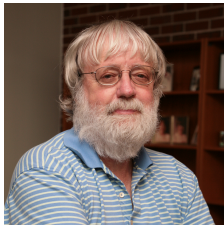# MAX D. GUNZBURGER   Francis Eppes Eminent Professor and Chair

Department of Scientific Computing
Florida State University
Tallahassee FL 32306-4120
850-644-7060
850-644-0098 (fax)
gunzburg@fsu.edu
http://www.sc.fsu.edu/~gunzburg

Positions

Full-time positions

Florida State University - Frances Eppes Eminent Professor of Scientific Computing and Founding Chair, Department of Scientific Computing, 2008-present; Director, School of Computational Science, 2005-2008; Frances Eppes Eminent Professor of Mathematics, 2002-2008

Iowa State University - Distinguished Professor of Mathematics, 2001-2003; Professor and Chair of Mathematics, 1995-2001

Virginia Polytechnic Institute and State University - Professor of Mathematics, 1987-1997

Los Alamos National Laboratories - Visiting Scientist, 1988-1989

Carnegie Mellon University - Professor of Mathematics, 1981-1989

University of Tennessee - Associate Professor and Professor of Mathematics, 1976-1982

Institute for Computer Applications in Science and Engineering - Staff Scientist, 1973-1976

Naval Ordnance Laboratory - National Research Council Postdoctorate Associate, 1971-1973

New York University - Research Scientist and Assistant Professor of Mathematics, 1969-1971

Adjunct, courtesy, and part-time positions

Florida State University - Professor of Mathematics, 2008-present; Professor of Mechanical Engineering, 2006-present

Peking University - Guest Professor of Computational Mathematics, 2000-2002

Virginia Polytechnic Institute and State University - Professor of Computer Sciences, 1992-1997; Professor of Aerospace and Ocean Engineering, 1994-1997

Hampton University - Adjunct Professor of Mathematics, 1990-1993

The College of William and Mary - Adjunct Associate Professor of Mathematics, 1973-1976

George Washington University - Adjunct Associate Professor of Mathematics, 1973-1976

Consulting positions

Sandia National Laboratories, 2000-present

Clear Science Corp., 2004-2005

Institute for Computer Applications in Science and Engineering, NASA Langley Research Center, 1976-1989, 1993-1997

Los Alamos National Laboratory, 1984-1995

Institute for Computational Mechanics in Propulsion, NASA Lewis Research Center, 1985-1986, 1991-1994

Oak Ridge National Laboratory, 1978-1986

Education

New York University - B.S. 1966, M.S. 1967, Ph.D. 1969

Awards and honors

Society for Industrial and Applied Mathematics – Charter Fellow, 2009

Society for Industrial and Applied Mathematics – W.T. and Idalia Reid Prize in Mathematics, 2008

Sandia National Laboratories – CSRI Senior Research Fellow, 2006-present

Florida State University – Frances Eppes Eminent Professor of Scientific Computing, 2008-present; Frances Eppes Eminent Professor of Mathematics, 2002-2008

Iowa State University – Distinguished Professor, 2001-2003; Award for Excellence in Outreach, College of Liberal Arts and Sciences, 2000; Visionary Award, Vision 2020 Project, 2000; Miller Faculty Fellow, 1996-1997

Peking University – Guest Professor of Computational Mathematics, 2000-2002

National Aeronautics and Space Administration – Innovator's Prize for Inventions and Contributions, 1985; Traineeship Fellowship for Graduate Studies, 1966-1969

National Research Council – Postdoctoral Associate, 1971-1973

New York University – Tau Beta Pi Honor Society, 1965; Founders' Day Awards for Academic Excellence, 1966 and 1969; Bryan Medal for Excellence in Mechanics, 1966; Alexander Klemin Prize, 1966

Distinguished lectures

Louisiana State University – Frontiers of Scientific Computing Lecture Series, 2009

International Congress of Mathematicians – Invited Section Lecturer, 2006

University of Manitoba – Distinguished Lecture on Computational Science, Inaugural Lecturer, 2006

University of Alberta – PIMS Distinguished Lecture in Scientific Computing, Inaugural Lecturer, 2006

University of Alabama, Hunstville – University Distinguished Lecture Series, Inaugural Lecturer, 2004

