meshing Roundtable Conference
Salt Lake City, UT**
“A Comparison of Gradient- and Hessian-Based Optimization Methods for Tetrahedral Mesh Quality Improvement”
- July 2009 **10th U.S. National Congress on Computational Mechanics
Columbus, OH**
“An Investigation into Efficient Local Tetrahedral Mesh Quality Improvement Methods for Various Shape Quality Metrics”
- May 2009 **2009 International Conference on Computational Science
Baton Rouge, LA**
“Experience with Approximations in the Trust-Region Parallel Direct Search Algorithm”
- October 2008 **17th International Meshing Roundtable Conference
Pittsburgh, PA**
“The Effect of Vertex Reordering on 2D Local Mesh Optimization Efficiency”
- August 2008 **Fields-MITACS Industrial Problem-Solving Workshop
Fields Institute, University of Toronto, Toronto, Ontario, Canada**
“NXP Semiconductor Problem: Model Order Reduction”
Joint talk with Ortho Flint
- May 2007 **Bio and Medical Informatics Retreat
The Pennsylvania State University, University Park, PA**
“Advanced Virtual Environments for Biomedical Applications”
- February 2007 **SIAM Computational Science and Engineering Conference
Costa Mesa, CA**
“Optimization of the Geometry of Materials”

- November 2006 **Finite Element Circus**
State College, PA
 “A Robust Solution Procedure for Hyperelastic Solids with Large Boundary Deformation”
- August 2006 **Fields-MITACS Industrial Problem-Solving Workshop**
Fields Institute, University of Toronto, Toronto, Ontario, Canada
 “Nonlinear Dimension Reduction for Microarray Data (Small n and Large p)”
 Joint talk with Steven Wang
- July 2006 **World Congress on Computational Mechanics**
Los Angeles, CA
 “A Robust Solution Procedure for Hyperelastic Solids with Large Boundary Deformation”
- October 2005 **Technology Forum, Department of Computer Science and Engineering**
University of Minnesota, Minneapolis, MN
 Poster Presentation: “New Developments in Numerical Methods for Electronic Structure Calculations” (with Yunkai Zhou)
- September 2005 **Numerical Analysis Seminar**
Department of Computer Science and Engineering
University of Minnesota, Minneapolis, MN
 “Efficient Geometry Optimization of Molecular Clusters”
- July 2005 **Institute for the Theory of Advanced Materials in Information Technology**
Workshop
University of Minnesota, Minneapolis, MN
 “Efficient Geometry Optimization of Molecular Clusters”
- May 2005 **Midwest Numerical Analysis Days**
University of Iowa, Iowa City, IA
 “A Linear Weighted Laplacian Smoothing Framework for Warping Tetrahedral Meshes”
- February 2005 **SIAM Conference on Computational Science and Engineering**
Orlando, FL
 “A Linear Weighted Laplacian Smoothing Framework for Warping Tetrahedral Meshes”
- November 2004 **Numerical Analysis Seminar**
Department of Computer Science and Engineering
University of Minnesota, Minneapolis, MN
 “Numerical Methods for Problems with Moving Meshes”
- September 2004 **Ph.D. Thesis Defense, Center for Applied Mathematics**
Cornell University, Ithaca, NY
 “Numerical Methods for Problems with Moving Meshes”
- February 2004 **SIAM Parallel Processing for Scientific Computing Conference**
San Francisco, CA
 “Using Approximation Models in Simulation-based Optimization”
- November 2003 **Applied Math Days**
Rensselaer Polytechnic Institute, Troy, NY
 “A Mesh Warping Algorithm Based on Weighted Laplacian Smoothing”
- September 2003 **Plenary Session, 12th International Meshing Roundtable**
Santa Fe, NM
 “A Mesh Warping Algorithm Based on Weighted Laplacian Smoothing”

