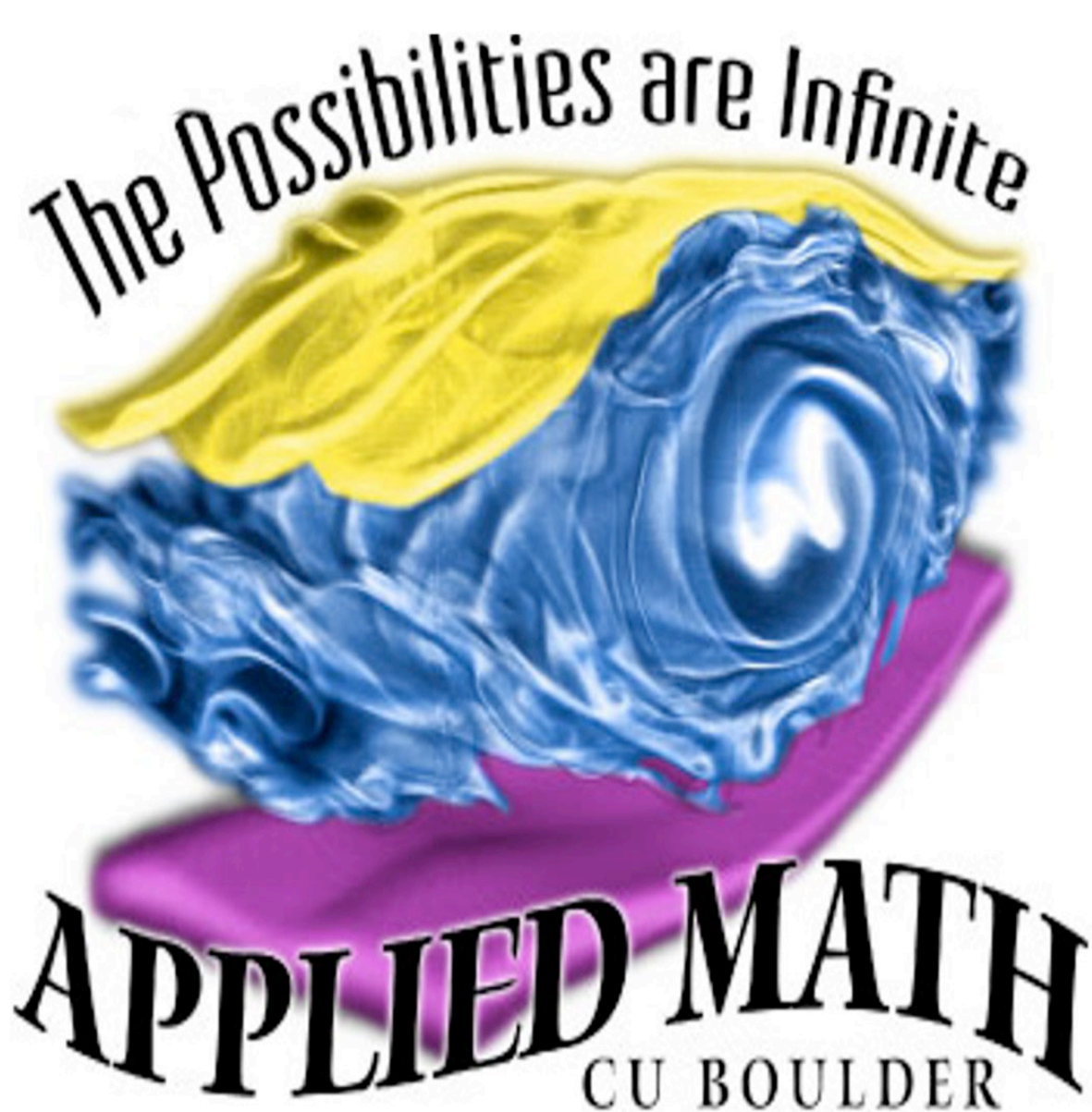


Department of Applied Mathematics

Annual Report 2008



Colorado
University of Colorado at Boulder

Department of Applied Mathematics

University of Colorado at Boulder

Vision

The vision of the Department of Applied Mathematics at the University of Colorado is to be an internationally leading department in Applied Mathematics in research and education.

Mission

The Department of Applied Mathematics at the University of Colorado strives to provide excellent teaching, research, and service to the university community and to the world in the application of mathematics to other disciplines.

Objectives

The Department of Applied Mathematics has four primary objectives:

- *To teach our students well;*
- *To seek out and develop new, interesting applications of mathematics in other disciplines;*
- *To provide each student with a rich educational experience;*
- *To create new mathematics.*

We interpret this to mean:

- Provide undergraduate and graduate students with a high quality education and training in applied mathematics and prepare them for careers in government, industry, laboratories, and the academic professions;
- Offer and monitor degree programs leading to BS, MS and PhD degrees in Applied Mathematics;
- Nourish and maintain a professional environment in which excellence in teaching, learning, scholarship, and creativity are of central importance;
- Assure teaching and research expertise in a number of key areas of applied mathematics including the methodology of applied mathematics, computational mathematics and algorithms, industrial applications, applied probability, and statistics.

Cover Art

Each year, the Department of Applied Mathematics at the University of Colorado at Boulder creates a t-shirt that illustrates aspects of current research in the department. This year's winner was Ben Jamroz, and his visualization of a numerical simulation of the Kelvin-Helmholtz instability. This instability is present when a fluid has an imposed vertical gradient of horizontal velocity, in this case a tanh profile. For this three dimensional simulation he also allowed for a temperature variation (hot at the top, cool at the bottom) A small perturbation of this field grows quickly and produces a "roll up" of vorticity. In three dimensions, this leads to a secondary instability, the Rayleigh Taylor instability, when more buoyant fluid is advected below less buoyant fluid. The Rayleigh Taylor instability corrects this imbalance and breaks up the flow.

Annual Report 2008

Table of Contents

Overview	5
Departmental Activities.....	6
Undergraduate Education	6
Graduate Education	6
Enrollment Statistics.....	8
Graduates	9
Faculty Awards and Honors	10
Faculty, Instructors, Research Associates, Visitors, and Staff.....	11
Core Faculty, Instructors, and Research Associates.....	11
Affiliated Faculty – Graduate Department	12
Visitors in 2008	14
Weekly Colloquia and Seminars	16
Applied Mathematics Colloquium.....	16
Nonlinear Waves Seminars	17
Computational Mathematics Seminars	18
Dynamics Seminars	18
Undergraduate and Graduate Organizations	20
Society for Industrial and Applied Mathematics (SIAM)	20
Women in Math (WIM).....	21
Research	22
Department-wide Grants.....	22
Individual Research Grants	23
Publications	26
Invited Lectures and Meetings Attended	30
Outreach	35
Faculty Service to the University, Department, and Societies.....	36
Teaching Activities.....	39
Undergraduate Courses Taught by Department Faculty	39
Graduate Courses Taught by Department Faculty.....	40

Overview

The Department of Applied Mathematics focuses on strategies and maintains traditions giving students three core advantages: Communication skills, Computational skills, and Mathematical skills. Along with these core skills, the Department strives to educate and train its students in the tools, methods, and strategies of solving real world problems. We believe that history has shown that the question is not whether mathematics will be applied – the only question is where and when!

Our mission has changed little from the Engineering Mathematics Department's mission from 1906. Since 1996, the Applied Mathematics community, composed of the department's students, faculty, and staff, has addressed its objectives with admirable levels of engagement.

The Department offers a Bachelor of Science (BS) in Applied Mathematics, as well as a minor, and a five-year concurrent Bachelor of Science/Master of Science (BS/MS) degree. At the Graduate level, the department offers the Master of Science (MS) and Doctor of Philosophy (PhD) degrees. We continue to seek new methods to continue the growth in enrollment we have seen across all our degrees over the last ten years. In 2008, Applied Mathematics had 16 tenure and tenure-track faculty, five instructors, and several lecturers who taught 14,030 undergraduate credit hours and 1,162 graduate credit hours. In 2008, there were 120 majors, 65 minors, and 86 graduate students. The department also successfully recruited a new Assistant Professor, Dr. Juan Restrepo, who will join the Department for the 2008-2009 academic year.

An Applied Mathematics degree is an extremely flexible technical degree. A consequence of this flexibility is that the Department is constantly on the look out for new areas of engagement or new areas to apply mathematics. For example, several years ago we noted that about 20% of our majors were interested in mathematics related to finance. Hence, we have been working with our colleagues in the Leeds Business School at the University of Colorado at Boulder to continue to develop offerings in that direction.