Professional activities

Professional societies

Society for Industrial and Applied Mathematics (SIAM) – Chairman of the Board of Trustees (2003), member of the Committee on Science Policy (2003-2007), member of the Board of Trustees (2001-2003), member of the Financial Management Committee (2002-2004), W. T. Reid Prize Committee (2000-2006), Ralph E. Kleinman Prize Committee (2004-2007), SIAM Activity Group on Control and Systems Theory Prize Committee (2004-2005), Chairman of the Outstanding Paper Prize Selection Committee (2005-2006), Student Paper Prize Selection Committee (2000)

Editor in Chief

SIAM Journal on Numerical Analysis (2000-2007)

Editorial boards

SIAM Journal on Numerical Analysis - Associate Editor (1996-2000, 2007-present)

Computational Science and Engineering (SIAM book series) - Associate Editor (2009-present)

Advances in Design and Control (SIAM book series) - Associate Editor (1998-present)

ESAIM: M2NA (Mathematical Modeling and Numerical Analysis) - Associate Editor (2005-present)

Theoretical and Computational Fluid Mechanics - Associate Editor (2005-present)

Journal of Mathematical Analysis and its Applications - Associate Editor (2003-present)

International Journal of Computer Mathematics - Associate Editor (2009-present)

Numerical Mathematics: Theory, Methods and Applications - Associate Editor (2007-present)

International Journal of Numerical Analysis and Modeling - Associate Editor (2003-present)

International Journal for Computational Fluid Dynamics - Associate Editor (1994-present)

Electronic Journal of Mathematical and Physical Sciences - Associate Editor (2002-present)

ESAIM: COCV (Calculus of Variations and Optimal Control) - Associate Editor (2003-2006)

SIAM Journal on Control and Optimization - Associate Editor (1997-2002)

National and international panels, advisory boards, and review committees

RWTH Aachen University, Scientific Advisory Board for the Aachen Institute for Advanced Study in Computational Engineering Science, Germany, 2007-present

Fundacao para a Ciencia e a Tecnologia (Foundation for Science and Technology) Evaluation Panel, Portugal, 2003, 2008; Chair of Panel 2009

Deutsche Forschungsgemeinschaft (German Research Foundation) Priority Programme Review Panel, Germany, 2006, 2007, 2008, 2009

Department of Mathematical Sciences, Carnegie Mellon University, Advisory Board, 2003, 2008 (Chair of Board)

National Science Foundation (NSF) Proposal Evaluation Panels, 1998, 1999, 2001, 2002, 2004 (2), 2005, 2006, 2007

NSF/MPS Advisory Panel on Cyberscience, 2004

Mellon College of Sciences, Carnegie Mellon University, External review committee, 2003

NSF Graduate Fellowship Application Evaluation Panel, 1993-1997; chair of panel, 1997

CBMS Regional Conferences Application Evaluation Panel, 1995-1997

Conferences and workshops - organizer or co-organizer

Workshop on Uncertainty Quantification for Systems Governed by Partial Differential Equations, Edinburgh, Scotland, 2010 (co-chair of the organizing committee)

Fourth International Conference on Multiscale Materials Modeling, Tallahassee, 2008 (co-chair of the organizing committee)

Workshop on Methods for Verification and Validation, Albuquerque, 2007 (co-chair of the organizing committee)

SIAM Conference on Computational Science and Engineering, Costa Mesa, 2007 (co-chair of the organizing committee)

SIAM Conference on Control and its Applications, New Orleans, 2005 (co-chair of the organizing committee)

Workshop on Emerging Methodologies and Applications in Numerical PDEs, Tallahassee, 2004 (chair of the organizing committee)

Eight Navier-Stokes Conference, St. Petersburg, Russia, 2002 (co-chair of the organizing committee)

Workshop on Least Squares Finite Element Methods and Applications, Oberwolfach, Germany, 2002 (co-chair of the organizing committee)

Conference on Superconductivity, Purdue University, 1998 (co-chair of the organizing committee)

SIAM Annual Meeting, Toronto, 1998 (co-chair of the organizing committee)

Conference on Recent Trends and Advances in PDEs and Numerical PDEs, Ames, 1998 (chair of the organizing committee)

Workshop on Optimal Design and Control, Blacksburg, 1994 (co-chair of the organizing committee)

AMS-SIAM-IMS Summer Research Conference on the Mathematics of Superconductivity, University of Washington, Seattle, 1993 (one of two organizers)