- February 2002 **Cornell Day at United Technologies Research Center
Hartford, CT**
“A Mesh Warping Algorithm Based on Weighted Laplacian Smoothing”
- February 2001 **Mathematical Sciences Graduate Student Seminar
Cornell University, Ithaca, NY**
“Women and Graduate School: Improving the Experience and Success of Female Students”
- October 2000 **First Annual Applied Mathematics Days
Rensselaer Polytechnic Institute, Troy, NY**
“Parallel Optimization Using Approximation Models”
- September 2000 **Mathematical Sciences Graduate Student Seminar
Cornell University, Ithaca, NY**
“Parallel Optimization Using Approximation Models”
- August 2000 **Computational Sciences and Mathematics Research Group Seminar
Sandia National Laboratories, Livermore, CA**
“Parallel Optimization Using Approximation Models”
- August 2000 **Student Research Symposium
Sandia National Laboratories, Livermore, CA**
“Parallel Optimization Using Approximation Models”
- August 1999 **Computational Sciences and Mathematics Research Group Seminar
Sandia National Laboratories, Livermore, CA**
“Some Parallel Extensions to Optimization Methods in OPT++”

Workshop Participation

- 2011 Invited Academic Expert, Fourth Montreal Industrial Problem Solving Workshop, Canada
- 2010 Invited Participant, DARPA 2nd GRID Workshop, Washington, D.C.
- 2008 Invited Academic Expert, Fields-Mitacs Industrial Problem Solving Workshop,
Fields Institute, University of Toronto, Toronto, Ontario, Canada
- 2006 Invited Participant, Fields-Mitacs Industrial Problem Solving Workshop, Fields Institute
University of Toronto, Toronto, Ontario, Canada

Service to the Profession and Professional Activities

Conference Committees/Organization/Session Chair

- 2012 Co-Chair, NSF CyberBridges Workshop (OCI), Arlington, VA
- 2012 Member, Program Committee, MICCAI Workshop on Mesh Processing in Medical Image
Analysis 2012 (MeshMed 2012), Nice, France
- 2012 Member, Grace Hopper Conference Panels, Workshops, and Papers Committee
- 2012 Member, Program Committee, 8th IEEE International Conference on eScience
(eScience 2012), Algorithms and Applications Track, Chicago, IL
- 2012 Member, IEEE CloudCom 2012 Program Committee, HPC on Cloud Track, Taipei, Taiwan
- 2011 Panelist, Professional Development Session, International Meshing Roundtable,
Paris, France
- 2011 Reviewer, Grace Hopper Celebration of Women in Computing Scholarships
- 2011 Member, Grace Hopper Conference Panels and Workshops Committee
- 2011 Co-organizer, Two Minisymposia on Recent Advances in Mesh Generation and Mesh
Quality Improvement, SIAM Conference on Computational Science and Engineering,
Reno, NV