Furthermore, the Department is developing curriculum initiatives that promise to be very exciting. These new foci already include departmental areas of strength such as Mathematical Biology, where the department has three excellent Assistant Professors. This will allow the Department to train students in the life sciences while focusing on aspects of genetics as well as components of molecular biology. A second initiative focus will allow the department to participate in the more technical aspects of the gaming industry where getting the mathematics and physics, "right," is becoming increasingly important. Here, we believe that the department can offer a *Gaming and Simulation Track*, focusing on mathematics and computing. In both cases, an important thing to note about these initiatives is that the Department will be working with new partners on campus: the campus wide Biotech Initiative and the Alliance for Technology, Learning, and Society Institute (ATLAS). Such opportunities could be very exciting for our students and faculty. On this note, the Department would like to give a special thanks to our alums, Dr. Laurie Heyer and Dr. David Eberly for their discussions and insights leading to the Department's better understanding potential opportunities in these directions.

As noted in the past, the Department has a very distinguished faculty at all ranks. For example, Department faculty include a former president of the world's largest Society of Industrial and Applied Mathematicians, faculty who are among the most highly cited for their research publications, recipients of outstanding student advisor awards, and numerous distinctions and awards for excellence in teaching. For example, Professor Anne Dougherty was awarded the outstanding faculty advisor for the College of Engineering and Applied Sciences. Assistant Professor, Dr. Per-Gunnar Martinsson was awarded an NSF-Career Award, one of the most prestigious awards from the National Science Foundation. This NSF honor is given to the best and brightest young scientists and mathematicians in the nation. Dr. Martinsson's NSF-Career award is a "first" for the Department

In closing, let us consider two additional forward looking efforts in the Department: *The ORALS assessment Experiment* led by Instructor Dr. Mary Nelson and the Department's *VIGRE* proposal led by Professor James Meiss. Both of these NSF proposal efforts share the goal of developing the capacity of the Department for students and faculty. The VIGRE proposal also is focused on developing research, "communities," around the following areas of significant interest: Renewable Energy, Climate Change and BioTechnology.

The Department of Applied Mathematics at the University of Colorado at Boulder has moved from strength to strength with its excellent faculty and excellent students. With its Vision, Mission, and Goals will not only participate in shaping the future, but also continue to develop and produce excellent scholar-students, excellent research, and excellent service to the State and the Nation. The best is yet to come. "Do more Math!"

Dr. James H. Curry
Department Chair

Dr. Anne Dougherty
Associate Chair

Departmental Activities

Undergraduate Education

Undergraduate education in the Department of Applied Mathematics provides students with broad-based preparation for the challenges and opportunities of today and tomorrow. Through courses, projects, research and other educational activities, the Department provides unique experiences to our majors and minors. The Department also has a large teaching commitment since most undergraduate engineering majors are required to take four courses in applied mathematics. The Department taught over XX undergraduate and graduate students in 2008. See p. 35 for a detailed list of the courses taught. We had 107 undergraduate Applied Mathematics majors in 2008, down from 2007; this is reflective of a college-wide dip in enrollment.

27 students received their baccalaureate degrees this year. (See p. 5 for a list of our graduates.) We are proud that 26 students in the fall and 34 in the spring semester made the Dean's List for academic achievement, with grade-point averages of 3.75 or better. Our minor program, attracting students from other majors who are interested in more in-depth training in applied mathematics, faces the same small enrollment slump as our major. 53 students have declared an Applied Math minor, and more are taking at least some of the upper division courses towards it. (This is an 18% decrease from 2007.)

The undergraduate student chapter of SIAM (the Society for Industrial and Applied Mathematics) is responsible for promoting interactions between applied math faculty and majors. It also sponsors activities and presentations that introduce undergraduates to the use of mathematics in engineering and the sciences. Events this past year included . (For a complete list of presentations, please see p. 16.)

The CU Boulder undergraduate chapter of SIAM, one of the newest engineering societies at CU, was founded to promote interactions between Applied Math students and faculty. Society functions include technical presentations by students, faculty, and industry speakers, field trips and student/faculty social events: all designed to introduce undergraduates to the widespread use of applied mathematics in engineering and the sciences. All interested students, from any major, are encouraged to participate in SIAM-sponsored events.

The 2007-2008 SIAM University of Colorado at Boulder Undergraduate Chapter Officers were Co-Presidents Joseph Adams, Ryan Schilt, Colin Peterson, and Jonathan Olson; and Faculty Advisor Luis Melara. For 2008-2009, SIAM University of Colorado at Boulder Undergraduate Chapter Officers were Co-Presidents Joseph Adams, Ryan Schilt, Garrett Clark, and Jonathan Olson. Anne Dougherty serves as Faculty Advisor.

Graduate Education

The role of the graduate program is to give students in-depth training in applied mathematics and to provide the skills necessary for success in industry, government laboratories, and academia. Different departments around the country use different definitions of "applied mathematics." In this department, the areas of mathematical expertise are: scientific computation, physical applied mathematics, dynamical systems, analysis, statistics/probability, and mathematical biology. In addition, the Department maintains an active program of affiliated faculty. These are faculty members in other departments with an interest in applying mathematics within their own disciplines. A graduate student in Applied Mathematics can pursue a doctorate in Applied Mathematics with an affiliated faculty member as the thesis advisor, along with an Applied Mathematics co-advisor. A basic goal of this department is to seek out and develop new areas of application for mathematics and our affiliated faculty members play a crucial role in that process.

Some of the demographics of the graduate program in the Applied Math Department:

- In 2008, the department had 60 graduate students.
- In spring 2008, we welcomed one new graduate student to our program.
- We continue to attract a large fraction of U.S. citizens: in 2008, 85% of the incoming students with financial support were U.S. citizens. This represents a more aggressive international recruitment policy.
- 7 of our graduate students are women.
- Our graduate program had seven under-represented minority students in 2005-2006.
- Nine students completed their PhDs in 2008. Eight students received MS degrees, with X continuing towards the PhD at CU. See p. 5 for a list of this year's graduates.
- Funding: Fully half of our graduate students (30) were Teaching Assistants (TAs) in the fall semester (includes both full time and part time TAs), with 27 serving as TAs in the spring.

The department offers three formal interdisciplinary programs, all at the MS level.

- A Combined MA/MS with the Molecular, Cellular, and Developmental Biology Department (MCDB). The combined MA/MS is a three-year interdisciplinary program designed to produce students trained both in applied mathematics and in molecular biology. A student who completes this program can begin a career in the biological sciences with a very desirable combination of skills, or can continue on to a PhD either in APPM or in MCDB.
- An MS with a Computational Science and Engineering Track. This track is designed for a student in a participating department in science or engineering, with a strong interest in scientific computation and mathematical analysis. Under this plan, the student obtains an MS in APPM on the way to a PhD in the other department. Six other departments now participate in this program.

Teacher-Licensure Option. An APPM graduate student can fulfill the outside-sequence requirement in the School of Education. By also meeting the requirements of that School, a student can obtain both an MS in applied mathematics and a license to teach mathematics in a secondary school (i.e., in middle through high school). More information about the graduate program is available at <http://amath.colorado.edu/programs/grad.html>.

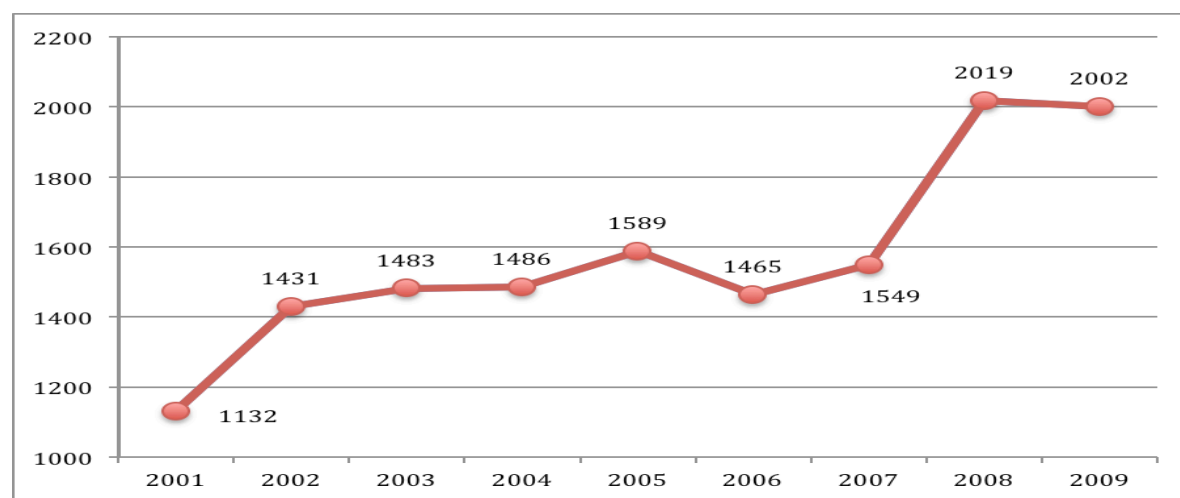
Enrollment Statistics

Enrollment in the courses offered by the Department continues at extremely high levels. It is particularly noteworthy that, given the faculty's small size, the Department teaches so many students. The statistics over the past sixteen years are as follows:

Year	Total Number of Enrolled Students in All Courses	Number of Enrolled Graduate Students	Number of Enrolled Undergraduate Majors	Number of Enrolled Undergraduate Minors
1993-94	2809	33	47	
1994-95	2670	39	51	
1995-96	2734	40	54	
1996-97	2973	46	52	
1997-98	3108/ 3323*	51	44	
1998-99	3172/ 3566*	49	54	
1999-00	3166/ 3529*	50	60	21
2000-01	3091/ 3517*	61	63	28
2001 (Calendar)	5,435	22/57	66	29
2002 (Calendar)	5,899	28/55	67	34
2003 (Calendar)	6,127	39/54	85	37
2004 (Calendar)	6,443	35/60	90	42
2005 (Calendar)	6,342	31/54	105	48
2006 (Calendar)	6,358	28/50	120	65
2007 (Calendar)	6,746	32/55	110	63
2008 (Calendar)	6,775	26/52	119	64

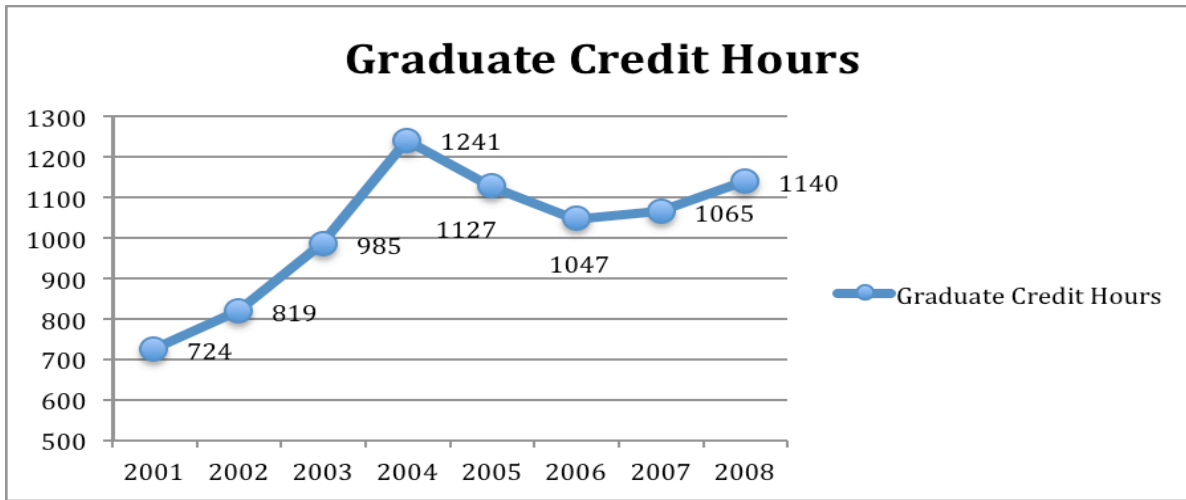
*The numbers in bold include all Calculus I and II Work Study Groups, as well as Calculus III Labs and Differential Equations Labs. Enrollment in our upper division courses has continued to increase. With projected increases in undergraduate enrollment, the Department continues to foresee enrollment increases in Applied Mathematics courses.

Undergraduate Enrolled Upper-Division Student Credit Hours



There is a general upward trend in undergraduate enrollment. Our higher-level Calculus and Differential Equations classes have been growing consistently.

Graduate Enrolled Credit Hours



Graduate credit hours continue to increase after the dip they took in 2006. This upward trend is expected to continue.

Graduates

May 2008

Roy Bistany
Stephen Casciano
Christopher-Ian Davis
Tanner Diehl
Erin Fogarty
Matthew Groeninger
Jordan Hachtel
Yoshiyuki Hasegawa
Juhyun Lee
Colin Misare
Lora Northcutt
Amanda Norton
Benjamin Safdi
Christopher Sprague
Kye Taylor
Brenton Vaughn
Marcus Waldman
Jason Worrall
Julia Whippo
Max Wilber
Nicholas Witte

August 2008

Bachelor's Degrees

William Detweiler
Steel Jones

December 2008

Gala Camacho
Kristofer Goggin
Jonathan Olson
Jessica Stewart

Master's Degrees

Alison Brown
James Robinson
Michael Ruston
Michael Smith-Palmer
Kye Taylor

Jason Hammond
Gregory Norgard
Sekson Sirisubtawee

Doctoral Degrees

Christopher Kurcz
Joshua Nolting
Cecile Piret
Michael Watson

Nathan Aragon
Seth Claudepierre

Terry Haut
Geoffrey Sanders
David Simpson

Changes in Personnel

In August, new instructor Sujeet Bhat joined the APPM faculty. Dr. Bhat comes to us from the University of Minnesota; his research interests include partial differential equations and nonlinear boundary value problems.

Faculty Awards and Honors

David Bortz wins CRCW Junior Faculty Development Award

The Council on Research and Creative Work (CRCW) was created on October 1, 1935, to encourage and strengthen research and creative work at the University of Colorado. The primary function of CRCW is to provide faculty members with financial assistance and time free from teaching responsibilities so they may pursue their research interests. Junior Faculty Development Awards (JFDAs) of \$5,000 each are awarded on a competitive basis to provide support for faculty in the very early stages of their professional academic careers to start programs of research and creative work.

Dr. Bortz spent the Fall 2008 semester in research.

Conference held to honor James Curry's 60th birthday

The Conference on Innovation in Undergraduate Research and Teaching was held June 4-5, 2008 at Montclair State University in New Jersey in honor of APPM Chair James Curry on his 60th birthday.

University awards Anne Dougherty teaching award.

CU's Committee on Learning and Academic Support Services awarded Anne Dougherty their Residence Life Academic Teaching Award on March 19, 2008 for her work in the fall 2007 semester.

Mary Nelson receives MEP award

Mary Nelson received the University of Colorado's Multicultural Engineering Program's faculty award in recognition of her commitment to the success of the university's minority scholars.

Faculty, Instructors, Research Associates, Visitors, and Staff

Core Faculty, Instructors, and Research Associates

Cory Ahrens – *Postdoctoral Associate*; PhD, University of Colorado at Boulder. Nonlinear Waves, Fast Computational Algorithms, Inverse Problems.

Mark J. Ablowitz – *Professor; College of Arts and Sciences Professor of Distinction*; PhD, Massachusetts Institute of Technology. Partial Differential Equations, Solutions, Nonlinear Waves.

Jerrold Bebernes – *Professor Emeritus*; PhD, University of Nebraska. Differential Equations, Reaction Diffusion Systems, Combustion Theory, Analysis.

Gregory Beylkin – *Professor*; PhD, New York University. Computational Methods, Wavelets, Geophysical Inverse Scattering.

Cathy Bishop – *Lecturer*; MS, University of Colorado. Computer Science, Software Development and Training.

David Bortz – *Assistant Professor*; Ph.D, North Carolina State University. Biological Systems.

Marian Brezina – *Postdoctoral Associate*; PhD, University of Colorado at Denver. Multigrid Methods, Scalable Algorithms, Parallel Computing.

Jem Corcoran – *Associate Professor*; PhD, Colorado State University. Applied Stochastic Processes, Perfect Simulation, Statistical Physics.

James H. Curry – *Department Chair; Professor; J. R. Woodhull Logicon Teaching Professor of Applied Mathematics*; PhD, University of California at Berkeley. Dynamical Systems, Numerical Methods, Nonlinear Equations.

Anne Dougherty – *Associate Department Chair; Chair of Undergraduate Studies; Senior Instructor*; PhD, University of Wisconsin, Madison. Applied Probability, Stochastic Processes.

Robert Easton – *Professor Emeritus*; PhD, University of Wisconsin. Dynamical Systems, Hamiltonian Mechanics.

Bengt Fornberg – *Professor*; PhD, Uppsala University, Sweden. Numerical Analysis, Computations of Wave Phenomena.

Ute C. Herzfeld – *Lecturer*; PhD, University of Mainz, Germany. Geostatistical Analysis of Remote Sensing Data, applications in Glaciology, Marine Geophysics and Global Change Research.

Theodoros Horikis – *Postdoctoral Associate*; PhD, Imperial College, England.

Keith Julien – *Chair of Graduate Studies; Associate Professor*; PhD, Cambridge University, United Kingdom. Mathematical and Computational Fluid Dynamics, Dynamical Systems Theory.

Congming Li – *Professor*; PhD, New York University. Elliptic Partial Differential Equations.

Manuel Lladser – *Assistant Professor*; PhD, Ohio State University. Probability Theory.

Thomas Manteuffel – *Professor*; PhD, University of Illinois, Urbana. Computational Math, Numerical Linear Algebra, Iterative Mathematics, Numerical Solution of Partial Differential Equations, Parallel Computation, Computational Fluid

Dynamics.