Workshop on Flow Control, Institute for Mathematics and its Applications, Minneapolis, 1992 (sole organizer)

Conferences and workshops - member of the organizing or scientific committee

Advances in Partial Differential Equations and their Applications, Shanghai, China, 2010

Department of Energy Applied Mathematics Principal Investigators Meeting, Argonne, 2008

International Conference on Applied Mathematics and Interdisciplinary Research, Nankai, China, 2006

Numerical PDEs in the 21st Century, Albuquerque, 2006

Conference on Robust Optimization-Directed Design, Shalimar, 2004

Com2MaC Conference on Computational Mathematics, Pohang, Korea, 2003

Third AIAA Theoretical Fluids Dynamics Conference, St. Louis, 2002

International Congress of Mathematicians Satellite Conference on Scientific Computing, Xi'an, China, 2002

Second Annual Conference on Computer Science and Information Technologies, Yerevan, Armenia, 1999

SIAM Conference on Emerging Issues in Mathematics and Computation from the Material Sciences, Pittsburgh, 1994

Symposia and special sessions organized by invitation

, Joint Meeting of the Korean and American Mathematical Societies, 2009 (with)

Numerical simulations of flows in porous media, SIAM Conference on Computational Science and Engineering, Miami, 2009 (with Y. Cao and X. Wang)

Advances in Optimization, Control, and Reduced-Order Modeling, Sixth International Conference on Large-Scale Scientific Computations, Sozopol, Bulgaria, 2007 (with Pavel Bochev)

Finite Element Methods for Flow Control and Optimization, Fourteenth International Conference on Finite Elements in Flow Problems, Santa Fe, 2007 (with Pavel Bochev)

Emerging Methodologies for PDE Constrained Optimization and Control Problems, SIAM Conference on Control and its Applications, New Orleans, 2005

Reduced-Order Modeling, SIAM Conference on Computational Science and Engineering, Orlando, 2005 (with K. Willcox)

Flow Control, SIAM Conference on Control and Optimization, San Diego, 2000 (with R. Smith)

Flow Control and Optimization, GAMM Annual Meeting, Göttingen, Germany, 2000

Numerical Solution of Partial Differential Equations, Canadian Applied and Industrial Mathematics Society Annual Meeting, Quebec, Canada, 1999

Modeling, Analysis, and Computation in Superconductivity, International Conference on Industrial and Applied Mathematics, Hamburg, Germany, 1995

Outreach

Department of Commerce Training Courses for Y2K Preparedness and Response (1999-2000), Ames and Des Moines, Iowa; organizer and manager

Virginia Tech Summer Program for Minority Undergraduate Students of Mathematics (1990-1993), a program that successfully attracted minority students to graduate programs in mathematics; organizer and manager

Other professional service

External examiner for doctoral and habilitation dissertations – University of Oxford (2), University of Paris-Sud, Simon Fraser University, York University, University of Madeburg

Evaluator of tenure and promotion cases – Over 200 letters written in response to requests to evaluate personnel being considered for tenure and/or promotion by other institutions

Reviewer for federal, state, and foreign funding agencies – Reviewed over 300 research proposals for eight Federal and State funding agencies and for funding agencies in Canada, Czech Republic, Chile, Germany, Hong Kong, Israel, NATO, and Portugal

Reviewer for journals and book publishers – Reviewer of over 400 papers for over sixty mathematics, engineering, and physics journals and reviewer of book proposals for over ten publishers

Invited presentations – (since 1994)

Short courses

EU-Regional School 2009: A numerical analyst's view of numerical methods for stochastic PDEs, Aachen, Germany, 2009

London Mathematical Society Durham Symposium: Numerical methods for stochastic PDEs, Durham, England, 2008

First Argentinean Congress on Applied, Computational, and Industrial Mathematics: Numerical Methods for Stochastic Partial Differential Equations, Cordova, Argentina, 2007

Winter School of the Collaborative Research Center SFB 611, Universität Bonn: PDE Constrained Control and Optimization, Bonn, Germany, 2006

University of North Carolina, Applied Mathematics Program: Control and Optimization, Chapel Hill, 2006

SIAM Conference on Control and its Applications: Flow Control and Optimization, San Diego, 2001

Canadian CFD Conference: Flow Control and Optimization, Montreal, Canada, 2000

Centre de Recherche en Calcul Applique: Optimal Control and MDO, Montreal, Canada, 1998