- 2011 Co-organizer, Minisymposium on Efficient Model Order Reduction Using Graph Theory and Numerical Linear Algebra, SIAM Conference on Computational Science and Engineering, Reno, NV
- 2011 Member, SIAM Professional Development Evening Working Group
- 2010 Session Chair, 19th International Meshing Roundtable, Chattanooga, TN
- 2010 Session Chair, SIAM Annual Meeting, Pittsburgh, PA
- 2010 Panelist, SIAM Professional Development Evening, SIAM Annual Meeting, Pittsburgh, PA
- 2010 Reviewer, Grace Hopper Celebration of Women in Computing Scholarships
- 2010 Co-Organizer, Professional Development Evening, SIAM Annual Meeting, Pittsburgh, PA
- 2010 Chair, SIAM Professional Development Evening Working Group
- 2010 Chair, Program Committee, 19th International Meshing Roundtable, Chattanooga, TN
- 2009- SIAM Visiting Lecturer
- 2009 Session Chair, 18th International Meshing Roundtable, Salt Lake City, UT
- 2009 Reviewer, Grace Hopper Celebration of Women in Computing Scholarships
- 2009 Session Chair, International Conference on Computational Science, Baton Rouge, LA
- 2009 Member, SIAM Professional Development Evening Working Group
- 2009 Co-Organizer, Professional Development Evening, SIAM Annual Meeting, Denver, CO
- 2009 Doctoral Showcase Committee, Supercomputing Conference, Portland, OR
- 2009 Co-organizer, Three Minisymposia on Mesh Quality Measurement and Improvement: An Overview of Recent Techniques, SIAM Conference on Computational Science and Engineering, Miami, FL
- 2009 Program Committee, 18th International Meshing Roundtable, Salt Lake City, UT
- 2008 Organizer, Minisymposium on Parallel Mesh Techniques for Medical Imaging
SIAM Conference on Parallel Processing for Scientific Computing, Atlanta, GA
- 2008 Reviewer, Grace Hopper Celebration of Women in Computing Scholarships
- 2007 Member, Poster Committee, Supercomputing Conference, Reno, NV
- 2006 Member, Grace Hopper Conference Committee on Presentations, Panels, and Workshops, San Diego, CA
- 2004 Session Chair, SIAM Parallel Processing for Scientific Computing Conference
San Francisco, CA

Journal and Conference Refereeing

SIAM Journal on Scientific Computing
 SIAM Journal on Numerical Analysis
 SIAM Review
 Transactions on Mathematical Software
 International Journal for Numerical Methods in Engineering
 Engineering with Computers
 Journal of Mechanical Engineering Science
 Computational Materials Science
 Journal of Computational Physics
 Computer Physics Communications
 Journal of Chemical Physics
 International Meshing Roundtable
 International Conference on Parallel Processing
 IEEE Computer Graphics and Applications
 ACM Crossroads Magazine

Proposal Reviewing

- 2012 King Fahd University of Petroleum and Minerals, Saudi Arabia
- 2012 Panelist, Department of Defense, Arlington, VA
- 2012 Panelist, NSF DGE, Washington, DC
- 2011 King Fahd University of Petroleum and Minerals, Saudi Arabia
- 2011 Panelist, NSF OCI Panels, Arlington, VA
- 2011 Chair, Department of Defense Panel, National Harbor, MD
- 2011 Panelist, NSF DGE Panel, National Harbor, MD
- 2010 Reviewer, Superior Council of the National Fund for Scientific and Technological Development (FONDECYT), Chile
- 2010 CUBIT External Review Panel (CUBIT is a mesh generation software package developed by Sandia National Laboratories)
- 2010 Panelist, NSF MPS Panel, Arlington, VA
- 2010 Panelist, Department of Defense, Arlington, VA
- 2010 Panelist, NSF DGE, Arlington, VA
- 2009 CUBIT External Review Panel
- 2009 Panelist, Department of Defense, Arlington, VA
- 2009 Panelist, NSF DGE, Arlington, VA
- 2008 Panelist, Department of Defense, Arlington, VA
- 2007 Panelist, NSF CISE, Arlington, VA
- 2007 Panelist, Department of Defense, Arlington, VA

Mentoring

- 2009 Mentor, Mentor/Protege Program, 2009 International Conference for High Performance Computing, Networking, Storage and Analysis
- 2005- Mentor, Association for Women in Mathematics Mentor Network

The Pennsylvania State University Service Activities**Service to the Colleges of Engineering/Science/Information Science & Technology****Membership on Graduate Student Committees**