Per-Gunnar Martinsson – *Assistant Professor*; PhD, University of Texas at Austin. Numerical Analysis, Modeling of Heterogeneous Media, Computational Biochemistry.

Stephen McCormick – *Professor*; PhD, University of Southern California. Computational Math, Numerical Partial Differential Equations, Multigrid Methods, Parallel Computation, computational Fluids, Tomography, Electromagnetics, Biomathematics.

James D. Meiss – *Professor*; PhD, University of California at Berkeley. Dynamical Systems, Hamiltonian Mechanics, Plasma Physics.

Luis Melara – *Visiting Instructor*; PhD, Rice University. Computational and Applied Mathematics.

Lucas Monzon – *Postdoctoral Associate*; PhD, Yale University. Harmonic Analysis, Wavelets.

Mary Nelson – *Instructor*; PhD, University of Colorado at Boulder. Assessment.

J. Adam Norris – *Instructor*; PhD, University of Colorado at Boulder. Phase Change Kinetics, Perturbation Methods, Numerical Methods.

Barbara Prinari – *Visiting Professor*; PhD, S.I.S.S.A. Italy. KP Equations, NLS Systems.

Anca Radulescu – *Instructor*; PhD, State University of New York. Clinical Neuroscience, Theoretical Neuroscience, Dynamical Systems.

Juan Restrepo – *Assistant Professor*; PhD, Northeastern University.

John Ruge – *Postdoctoral Associate*; PhD, Colorado State University. Algebraic Multigrid Methods.

Kristian Sandberg – *Postdoctoral Associate*; PhD, University of Colorado at Boulder. Wave Propagation, Tomography, Image Processing.

Harvey Segur – *Professor*; PhD, University of California at Berkeley. Nonlinear Waves, Fluid Dynamics, Asymptotic Methods.

Tiejun Tong – *Assistant Professor*; PhD, University of California, Santa Barbara. Statistics.

John Williamson – *Professor Emeritus*; PhD, University of Minnesota. Statistical Methods in Genetics, Applied Probability, Mathematical Statistics.

Affiliated Faculty – Graduate Department

Steve C. Arendt – *Colorado Research Associates*; Theoretical Fluid Dynamics.

Mark Balas – *Aerospace Engineering, Electrical Engineering*; Control of Large Scale and Distributed Parameter Systems, System Identification and Adaptive Control, Nonlinear Partial Differential Equations, Numerical Methods for Model Reduction, Controller Synthesis and Stability Analysis.

Elizabeth Bradley – *Computer Science*; Scientific Computation, Artificial Intelligence, Nonlinear Dynamics.

Richard Byrd – *Computer Science*; Numerical Computation, Optimization Algorithms.

Xiao-Chuan Cai – *Computer Science*; Numerical and Parallel Computations.

John Cary – *Physics*; Nonlinear Dynamics, Plasma Physics, Accelerator and Space Physics.

Claudio Cioffi-Revilla – *Political Science*; Long-Range Analysis of War.

Senarath P. de Alwis – *Physics*; Theoretical Physics, String Theory, Quantum Gravity.

Thomas DeGrand – *Physics*; Numerical Methods for Quantum Field Theory.

Fred Glover – *College of Business*; Large-scale Systems, Applied Artificial Intelligence, Optimization Models.

Martin Goldman – *Physics*; Plasma Physics, Nonlinear Waves, Turbulence.

Vijay K. Gupta – *Civil, Environmental, and Architectural Engineering*; Hydrology, Stochastic Processes, Fluid Dynamics.

Ute C. Herzfeld – *Institute of Arctic and Alpine Research (INSTAAR)*; Geostatistical Analysis of Remote Sensing Data, applications in Glaciology, Marine Geophysics and Global Change Research.

Christine M. Hrenya – *Chemical Engineering*; Gas-Particle Fluidization, Granular Flow Mechanics, Turbulent Flows, Computational Fluid Mechanics.

Tissa Illangasekare – *Environmental Science and Engineering Division, Colorado School of Mines*; Mathematical Modeling of Flow and Transport in Porous and Fractured Media, Computational Methods, Numerical Modeling.

Elizabeth Jessup – *Computer Science*; Numerical Computation, Parallel Computation.

David R. Kassoy – *Mechanical Engineering*; Fluid Dynamics, Combustion Theory, Thermal Science.

Manuel Laguna – *College of Business*; Exact and Heuristic Methods for Combinatorial Optimization Problems, Network Flow Programming, Applied Artificial Intelligence.

Michael Lightner – *Electrical Engineering*; Very Large Scale Integration (VLSI), Discrete Mathematics, Graph Theory.

Oliver McBryan – *Computer Science*; Parallel computation, Graphics and Visualization, Computational Fluid Dynamics.

Kamran Mohseni – *Aerospace Engineering*; Physical Applied Mathematics.

Andrew Moore – *Atmospheric and Oceanic Sciences*; Ocean Atmosphere Modeling.

Doug Nychka – *Geophysical Statistics Project, National Center for Atmospheric Research (NCAR)*; Geophysical Statistics.

Lev Ostrovsky – *National Oceanic and Atmospheric Administration (NOAA)*; Nonlinear Waves, Fluid Dynamics, Oceanography, Acoustics.

K. C. Park – *Aerospace Engineering*; Parallel computation, Structural vibrations.

Scott Parker – *Physics*; Plasma Physics.

Carl E. Patton – *Physics*; Solid State Physics.

Annick Poquet – *National Center for Atmospheric Research (NCAR)*; Physical Applied Math, Weather Prediction Models.

Harihar Rajaram – *Civil, Environmental, and Architectural Engineering*; Fluid Flow, Transport Phenomena and Reactive

Processes in Geologic/Geochemical Phenomena.

Thomas F. Rutherford – *Economics*; Formulation and Analysis of Large-Scale Economic Equilibrium Models.

Robert Sani – *Chemical Engineering*; Computational Fluid Dynamics, Free and Moving Boundary Problems, Stability of Systems.

Robert B. Schnabel – *Computer Science*; Numerical Methods for Optimization, Nonlinear Equations, Parallel Scientific Computation.

J. Michael Shull – *Astrophysical and Planetary Sciences (APS)*; Theoretical Astrophysics.

Rex Skodje – *Chemistry*; Nonlinear Dynamics, Quantum Chaos, Molecular Dynamics.

Renjeng Su – *Electrical Engineering*; Nonlinear Dynamics Modeling, Control, Robotics.

Juri Toomre – *Astrophysical and Planetary Sciences (APS)*; Astrophysics, Mathematical Modeling, Numerical Simulation.

Henry Tufo – *Computer Science*; Computational Science, Parallel Algorithms for High Performance Computers.

Oleg V. Vasilyev – *Mechanical Engineering*; Computational Fluid Mechanics, Large Eddy Simulations of Turbulent Flow, Wavelet Methods for Modeling and Simulation of Complex Multi-Scale Phenomena, Thermal Convection Flows.

Thomas Warner – *Atmospheric and Oceanic Sciences*; Numerical Modeling of Mesoscale Atmospheric Phenomena; Marine Meteorology.

Patrick Weidman – *Mechanical Engineering*; Hydrodynamic Stability, Solitary Waves and their Interaction, Counter-Rotating Vortex Rings, Stokes Flow on Dendrite Models, Similarity Flows in Natural Convection, Fluid Sloshing in Freely Suspended Containers.

Jeffrey B. Weiss – *Astrophysical and Planetary Sciences (APS), Atmospheric and Oceanic Sciences*; Geophysical Fluid Mechanics, Turbulence, and Climate predictability.

Joseph Werne – *Colorado Research Associates*; Fluid dynamics.

Visitors in 2008

In addition to our visiting speakers, the following guests visited the department:

Dave Eberly - *Geometric Tools*, Phoenix, AZ

Laurie Heyer - *Davidson College*, Davidson, NC; 07/21/08-07/25/08

Peter Clarkson - *University of Kent*, Canterbury, United Kingdom; 08/16/08-08/24/08

Silvana De Lillo - *Universit`a degli Studi di Perugia*, Perugia, Italy; 09/15/08-10/03/08

Thomas Hou - *California Institute of Technology*, Pasadena, CA; 09/26/08 - 10/01/08

Staff

Marcia Flynt – *Department Administrator.*

Susan Pryor – *Graduate Program Assistant.*

David Hanley – *Accounting Technician and Undergraduate Program Assistant.*

Ian Campbell – *Internet/Publications Designer and Art Director.*

Ian Cunningham - *Office Coordinator*

Part Time Student Assistants – Shannon Priem, Lisa Garal,

Weekly Colloquia and Seminars

Applied Mathematics Colloquium

The Applied Mathematics Colloquium series was held on Friday afternoons during the academic year at 3:00 pm, with refreshments preceding at 2:30 pm outside the Applied Mathematics conference room, ECOT 226. Tom Manteuffel chaired and organized the Colloquium Series during the Spring 2008 semester. Gunnar Martinsson and Tiejun Tong chaired and organized the Colloquium Series during the Fall 2008 semester.