Seoul National University: Modeling, Analysis, and Computations for Superconductivity, Seoul, Korea, 1997

von Karman Institute for Fluid Dynamics: Lecture Series in Inverse Design and Optimization Methods, Brussels, Belgium, 1997

Plenary talks

Scientific Computing Around Louisiana, Baton Rouge, 2010

Second Argentinean Congress on Applied, Computational, and Industrial Mathematics, Rosario, Argentina, 2009

Red Raider Mini Symposium, Texas Tech University, 2009

Challenges and Advances in Computational Materials Simulations and Design, Singapore, 2009

Energy, Wind and Water: Algorithms for Simulation, Optimization and Control, Auckland, New Zealand, 2009

33rd SIAM Southeast-Atalantic Section Annual Meeting, Columbia, South Carolina, 2009

SIAM Annual Conference, San Diego, 2008 (Reid Prize Lecture)

6th International Conference on Scientific Computing and Applications, Busan, Korea, 2008

First Argentinean Congress on Applied, Computational, and Industrial Mathematics, Cordova, Argentina, 2007

Sixth International Conference on Large-Scale Scientific Computations, Sozopol, Bulgaria, 2007

The Salishan Conference on High-Speed Computation: Confidence in HPC Simulations, Glenneden Beach, 2007

International Congress of Mathematicians - Section Talk, Madrid, Spain, 2006

International Conference on Recent Advances in Scientific Computation, Beijing, China, 2006

International Conference on Applied Mathematics and Interdisciplinary Research, Nankai, China, 2006

Conference on Adaptive Model Reduction Methods for PDE Constrained Optimization, Houston, 2006

Workshop on Computational Methods and Applied Partial Differential Equations, Ames, 2005

Workshop on Mathematics as an Enabling Science, Blacksburg, 2005

Workshop on PDE-Constrained Optimization, Tomar, Portugal, 2005

International Conference on Approximation Methods for Design and Control, Buenos Aires, Argentina, 2005

Workshop on Multiscale Mathematics, Albuquerque, 2004

Conference on PDEs in Mathematical Physics, Trento, Italy, 2004

DOE Workshop on Multiscale Problems, Denver, 2004

International Workshop on Flow Control by Tailored Magnetic Fields, Dresden, Germany, 2004

Com2MaC Conference on Computational Mathematics, Pohang, Korea, 2003

Perspectives on incompressible flows. Comparison of different computational strategies, College Park, 2003

Eight Navier-Stokes Conference, St. Petersburg, Russia, 2002

ICAM Workshop on Control and Identification, Blacksburg, Virginia, 2002

Flow Instabilities and Control Forum, Montreal, Canada, 2002

ICASE 30th Anniversary Symposium, Newport News, 2002

SIAM Annual Conference, San Diego, 2001

Fourth SIG 33 Workshop: Flow Control, Abisko, Sweden, 2001

International Conference on Scientific & Engineering Computing, Beijing, China, 2001

Sixth Korean Applied Mathematics Forum, Sangnisan, Korea, 2000

Conference on the Occasion of the 60th Birthday of Professor Dr. Karl-Heinz Hoffmann, Munich, Germany, 1999

ERCOFTAC Workshop on Adjoint Systems, Toulouse, France, 1999

Annual Conference of the Canadian Applied and Industrial Mathematics Society, Quebec, Canada, 1999

NSF Conference on Flow Control, San Diego, 1999

Finite Element in Fluids, Tucson, 1998

Workshop on Control of Fluids and Structures, Institut Henri Poincare, Paris, France, 1998

Annual Conference of the Hong Kong Mathematical Society, Hong Kong, 1998

17th Daewoo Conference on Pure Mathematics, Suwon, Korea, 1997

Korean Advanced Institute for Science and Technology Workshop on Finite Elements, Taejon, Korea (4 talks), 1997

Workshop on Optimal Design and Control, Arlington, VA, 1997

Royal Society of London Conference on Vortices, Dislocations and Line Singularities in Partial Differential Equations, London, United Kingdom, 1996

Conference on Optimal Design and Control, Blacksburg, 1994

SIAM Conference on Emerging Issues in Mathematics and Computation from the Material Sciences, Pittsburgh, 1994