- Gunseop Lee, Computer Science and Engineering, Ph.D. Comprehensive Exam, December 2011
- Jeffrey Magedanz, Nuclear Engineering, Ph.D. Comprehensive Exam, September 2011.
- Alexandre Jolibois, Acoustics, Ph.D. Comprehensive Exam, July 2011.
- Yasharth Bhartiya, Mechanical Engineering, Ph.D., May 2011.
- Kun Zhou, Mathematics, Ph.D. Defense, December 2011.
- Ning Yang, Bioengineering, Ph.D. December 2009.
- Junseok Oh, Civil Engineering, Ph.D. December 2009.
- Anirban Chatterjee, Computer Science and Engineering, Ph.D. December 2011.
- Inghmar Rauschert, Computer Science and Engineering, Ph.D. Comprehensive Exam, July 2009.
- Sue Kase, Information Sciences and Technology, Ph.D. December 2008.
- Xin Yang, Computer Science and Engineering, Ph.D. December 2007.
- Jiakou Wang, Mathematics, Ph.D. August 2007.
- Matthew Baran, Mathematics, M.S. May 2012.
- Kelly Fermoye, Computer Science and Engineering, M.S. December 2010.
- Daniel Kwon, Civil Engineering, M.S. August 2009.

Service to the College

- 2012 Penn State Society of Women Engineers Stayover Dinner (Prospective Female Students)
- 2012 Engineering Undergraduate Council Engineering Week Event

- 2011 Pre First Year (PREF) Outreach Effort focusing on computational biomedical science, scientific visualization, and bioengineering for entering PSU freshmen minority students; Developed workshop in conjunction with Penn State Visualization Group and Department of Bioengineering
- 2008 College of Engineering WEPO Welcome Dinner (Female Freshmen)
- 2007 Engineering Center, General advisor to all Computer Science and Computer Engineering students at the Freshman/Sophomore Level, Fall 2007
- 2007 College of Engineering WEPO Welcome Dinner (Female Freshmen)
- 2007 Panelist, Clare Boothe Luce Fellowship Luncheon
- 2006 Presenter, College of Engineering, Graduate Cohort Workshop

Service to the Department

- 2011-12 Member, Climate/Social and Faculty Development Committee
- 2007-12 Advisor to 7-14 undergraduate Computer Science/Computer Engineering majors
- 2006-12 Member, Scientific Computing/Numerical Analysis Qualifying Exam Committee
- 2010-11 Member, IT Committee
- 2010-11 Chair, Scientific Computing/Numerical Analysis Qualifying Exam Committee
- 2006-11 Member, Climate and Social Committee
- 2009-10 Member, Faculty Development and Teaching Issues Committee
- 2009-10 Member, IT and Lab Evaluation Committee
- 2009-10 Chair, Climate/Social Committee
- 2008-09 Colloquium Chair
- 2007-08 Chair, Scientific Computing/Numerical Analysis Qualifying Exam Committee (3 semesters)
- 2006-10 Member, Graduate Committee
- 2006-07 Member, English Proficiency Exam Committee

University of Minnesota Service and Professional Activities

- 2006 Co-Advisor to three interns in Minnesota Supercomputing Institute Summer Internship Program
- 2005-06 Executive Board Member, Postdoctoral Association
- 2005 Co-Mentor to three interns in Minnesota Supercomputing Insitute Summer Internship Program
- 2004-06 Participant, Women in the Institute of Technology meetings
- 2004-06 Member, Women in Computing

Cornell University Service and Professional Activities

- 2004 Expanding Your Horizons Volunteer; Assisted with computational science workshop
- 2002 Treasurer, Engineering Graduate Student Association
- 2001-03 Mathematical Sciences Graduate Student Seminar Series Co-organizer, Center for Applied Mathematics
- 2001-03 Mentor to two Ph.D. Students in Applied Mathematics, Center for Applied Mathematics
- 2001 Expanding Your Horizons Volunteer; Assisted with computational science workshop
- 2001 Secretary, Engineering Graduate Student Association
- 2001 Diversity Committee Member, Engineering Graduate Student Association
- 2000 Expanding Your Horizons Volunteer; Assisted with computational science workshop.
- 2000 Treasurer, Engineering Graduate Student Association
- 2000 Bill Sears Club Colloquium Co-organizer, Center for Applied Mathematics
- 1999 Media Relations, Engineering Graduate Student Association

References are available upon request.