Luke Olson, Department of Computer Science, University of Illinois, 25 January 2008, *Advances in Algebraic Multigrid for Topological Problems*

Anca Radulescu, Department of Applied Mathematics, University of Colorado at Boulder, 01 February 2008, *A Dynamical Systems Approach to Schizophrenia*

Steve Hammond and Peter Graf, Materials and Computational Sciences Center, National Renewable Energy Laboratory (NREL), 08 February 2008, *Computational and Applied Math Challenges in Renewable Energy*

Jim Meiss, Department of Applied Mathematics, University of Colorado at Boulder, 15 February 2008, *Dynamics of Volume-Preserving Maps*

Keith Julien, Department of Applied Mathematics, University of Colorado at Boulder, 22 February 2008, *Reduced Models for Fluid Flows with Strong Constraints*

2008 Annual Spring Celebration and Faculty Lecture Series

Harry Swinney, Center For Nonlinear Dynamics, Department of Physics, University of Texas, 29 February 2008, *Dynamical Systems Invariant Curves as Barriers to Transport in Oceanic Flows*

Mac Hyman, Mathematical Modeling and Analysis, Los Alamos National Laboratory, 07 March 2008, *Paradigm Shifts in Science Based Simulations*

Nancy Kopell, Center For BioDynamics, Department of Mathematics, Boston University, 14 March 2008, *Rhythms of the Nervous System: How to Connect Biophysics and Behavior*

Steve Shkoller, Department of Mathematics, University of California, Davis, 21 March 2008, *Free-Boundary Problems for the Compressible Euler Equations in a Vacuum*

Randy Bank, Center for Computational Mathematics, University of California, San Diego, 11 April 2008, *Convergence Analysis of a Domain Decomposition Paradigm*

Tom Banks, Center for Research in Scientific Computation, North Carolina State University, 18 April 2008, *Size-Structured Population Models: Sensitivity and Probabilistic/Stochastic Formulations for Inclusion of Uncertainty/Variability in Growth*

Robert D. Falgout, Center for Applied Scientific Computing, Lawrence Livermore National Lab, 25 April 2008, *Algebraic Multigrid on Petascale Computers*

Annick Pouquet, National Center for Atmospheric Research (NCAR), 02 May 2008

Doug Arnold, School of Mathematics, University of Minnesota. 05 September 2008, *The Geometrical Basis of Numerical Stability*

Don Estep, Department of Mathematics, Colorado State University, 12 September 2008, *Adjoint-Fueled Advances in Error Estimation for Multiscale, Multiphysics Problems*

Joel Tropp, Applied & Computational Mathematics, California Institute of Technology, 19 September 2008, *Beyond Nyquist: Efficient Sampling of Sparse, Bandlimited Signals*

Pat Weidman, Department of Mechanical Engineering, University of Colorado at Boulder, 26 September 2008, *A Tale of Two Rotating Jets*

Brian Rider, Department of Mathematics, University of Colorado at Boulder, 03 October 2008, *Extremal Laws in Random Matrix Theory*

Rodger Kram, Department of Integrative Physiology, University of Colorado at Boulder, 10 October 2008, *Disintegrating the Metabolic Cost of Locomotion*

Charlie Doering, Department of Mathematics, University of Michigan, 17 October 2008, *Heat Rises: Energy Transport in Rayleigh-Benard Convection*

Debra Goldberg, Department of Computer Science, University of Colorado at Boulder, 24 October 2008, *Learning From the Graph-Theoretic Properties of Gene and Protein Networks*

Jean Opsomer, Department of Statistics, Colorado State University, 31 October 2008, *Nonparametric Variance Estimation for Systematic Samples*

Mike Reed, Department of Mathematics, Duke University, 07 November 2008, *Cell Metabolism, Mathematics, and Public Health*

Doug Nychka, National Center for Atmospheric Research (NCAR), Boulder, 14 November 2008, *Surfaces For Spatial Data: A Framework to Understand The Asymptotic Properties of Kriging and Splines*

Jie Yu, Civil, Construction and Environmental Engineering, North Carolina State University, 21 November 2008, *Bragg Resonance, Shore Reflection and Longshore Sandbars*

Nonlinear Waves Seminars

Gino Biondini, Department of Mathematics, State University of New York at Buffalo, 03 March 2008, *Inverse Scattering Transform for the Kadomstev-Petviashvili Equation via the Ablowitz-Kaup-Newell-Segur Hierarchy*

Yi Zu, Department of Applied Mathematics, University of Colorado at Boulder, 16 September 2008, *Weak Interactions of Solitary Waves in Generalized NLS Equations, Part I*

Barbara Prinari, Dipartimento di Fisica, Università del Salento (Lecce), 23 September 2008, *Inverse Scattering Transform (IST) for the Multicomponent Nonlinear Schrodinger (NLS) Equation Under Non-Vanishing Boundary Conditions*

Silvana De Lillo, Dipartimento di Matematica e Informatica, Università degli Studi di Perugia, 30 September 2008, *Multiscale Modelling of Biopolymers: An Integrable Model for Elastic Rods*

Yi Zu, Department of Applied Mathematics, University of Colorado at Boulder, 07 October 2008, *Weak Interactions of Solitary Waves in Generalized NLS Equations, Part II*

Terry Haut, Department of Applied Mathematics, University of Colorado at Boulder, 14 October 2008, *A Nonlocal Formulation of Water Waves, Pt. 1*

Lincoln Carr, Physics Department, Colorado School of Mines, 21 October 2008, *Relativistic Nonlinear Phenomena in Bose-Einstein Condensates*

Mingzhong Wu, Department of Physics, Colorado State University, 28 October 2008, *Excitation of Chaotic Spin Waves Through Three-Wave and Four-Wave Nonlinear Processes*

Terry Haut, Department of Applied Mathematics, University of Colorado at Boulder, 04 November 2008, *A Nonlocal Formulation of Water Waves, Pt. 2*

Terry Haut, Department of Applied Mathematics, University of Colorado at Boulder, 11 November 2008, *A Nonlocal Formulation of Water Waves, Pt. 3*

Willy Hereman, Department of Mathematical and Computer Sciences, Colorado School of Mines, 18 November 2008, *Symbolic Computation of Lax Pairs of Two-Dimensional Nonlinear Partial Difference Equations*

Computational Mathematics Seminars

David Alber, National Renewable Energy Laboratory (NREL), 05 February 2008, *Green Energy: Advancing Bio-Hydrogen*

Hans De Sterck, Department of Applied Mathematics, University of Waterloo, 04 March 2008, *Smoothed Aggregation Multigrid for Slowly Mixing Markov Chains*

Glenn Hammond, and Jarek Nieplocha, Pacific Northwest National Laboratory, 23 September 2008, *Ultrascale Solvers for Subsurface Simulation*

Tom Hou, California Institute of Technology, 30 September 2008, *Recent Progress on Dynamic Stability and Global Regularity of 3D Incompressible Euler and Navier-Stokes Equations*

James Adler, University of Colorado at Boulder, Applied Mathematics Department, 21 October 2008, *Nested Iteration First-Order System Least Squares on Incompressible Resistive Magnetohydrodynamics*

John Ruge, Department of Applied Mathematics, University of Colorado at Boulder, 28 October 2008, *An Introduction to Algebraic Multigrid Methods (AMG)*

Geoffrey Sanders, Department of Applied Mathematics, University of Colorado at Boulder, 04 November 2008, *An Introduction to Iterative Smoothers and Geometric Multigrid*

Jose Garcia, NCAR/ Department of Applied Mathematics, University of Colorado at Boulder, 11 November 2008, *Use of Accelerations on Computational Mathematics, Introduction to the Cell Broadband Engine in the Context of Quantum Chromodynamics*

Dynamics Seminars

Hari Rajaram, Civil, Environmental and Architectural Engineering, University of Colorado at Boulder, 24 January 2008, *Mathematical Modeling of Reactive Alteration and Pattern Formation in Geologic Systems*

Hanspeter Schaub, Aerospace Engineering, University of Colorado at Boulder, 07 February 2008, *Electrostatic Spacecraft Relative Motion Control*

Daniel Scheeres, Aerospace Engineering, University of Colorado at Boulder, 14 February 2008, *Celestial Mechanics of the Full Two-Body Problem: Applications to Binary Asteroids*

Todd Murphey, Electrical Engineering, University of Colorado at Boulder, 21 February 2008, *Constrained Rigid Body Simulation Using Graph-Based Variational Integrators*

Hector Lomeli, University of Texas at Austin and Instituto Tecnológico Autónomo De México, 28 February 2008, *Measures of Chaotic Transport*

Geoffrey Vasil, Department of Applied Mathematics, University of Colorado at Boulder, 13 March 2008, *Parity Mixing in confined Rotating Thermal Convection*

Ann Scheels, Department of Applied Mathematics, University of Colorado at Boulder, 03 April 2008, *The Fortification Illusion of Migraine*

Baylor Fox-Kemper, Department of Atmospheric and Oceanic Sciences, University of Colorado at Boulder, 10 April 2008, *Formulating a Parameterization: Submesoscale Eddy Fluxes*

William Bottke, Southwest Research Institute, 17 April 2008, *An Asteroid Breakup 160 MY Ago as the Probable Source of the K-T Impactor*

Paul Mulleney, TechX Corp, 24 April 2008, *High-Performance GPU Computing in Very High-Level Languages*

Undergraduate and Graduate Organizations

Society for Industrial and Applied Mathematics (SIAM)

The University of Colorado at Boulder undergraduate chapter of the Society for Industrial and Applied Mathematics (SIAM) was founded to promote interactions between Applied Mathematics students and faculty. Society functions include technical presentations by students, faculty, and industry speakers, field trips and student/faculty social events –all designed to introduce undergraduates to the widespread use of applied mathematics in engineering and the sciences. All interested students, from any major, are encouraged to participate in SIAM-sponsored events.