Conference on Least-Squares Methods for Partial Differential Equations, Los Alamos, 1994

NASA-Lewis Conference on Least-Squares Methods for Partial Differential Equations, Cleveland, 1994

Invited conference, workshop, symposium, and special session talks

SIAM Conference on Computational Science and Engineering, Miami, 2009
AMS Joint Mathematics Meeting, Washington, 2009
World Congress on Computational Mechanics, Venice, Italy, 2008
SIAM Conference on Computational Science and Engineering, Costa Mesa, 2007
SIAM Annual Conference, New Orleans, 2005
International Conference on Large-Scale Computations, Sozopol, Bulgaria, 2005
Workshop on Numerical Methods for Nonstationary, Nonlinear Control Problems, Oberwolfach, Germany, 2004
Computational Methods in Multiscale Analysis and Applications, Gainseville, 2004
International Workshop on Materials Analysis and Processing in Magnetic Fields, Tallahassee, 2004
Fourth World Congress of Nonlinear Analysts, Orlando, 2004
AFSOR Workshop on Agile, Autonomous Vehicles, Shallimar, Florida, 2003
SIAM Annual Conference, Montreal, Canada, 2003
Computation, Control, and Biological Systems VIII, Bozeman, 2003
AMS Joint Mathematics Meeting, San Diego, 2002
Mathematical Challenges in Scientific Data Mining, Los Angeles, 2002
Workshop on Least-Square Finite Element Methods and Applications, Oberwolfach, 2002
Ninth International Conference on Hyperbolic Problems, Pasadena, 2002
AFRL/AFOSR Control Workshop, Dayton, 2002
Foundations of Computational Mathematics Conference, Minneapolis, 2002
8th Conference on Control of Distributed Parameter Systems, Graz, Austria
Workshop on Meshfree Methods, Iowa City
8th Annual Conference of the CFD Society of Canada, Montreal, Canada
Workshop on Optimal Control of Complex Dynamical Systems, Oberwolfach, Germany
SIAM Conference on the Material Sciences, Philadelphia
AMS Meeting, Lafayette
13th US National Congress of Applied Mechanics, Gainesville
Canadian Applied Mathematics Society, Vancouver, Canada
AMS Meeting, Memphis
SIAM 1996 Annual Conference, Kansas City
U. S. Air Force Workshop on Superconductivity, Washington
Forum on CFD for Design and Optimization, San Fransisco
ICIAM95, Hamburg, Germany
Third SIAM Conference on Control and its Applications, St. Louis
33rd IEEE Conference on Decision and Control, Orlando
IMACS World Congress, Atlanta
Canadian Applied Mathematics Society Annual Meeting, Montreal, Canada

Invited colloquium talks

Brown University	*Oxford University*, England
University of Manchester Institute for Science and Technology	*North Carolina State University*
Korean Adanced Institute for Science and Technology	*Pohang University*, Korea
University of North Carolina at Charlotte	*Purdue University*
Iowa State University	*Centre de Recherche en Calcul Appliqué*, Montreal
University of Montreal	*Rome Air Force Laboratory*, Boston
State University of New York at Stony Brook	*Wright Air Force Laboratory*, Dayton
University of Maryland	*Carnegie Mellon University*
Oxford University, England	*Wright State University*
University of Iowa	*Rensaeler Polytechnic Institute*
University of Colorado, Boulder	*Penn State University*
University of Science and Technology of Hong Kong	*University of New Orleans*
Ajou University, Korea	*Hong Kong Baptist University*
Purdue University	*Korea Institute of Advanced Studies*

University of Pittsburgh	University of Kansas
Carnegie Mellon University	Kansas State University
Arizona State University	Clemson University
North Carolina State University	University of Augsburg, Germany
Wright State University	Los Alamos National Laboratory
University of Virginia	Virginia Tech
Rice University	University of Houston
Hong Kong Baptist University	University of Science and Technology of Hong Kong
Ajou University, Korea	University of Pittsburgh
Michigan State University	Clemson University
Sandia National Laboratories, Albuquerque	Peking University, China
Academy of Sciences of China	Georgia Tech
Florida State University	Carnegie Mellon University
Institue of Mathematics and its Applications	Sandia National Laboratories, Albuquerque
University of California at Los Angeles	University of Houston
Statistics and Applied Mathematics Institute	Los Alamos National Laboratory
University of Colorado, Boulder	Colorado State University
University of Houston	University of Alabama, Huntsville
University of South Carolina	Auburn University
University of Coimbra, Portugal	University of Bonn, Germany
University of North Carolina, Chapel Hill	University of Alberta
University of Manitoba	Penn State University
Peking University, China	Academy of Sciences of China
Xi'an Jiaotong University, China	Fudan University, China
University of Bonn, Germany	University of Texas at Arlington
Colorado State University	Indiana University
University of California, San Diego	Sandia National Laboratories, Albuquerque
Purdue University	National Technical University of Athens, Greece
Florida International University	George Mason University
University of North Carolina, Charlotte	Tulane University
Oxford University, England	Nanyang Technical University, Singapore
Massachusetts Institute of Technology	Emory University

Grants and contracts

Current research grants and contracts

Department of Energy (2007–2011) New grid and discretization technologies for ocean and ice simulations - Florida State share $883,314 (with J. Lili)

Department of Energy (2009–2011) Transforming how climate system models are used: A global, multi-resolution approach to regional ocean modeling - Florida State share $226,000 (with Q. Du and D. Estep)

National Science Foundation and Air Force Office of Scientific Research (2009–2010) Conference funding: Uncertainty quantification for systems governed by partial differential equations - Edinburgh, Scotland - $44,100 and $18,185

Air Force Office of Scientific Research (2008–2010) Advanced numerical methods for computing statistical quantities of interest from solution of SPDES - Florida State share $425,245 (with C. Trenchea)

National Science Foundation (2006–2010) CMG collaborative proposal: Multiphysics and multiscale modeling, computations, and experiments for karst aquifers - Florida State share $633,298 (with Y. Cao, B. Hu, and X. Wang)

National Science Foundation (2006–2010) Collaborative proposal: A geometric method for image registration - Florida State share $119,963 (with G. Liao)

Completed research grants and contracts

Department of Energy (2005–2009) A mathematical analysis of atomistic-to-continuum (AtC) coupling methods - Florida State share $380,214 (with P. Bochev, D. Estep, J. Fish, R. Lehoucq, and M. Sheppard)

Sandia National Laboratories (2008) Conforming particle distribution for numerical modeling - $30,000 (with J. Peterson)

National Science Foundation (2003–2007) Finite element methods for two problems for hyperbolic partial differential equations - $166,928

Sandia National Laboratories (2005-2007) Reduced memory and multi-parameter reduced order modeling - $65,000 (with J. Peterson)

Sandia National Laboratories (2004) Integration of CVT and quasi-Monte Carlo sampling methods into DAKOTA - $35,000 (with J. Burkardt)

Sandia National Laboratories (2003-2004) Reduced-order modeling with application to chemical and biological terrorist events - $30,000 (with J. Burkardt and J. Peterson)

National Science Foundation (2000–2003) Centroidal Voronoi tessellations: algorithms, applications, and theory - $333,882 (with Q. Du)

National Science Foundation (1998-2002) Least-squares finite element methods and optimization based domain decomposition methods for partial differential equations - $83,578

National Science Foundation (1999-2002) Collaborative Research with the Steklov Institute, St. Petersburg Branch - $19,000

Sandia National Laboratories (2001) Algorithms for point placement, first moment, and second moment determination for particle methods - $30,000

Air Force Office of Scientific Research and Defense Advanced Research Projects Agency (1995-2000) Computation and Control in Crystal Growth Processes (Multidisciplinary University Research Initiative Center Grant) - Iowa State share $460,356 (with J. Flaherty, M. Gevelber, J. Glimm, V. Prasad, and J. Turner)

EASi Engineering (1998) Engineering applications of control - $9,250

National Science Foundation (1998) Conference on recent trends and advances in PDEs and numerical PDEs - $15,568

Institute for Mathematics and its Applications (1998) Conference on Recent Trends and Advances in PDEs and Numerical PDEs - $4,000

Office of Naval Research (1993-1997) AASERT Support for student research in flow control problems - $139,524

Air Force Office of Scientific Research (1993-1996) Optimal design and control of distributed parameter systems (University Research Initiative Center Grant) - $2,759,930 (with J. Burns, H. Cudney, E. Cliff, D. Inman, and J. Peterson)

Department of Energy (1993-1996) Analyses, algorithms, and computations for models of high-temperature superconductivity - $118,200 (with J. Peterson)