The graduate student chapter of SIAM at the University of Colorado at Boulder is a low-pressure, informal setting for discussing and learning about applied mathematics. The graduate student chapter holds regular meetings every other Thursday throughout the academic year. Faculty are not allowed at these meetings and the atmosphere is very low-key so that students can feel free to ask questions that they may not otherwise address to faculty members. Other activities include the Front Range Applied Mathematics Student Conference and trips to visit local industry and research groups.

The 2007-2008 SIAM University of Colorado at Boulder Undergraduate Chapter Officers were Co-Presidents Joseph Adams, Ryan Schilt, Colin Peterson, and Jonathan Olson; and Faculty Advisor Luis Melara. For 2008-2009, SIAM University of Colorado at Boulder Undergraduate Chapter Officers were Co-Presidents Joseph Adams, Ryan Schilt, Garrett Clark, and Jonathan Olson. Anne Dougherty serves as Faculty Advisor. Officers for the Grad Student chapter were President Dan Kaslovsky, and Vice-President Dan Larremore. Tom Manteuffel acted as Faculty Advisor.

SIAM Undergraduate 2008 Events

SIAM "Movie" Night

Thursday, January 24th, 2008

Practice Meeting: MCM

Thursday, January 31st, 2008

This was a meeting to prepare for the Mathematical Contest in Modeling (held February 14th-18th), by thinking about how to solve previously presented problems.

Mathematical Contest in Modeling

Thursday, February 14th, 2008 - Monday, February 18th, 2008

The Mathematical Contest in Modeling is a 4-day competition where a team selects one of two problems, models it, and submits a solution.

2008 SIAM Student Conference

Saturday, March 1st, 2008

Location: University of Colorado at Denver

The SIAM student chapters of Colorado hosted their fourth annual regional student conference on applied mathematics for all schools along the Front Range. This event allowed students from different universities in the area to see what is being done in this field and promote interest in applied mathematics in general. This event was open to both undergraduates and graduate students.

"Mathematics and Biology in the 21st Century"

Thursday, March 13th, 2008

Talk given by Prof. David M. Bortz, Department of Applied Mathematics, CU-Boulder.

"5 Years Later - Is There An End In Sight"

Thursday, April 3rd, 2008

A talk given by Mike Levy, a CU-Boulder Applied Mathematics graduate student.

Welcome Back Dinner

Thursday, September 11th, 2008

A welcome back party for all of the undergrads in Applied Math.

Talk on Web Analytics

Thursday, October 9th, 2008

Garrett Clark presentation about the rapidly growing field of web analytics.

Actuarial Sciences Panel Discussion**Monday, November 3rd, 2008**

The Actuarial Sciences and Quantitative Finance Program sponsored a panel discussion on internships for actuarial students.

SIAM Graduate 2008 Events**Organizational meeting:****Thursday, September 18, 2008**

Informational session for new members. Introduced officers Dan Kaslovsky and Dan Larremore for the 2008-2009 academic year.

Student Talk - Doug Lipinski**Thursday, October 16, 2008**

Topic: Lagrangian coherent structures applied to jellyfish swimming and feeding.

Student Talk - Sean Nixon**Thursday, November 6, 2008**

Topic: Research summary and introduction to mode locked lasers.

Student Talk - Christian Ketelson**Thursday, December 4, 2008**

Topic: Least-Squares finite element methods for the Schwinger model of Quantum Electrodynamics.

Women in Math (WIM)

The University of Colorado at Boulder's Women in Math (WIM) program is a joint group of faculty, postdoctoral associates, graduate students, and undergraduate students in the departments of Mathematics and Applied Mathematics. The goals of WIM are to encourage more women to engage in mathematical sciences and mathematical research, to promote a greater understanding of the contributions of women in the mathematical sciences, to mentor and encourage women in math, and to provide a network between departments and among women in both departments. In the past, WIM has hosted events approximately once a month.

Research

Department of Applied Mathematics faculty continue to demonstrate appreciable accomplishments in research.

Department-wide Grants

MCTP

Mentoring Through Critical Transition Points (hereafter, MCTP) is a National Science Foundation (NSF) funded program that brings together undergraduate students, graduate students, and faculty on common research projects. Previously, undergraduate research was funded through a NSF Vertical Integration of Research and Education (VIRGE) grant which ended in the spring of 2004. MCTP picks up where VIRGE left off, providing support for innovative research in the Department. Over five years, the MCTP grant will support approximately 15 to 20 undergraduates with stipends of up to \$6,500 per year.

Students are recruited as freshmen through honors seminars. As students progress into the sophomore and junior level, they are invited to join small research seminars led by faculty and advanced graduate students. After the seminars, the students often continue their own research projects alone or in small groups.

The grant is headed by Professor and Department Chair James Curry. Anne Dougherty, Keith Julien, James Meiss and Harvey Segur serve as co-investigators. Every one of these faculty members have extensive experience working with undergraduate students, both in the classroom and on individual research projects.

Projects topics Included:

Atmospheric and Ocean Circulation, led by graduate sponsor Mike Watson

Variational Integration of Mechanical Systems, led by faculty sponsor Todd Murphy

Heating and Cooling in a Bakery

Option pricing theory via the Black-Scholes Partial Differential Equation

Diffusion Maps

Progresa, led by faculty sponsor Tania Barham

Real Time Video Compression

Finite-time Singularities in Coupled Nonlinear Schrodinger Equations with 4-Wave Mixing, led by faculty sponsor Harvey Segur

Research on Student Learning

HIV Early Infection Pathogenesis Modeling, led by faculty sponsor David Bortz

Oral Assessment-NSF Grant

In November 2008, The University of Colorado at Boulder applied mathematics department was awarded a \$450,000 grant by the National Science Foundation to introduce pre-examination "oral assessments" in a number of courses to improve student understanding.

Led by principal investigator and applied math department instructor Mary Nelson, the oral assessments effort was increased on the CU-Boulder campus and implemented at several other sites. Faculty from CU-Boulder's aerospace engineering sciences department, UC-Colorado Springs mathematics Professor Gene Abrams and teachers at Fairview High School also were involved.

The NSF grant will make it possible to collect and analyze data and to introduce oral assessments into a wider range of courses both at CU-Boulder and local schools. Oral assessments are now in use in calculus classes at CU-Boulder and UC-Colorado Springs and are being introduced in two algebra classes at Fairview High School. In fall 2009, oral assessments will be offered in CU-Boulder introductory mechanical engineering and aerospace engineering classes

Individual Research Grants

Ablowitz, Mark

Air Force Office of Scientific Research (AFOSR), Program in Physical Mathematics: "Nonlinear wave propagation", 2006--2008.

NSF-DMS: "Mathematical and computational methods for high-performance light-wave systems" 2005--2009

NSF-DMS: "Nonlinear wave motion", 2006--2009

Beylkin, Gregory

Air Force Office of Scientific Research (AFOSR): "Geospatial Representation, Analysis and Computing Using Bandlimited Functions", 2006--2009

DOE: "Integrated Multiscale Modeling of Molecular Computing Devices", 2007--2009

DOE/UT-Battelle/ORNL: "Multiresolution Adaptive Numerical Evaluation and Scientific Simulation", 2005--2010

NSF: "Fast Multiresolution Methods and Nonlinear Approximations for Multidimensional Problems", 2006--2009

Bortz, David

CRCW: "Junior Faculty Development Award"

Corcoran, Jem

LEAP Associate Professor Growth Grant: "Non-parametric Monte Carlo Estimation of Rare Event Probabilities Using Kernel Density Estimation", 2008-2009.

Curry, James

NSF: "Mentoring Through Critical Transition Points (MCTP)", 2006--2011, Co-PI with A. Dougherty, K. Julien, and J. Meiss

Dougherty, Anne

CU-Boulder Outreach Committee: "Colorado Math Circle", 2008--2009.

NSF-DUE: "CCLI Phase 2; Colorado Momentum: Oral Assessment in the Mathematical Sciences Classroom.", 2008--2010, co-PI with H. Segur

NSF-DMS: "Mentoring Through Critical Transition Points (MCTP)", 2006--2011, Co-PI with J. Curry, K. Julien, and J. Meiss

Fornberg, Bengt

DOD-ARO: "Training Knowledge and Skills for the Networked Battlefield", 2005--2010

NSF-ATM: "Collaborative Research: CMG - Freedom from Coordinate Systems and Spectral Accuracy with Local Refinement: Radial Basis Functions for Climate and Space-Weather Prediction", 2006--2009

NSF-DMS: "Radial Basis Functions", 2006--2009

Julien, Keith

NASA Living with a Star Program: "Community Hounds and Hares Exercises in Local Helioseismology"

NASA Physical Oceanography: "Langmuir Circulations: Observing and Modeling on Global Scales." 2009--2012

NASA Solar Heliospheric: "Modeling Magneto-Inertial-Gravity waves in the Lower Convection Zone."

NSF-DSM: "Opportunities for Research Collaborations between the Mathematical Sciences and Geosciences", 2007-2008.

NSF: "Mentoring Through Critical Transition Points (MCTP)", 2006--2011, Co-PI with J. Curry, A. Dougherty, and J. Meiss

University of Colorado, Innovative Seed Grant: "Multi-scale Modeling and Simulation in the Geosciences: Towards Petascale Computing", 2007--2008.

Li, Congming

CU-Boulder Outreach Committee: "Colorado Math Circle", 2008--2009.

Lladser, Manuel

NIH: "Scientific Computation for RNA Catalysis of Translational Reactions", 2007--2010. Co-PI with M. Yarus, University of Colorado department of Molecular, Cellular, and Developmental Biology.

NIH: "New Tools for Understanding the Composition and Dynamics of Microbial Communities in Human Body Habitats", 2008--2011, Co-PI with R. Knight, University of Colorado department of Chemistry and Biochemistry.

NSF: "AMC-SS: Markovian Embeddings for the Analysis and Computation of Patterns in non-Markovian Random Sequences", 2008--2010

Manteuffel, Tom

DOE: "First-order system least-squares (FOSLS) for nonlinear systems arising from DOE applications.", 2006--2009, Co-PI with S. McCormick

DOE: "Towards Optimal Petascale Simulation (TOPS).", 2006--2011, Co-PI with S. McCormick and X.C. Cai, University of Colorado department of Computer Science

NSF: "Petascale Multilevel Quantum Chromodynamics", 2008--2011, Co-PI with S. McCormick

NSF: "Enhanced Least-Squares Methods for PIV Analysis ", 2008--2011, Co-PI with S. McCormick

NSF-EAR: "CMG: Modelling River Basin Dynamics: Parallel Computing and Advanced Numerical Methods", 2006--2010, Co-PI with S. McCormick; S. Peckham, Institute of Arctic and Alpine Research; and G. Tucker, Cooperative Institute for Research and Environmental Science.

Per-Gunnar Martinsson

NSF-DMS: "CAREER: Fast Direct Solvers for Differential and Integral Equations"

McCormick, Stephen

DOE: "First-order system least-squares (FOSLS) for nonlinear systems arising from DOE applications.", 2006--2009, Co-PI with T. Manteuffel

DOE: "Towards Optimal Petascale Simulation (TOPS).", 2006--2011, Co-PI with T. Manteuffel and X.C. Cai, University of Colorado department of Computer Science

LLNL: "Geometric and Algebraic Multigrid Methods for QCD, MHD, Elasticity, Transport, and Other DOE Applications", 2007--2010

NSF: "Multigrid QCD at the Petascale", 2007--2011

NSF: "Enhanced Least-Squares Methods for PIV Analysis", 2008--2011, Co-PI with T. Manteuffel

NSF, "Petascale Multilevel Quantum Chromodynamics", 2008--2011, Co-PI with T. Manteuffel

NSF-EAR: "CMG: Modelling River Basin Dynamics: Parallel Computing and Advanced Numerical Methods", 2006--2010, Co-PI with T. Manteuffel; S. Peckham, Institute of Arctic and Alpine Research; and G. Tucker, Cooperative Institute for Research and Environmental Science.

Meiss, Jim

NSF-DMS: "Chaos and Bifurcations in Volume-Preserving Dynamics", 2007--2012

NSF: "Mentoring Through Critical Transition Points (MCTP)", 2006--2011, Co-PI with J. Curry, A. Dougherty, and K. Julien

Segur, Harvey

NSF-DMS: "Collaborative Research: Nonlinear Dispersive Waves with Weak Dissipation" 2007-- 2010

NSF-DMS: "MCTP: Colorado Advantage" 2006--2009

NSF-DUE: "CCLI-Phase 2: Colorado Momentum: Oral Assessment in the Mathematical Sciences Classroom" 2008--2010, co-PI with A. Dougherty

Publications

Ablowitz, Mark

Ablowitz, MJ; Ablowitz, SA; Antar, N. "Damping of periodic waves in physically significant wave systems" Stud. Appl. Math. 121 (2008): 313-335.

Ablowitz, MJ; Haut, TS. "Spectral formulation of the two fluid Euler equations with a free surface and long wave reductions" Analysis and Applications 6 (2008): 323-348.

Ablowitz, MJ; Horikis, TP. "Pulse dynamics and solitons in mode-locked lasers" Phys. Rev. A, 78 (2008): 011802.

Ablowitz, MJ; Horikis, TP; Ilan, B. "Solitons in dispersion-managed mode-locked lasers" Phys. Rev. A, 77 (2008): 033814.

Hoefer, MA; Ablowitz, MJ; Engels, P. "Piston dispersive shock wave problem" Phys. Rev. Lett., 100 (2008): 084504.

Beylkin, Gregory

Beylkin, G; Cheruvu, V; Perez, F. "Fast adaptive algorithms in the non-standard form for multidimensional problems" Applied and Computational Harmonic Analysis 24 (2008): 354-377

Beylkin, G; Kurcz, C; Monzon, L. "Fast algorithms for Helmholtz Green's functions" Proceedings of the Royal Society A 464 (2008): 3301-3326

Beylkin, G; Mohlenkamp, MJ; Perez, F. "Approximating a Wavefunction as an Unconstrained Sum of Slater Determinants" Journal of Mathematical Physics 49 (2008)

Bortz, David

Bortz, DM; Christlieb, AJ. "Random numerical discretizations" Abstracts of the International Conference Inverse Problems: Modeling and Simulation Banks, HT; Hasanov, A; Kabanikhin, SI; Kappel, F. editors, 2008, pages 29–30.

Bortz, DM; Jackson, TL; Taylor, KA; Thompson, AP; Younger, JG. "Klebsiella pneumoniae flocculation dynamics" Bulletin of Mathematical Biology 70.3 (2008):745–768

Chung, HM; Cartwright, MM; Bortz, DM; Jackson, TL; Younger, JG. "Dynamical system analysis of Staphylococcus epidermidis bloodstream infection" SHOCK 30.5 (2008): 518-526

Curry, Jim

Klingenberg, Bradley; Curry, James; Dougherty, Anne. "Non-negative matrix factorization: Ill-posedness and a geometric algorithm" Pattern Recognition (2008)

Tucker, Kris; Curry, Jim; Dougherty, Anne; Martin, Jim. "A Cluster-Based Information Retrieval Technique Employing Diffusion Maps" (2008)

Dougherty, Anne

Corotis, RB; Dougherty, AM; Xu, Wei. "Extreme value index and tail probability estimates for mixed distributions" Probabilistic Engineering Mechanics 23 (2008): 385-392

Klingenberg, Bradley; Curry, James; Dougherty, Anne. "Non-negative matrix factorization: Ill-posedness and a geometric algorithm" Pattern Recognition (2008)

Tucker, Kris; Curry, Jim; Dougherty, Anne; Martin, Jim. "A Cluster-Based Information Retrieval Technique Employing Diffusion Maps" (2008)

Fornberg, Bengt

Elcrat, A; Fornberg, B; Miller, K. "Steady axisymmetric vortex flows with swirl and shear" J. Fluid. Mech. 613 (2008): 395-410.

Elcrat, A; Miller, K; Fornberg, B. "Steady vortex flow past a cylinder or sphere" 5th conference on Frontiers in Applied and Computational Mathematics (FACM 08) World Scientific Publishing Company (2008).