Aerosoft Corporation and the Virginia Tech Center for Innovative Technology (1994-1995) Aeropropulsion shape optimization - $31,036 (with E. Cliff)

Air Force Office of Scientific Research (1994-1995) Graphical pre- and post processing for scientific computations - $132,190 (with J. Burns and E. Cliff)

Office of Naval Research (1991-1995) Analysis, approximation, and computation of flow control problems in Navy applications - $193,309

Air Force Office of Scientific Research (1992-1994) Computational methods for PDEs in flow control, superconductivity, fluid flows, and other applications - $110,000

North Atlantic Treaty Organization (1992-1994) Travel support for collaborative research on superconductivity - $8,000

Air Force Office of Scientific Research (1990-1992) Computational methods for flow problems - parallel algorithms, flow control and novel approaches - $226,483

Air Force Office of Scientific Research (1983-1989) Parallel algorithms in the finite element approximation of flow problems - $685,534

Air Force Office of Scientific Research (1985-1986) Fast algorithms for the CMU attached processor system - $99,960

Army Research Office (1983-1986) Numerical solution of flow problems in ballistics - $145,086

Department of Defense (1983-1985) Physical mathematics and modeling: array processor (University Research Initiative Center Grant) - $196,660

National Aeronautics and Space Administration Grant (1982-1986) Finite element methods for incompressible viscous flows - $158,000

Air Force Office of Scientific Research (1980-1983) Mixed finite element methods with application to flow and other problems - $80,881

Army Research Office (1980-1982) A computational and theoretical study of finite element methods for hyperbolic equations - $73,000

Army Research Office (1978-1980) Computational and theoretical comparison of finite difference and finite element methods for second order hyperbolic equations - $64,094

National Aeronautics and Space Administration (1976-1977) Least squares methods for transonic flows about oscillating wings - A $13,000

Completed outreach or education grants and contracts

Pew Grant Porgam in Course Redesign (2001-2003) Redesign of the discrete mathematics course - $200,000

Iowa Manufacturing Extension Partnership (2001-2002) Information solutions for MEPs - $25,000

U.S. Department of Commerce (National Institute of Standards and Technology) (2001) Study of the NIST evaluation process for MEP's - $35,000

U.S. Department of Commerce (National Institute of Standards and Technology) (1999-2000) Training and operation of emergency Y2K response team - $153,108

U.S. Department of Agriculture (1999) Testing and simulation of Y2K curriculum materials and operation of Y2K training sessions - $50,000 (with L. Hou and J. Peterson)

Iowa State University (1996-1997) Miller Faculty Fellowship - Calculus reform - $25,852 (with K. Heimes, R. Miller, R. Nelson, and F. Rizzo)

Virginia Polytechnic Institute and State University (1990-1993) Summer Program for Minority Students of Mathematics - Student stipends and living costs - $56,000

Students

Ph.D. Degree (32 + 4 current)

William Layton (1980) - The Galerkin method for first order hyperbolic equations

Janet Peterson (1980) - On eigenvalue approximations by mixed finite element methods

Jerome Eastham (1981) - On the finite element method in anisotropic Sobolev spaces

Georges Guirguis (1983) - On the existence, uniqueness, regularity and approximation of the exterior Stokes problem in R^3

Peter Hoffman (1985) - Analysis of high order numerical approximations used for partial differential equations

James Turner (1985) - A finite element method for the algebraic model of turbulence

Ching-Lung Chang (1985) - Finite element approximations for first order elliptic systems

Qiang Du (1988) - Analysis of a Ladyzhenskaya model for incompressible viscous flow and its finite element approximation

Amnon Meir (1989) - Existence, uniqueness and finite element approximation of solutions of the equations of stationary, incompressible MHD

Lisheng Hou (1989) - Analysis and finite element approximation of some optimal control problems associated with the Navier-Stokes equations

Hong-Chul Kim (1993) - Analysis and finite element approximation of an optimal shape control problem for the steady-state Navier-Stokes equation

Hyung-Chun Lee (1994) - Analysis, finite element approximation, and computation of optimal and feedback flow control problems

Pavel Bochev (1994) - Least squares finite element methods for the Stokes and Navier-Stokes equations

John Burkardt (1995) - Sensitivity analyses and computational shape optimization for incompressible flows

Yanzhao Cao (1996) - Analysis and numerical approximation of exact controllability problems for systems governed by parabolic differential equations

Jennifer Deang (1997) - A study of inhomogeneities and anisotropies in superconductors via Ginzburg-Landau type models

Justin Appel (1997) - Sensitivity calculations for conservation laws with application to discontinuous fluid flows

Sandro Manservisi (1997) (Physics) - Optimal distributed and boundary controls for the velocity tracking problem for Navier-Stokes flows

Hyesuk Kwon Lee* (1997) - Optimization-based domain decomposition methods for linear and nonlinear problems

Jeehyun Lee (2001) - Optimization-based domain decomposition methods for multidisciplinary simulation

Lili Ju* (2002) - Probabilistic and parallel algorithms for centroidal Voronoi tessellations with application to meshless computing and numerical analysis on surfaces

Konstantinos Chrysafinos* (2002) - Analysis and finite element approximations of parabolic saddle point problems with applications to optimal control

Wenxiang Zhu* (2002) - Modeling, analysis, and numerical approximations of the forced Fisher's equation and related control problems

Hee-Dae Kwon* (2003) - Analysis and approximation of terminal-state tracking optimal control problems and controllability problems constrained by linear and semilinear parabolic differential equations

Marcus Calhoun-Lopez (2003) - Numerical solution of hyperbolic conservation laws: Incorporating multi-resolution viscosity methods into the finite element framework

Clayton Webster (2007) - Sparse grid stochastic collocation techniques for the numerical solution of partial differential equations with random input data

Zheng Chen* (2007) - ANOVA for parameter dependent nonlinear PDEs and numerical methods for the stochastic Stokes equations

Yuki Saka* (2007) - Analysis of two partial differential equation models in fluid mechanics: nonlinear spectral eddy-viscosity model of turbulence and infinite-Prandtl-number model of mantle convection

Wan-Kan Chan* (2007) - Analysis, numerical analysis, and simulation of a two-band model for super-condutivity

Hoa Nguyen (2008) - Centroidal Voronoi tessellations for mesh generation: from uniform to anisotropic adaptive triangulations

Haomin Lin* (2008) - An optimal control problem for the time-dependent Ginzburg-Landau equations of superconductivity

Fei Hua* (2009) - Modeling, analysis, and simulation of the Stokes-Darcy system with Beavers-Joseph interface condition

M.S. Degree (9 + 2 current)

Benjamin Thomas (1978) - The Galerkin-multigrid method for complex self adjoint and non-self adjoint elliptic boundary value problems

Jo Ann Jordan (1983) - A numerical study of the effects of curvature on the fluid dynamics of gas centrifuges

David Hudak (1983) - Finite element methods in curvilinear coordinate systems

Douglas Beattie (1984) - Computation of high Reynolds number flow around a circular cylinder

Ray McKendall (1984) - On the treatment of boundary conditions in Galerkin methods for hyperbolic systems of partial differential equations

Kostas Chrysafinos* (1999) - The Lagrange multiplier method for inhomogeneous parabolic partial differential equations

Marcus Calhoun-Lopez* (2001) - Numerical simulations of superconducting rings using a Ginzburg-Landau model

Geoffrey Womeldorff* (2008) - Spherical centroidal Voronoi tessellations: point generation and density functions via images

Doug Jacobsen (2009) - Effects of vertical mixing closures on North Atlantic overflow simulations

Postdoctoral Associates (12 + 8 current)

John Burkardt, Marcus Garvie, Sangbum Kim, Eunjung Lee, Hugh MacMillan, Ersin Ozugurlu, Jill Reese, Ajit Shenoy, Lazarus Tenek, Catalin Trenchea, Xiaonan Wu, Sungdae Yang

* Co-advised

Books

1. *Finite Element Methods for Viscous Incompressible Flows: A Guide to Theory, Practice and Algorithms*; Academic, Boston, 1989.
2. *Perspectives in Flow Control and Optimization*; SIAM, Philadelphia, 2003.
3. *Least Squares Finite Element Methods*; Springer, Berlin, 2009; with P. Bochev.
4. *A Primer on the Numerical Solution of Stochastic Partial Differential Equations*; in preparation; with C. Webster.
5. *Finite Element Methods*; in preparation; with J. Peterson.
6. *Fluid Mechanics: The Classical and Modern Theories*; in preparation.

Edited books

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