Fornberg, B; Flyer, N; Hovde, S; Piret, C. "Locality properties of radial basis function expansion coefficients for equispaced interpolation" IMA Journal of Numerical Analysis 28 (2008): 121-142

Fornberg, B; Piret, C. "On choosing a radial basis function and a shape parameter when solving a convective PDE on a sphere", Journal of Computational Physics 227 (2008): 2758-2780

Raymond, WD; Fornberg, B; Buck-Gengler, CJ; Healy, AF; Bourne, LE. "Matlab optimization of an IMPRINT model of human behavior" Proceedings of the Seventeenth Conference on Behavior Representation in Modeling and Simulation, Orlando, FL: Simulation Interoperability Standards Organization (2008), 26-34.

Xiong, JY; Colice, M; Schlottau, F; Wagner, K; Fornberg, B. "Numerical solutions to 2D Maxwell-Bloch equations" Optical and Quantum Electronics 40(2008): 447-453.

Julien, Keith

Jamroz, B; Julien, K; Knobloch, E. "Saturation of the Magnetorotational Instability at Large Elsasser number" Astronomische Nachrichten 329.6 (2008): 675-687

Jamroz, B; Julien, K; Knobloch, E. "An Asymptotically Exact Reduced PDE Model for the Magnetorotational Instability: Derivation and Numerical Simulation" Physica Scripta 6 (2008)

Muldowney, P; Julien, K; Meiss, JD. "Chaotic Advection and the Emergence of Tori in the Kupperts-Lortz State" Chaos 18 (2008)

Vasil, GM; Brummell, NH; Julien, K. "A New Method for Fast Transforms in Parity Mixed PDE's: Part I. Numerical Techniques and Analysis" Journal of Computational Physics, 227.17 (2008): 7999-8016

Vasil, GM; Brummell, NH; Julien, K. "A New Method for Fast Transforms in Parity Mixed PDE's: Part I. Application to Confined Rotating Convection" Journal of Computational Physics, 227.17 (2008): 8017-8034

Li, Congming

Chen, W; Li, C. "The Best Constant in Some Weighted Hardy-Littlewood-Sobolev Inequality" Proc. Amer. Math. Soc. 136 (2008): 955-962

Hou, T; Li, C. "Dynamic Stability of the 3D Axi-Symmetric Navier-Stokes Equations with Swirl" Comm. Pure Appl. Math. 61.5 (2008): 661-697

Hou, T; Lei, Z; Li, C. "Global regularity of the 3D axi-symmetric Navier-Stokes equations with anisotropic data" Comm. in Partial Differential Equations, 33 (2008): 1622-1637

Li, C; Ma, L. "Uniqueness of positive bound states to Shrodinger systems with critical exponents", SIAM J. Math. Analysis 40.3 (2008): 1049-1057

Lladser, Manuel

Bijral, AS; Lladser, M; Grudic, G. "Semi-supervised learning of a Markovian metric" Proceedings of the 2008 SIAM International Conference on Data Mining (2008): 466-471

Kenney, R; Lladser, M; Yarus, M; Knight, R. "Information, probability, and the abundance of the simplest RNA active sites" Front Biosci. 13 (2008): 6060-71

Oscamou, M; McDonald, D; Yap, V-B; Huttley, GA; Lladser, M; Knight, R. "Comparison of methods for estimating the nucleotide substitution matrix" BMC Bioinformatics, 9 (2008): 511

Manteuffel, Tom

Brezina, M; Manteuffel, T; McCormick, S; Sanders, G; Vassilevski, P. "A generalized eigensolver based on smoothed aggregation (GES-SA) for initializing smoothed aggregation multigrid (SA)" J. Num. Lin. Alg. Appl. 15 (2008): 249-270

De Sterck, H; Manteuffel, T; McCormick, S; Nguyen, Q; Ruge, J. "Multilevel adaptive aggregation for Markov chains, with application to web ranking" SIAM J. Sci. Comp. 30.5 (2008).

De Sterck, H; Manteuffel, T; McCormick, S; Nolting, J; Ruge, J; Tang, L. "Efficiency-based h- and hp-refinement strategies for finite element methods" Numer. Lin. Alg. App. 15 (2008): 84-114

Heys, J; Lee, E; Manteuffel, T; McCormick, S. "An alternative least-squares formulation of the Navier-Stokes equations with improved mass conservation" J. Comp. Phys. 226 (2008): 994-1006

Lee, EJ; Manteuffel, TA; Westphal, CR. "Weighted norm first-order least squares (FOSLS) for Div/Curl systems with edge singularities" SIAM J. Numer. Anal. 46.3 (2008)

Martinsson, Gunnar

Greengard, L; Gueyffier, D; Martinsson, PG; Rokhlin, V. "Fast direct solvers for integral equations in complex three-dimensional domains". Acta Numerica (2008): 1-33

Martinsson, P.G. "Approximation of Structured Matrices via Randomized Sampling" arXiv.org report number 0806.2339, June 2008.

McCormick, Stephen

Brezina, M; Manteuffel, T; McCormick, S; Sanders, G; Vassilevski, P. "A generalized eigensolver based on smoothed aggregation (GES-SA) for initializing smoothed aggregation multigrid (SA)" J. Num. Lin. Alg. Appl. 15 (2008): 249-270

De Sterck, H; Manteuffel, T; McCormick, S; Nolting, J; Ruge, J; Tang, L. "Efficiency-based h- and hp-refinement strategies for finite element methods" Numer. Lin. Alg. App. 15 (2008): 84-114

De Sterck, H; Manteuffel, T; McCormick, S; Nguyen, Q; Ruge, J. "Multilevel adaptive aggregation for Markov chains, with application to web ranking" SIAM J. Sci. Comp. 30.5 (2008).

Heys, J; Lee, E; Manteuffel, T; McCormick, S. "An alternative least-squares formulation of the Navier-Stokes equations with improved mass conservation" J. Comp. Phys. 226 (2008): 994-1006

McCormick, S; Brannick, J; Clark, MA; Brower, RC; Manteuffel, T; Osborn, JC; Rebbi, C. "The removal of critical slowing down" Procs. XXVI Int'l Symp. On Lattice Field Theory, July 14-19, 2008

Meiss, Jim

Dullin, HR; Meiss, JD. "Nilpotent Normal form for Divergence Free Vector Fields and Volume-Preserving Maps," Physica D 237.2 (2008) 156-166

Lomeli, HE; Meiss, JD; Ramirez-Ros, R. "Canonical Melnikov Theory for Diffeomorphisms," Nonlinearity 21 (2008): 485-508

Meiss, J.D. "Visual Explorations of Dynamics: the Standard Mapping," Pramana, Indian Academy of Sciences 70 (2008): 965-988

Mullowney, P; Julien, K; Meiss, JD. "Chaotic Advection and the Emergence of Tori in the Kuppers-Lortz State" Chaos 18 (2008)

Simpson, DJW; Meiss, JD. "Unfolding a Codimension-Two Discontinuous Hopf Bifurcation," Chaos 18 (2008): 033125

Simpson, DJW; Meiss, JD. "Neimark-Sacker Bifurcations in Planar, Piecewise Smooth, Continuous Maps," SIAM J. Appl. Dyn. Sys. 7.3 (2008): 795-824

Restrepo, Juan

Restrepo, JG; Weiss, JN; Karma, A. "Calsequestrin Mediated Mechanism for Cellular Calcium Transient Alternans" Biophysical Journal 85 (2008): 3767

Segur, Harvey

Segur, H. "Integrable models of waves in shallow water" Probability, Geometry and Integrability 55 (2008): 307-333

Segur, H. "Explosive instability due to 3-wave or 4-wave mixing, with or without dissipation", Analysis & Applications 6 (2008): 413-428

Segur, H; Henderson, D. "Stable deep-water waves propagating in one and two dimensions" Proc. in Appl. Math. & Mech. 8 (2008)

Tong, Tiejun

Chen, L; Tong, T; Zhao, H. "Considering Dependence Among Genes and Markers for False Discovery Control in eQTL Mapping." Bioinformatics 24 (2008): 2015-2022.

Tong, T; Hongyu, Z. "Practical Guidelines for Assessing Power and False Discovery Rate for a Fixed Sample Size in Microarray Experiments." Statistics in Medicine 27 (2008): 1960-1972

Tong, T; Liu, A; Wang Y. "Relative Errors of Difference-based Variance Estimators in Nonparametric Regression." Communications in Statistics - Theory and Methods 37 (2008): 2890-2902.

Invited Lectures and Meetings Attended

Ablowitz, Mark

Nonlinear waves: Theory and application, Beijing, China, June 9-12, 2008: "Solitons and dynamics in mode-locked lasers", June 11, 2008.

Nonlinear Physics Theory and Experiment, Gallipoli, Italy, June 13-16, 2008: "Reformulation and asymptotic reductions of interfacial waves", June 14, 2008.

Department of Physics, University of Naples, Naples, Italy: "Dispersive Shock Waves", June 23, 2008.

AFOSR Workshop: Nonlinear Optics, Dayton Ohio, September 10-11, 2008, "Pulses, properties and dynamics in mode locked lasers", September 10, 2008.

International conference on magnetics and applications, Colorado State University, September 12-14, 2008: "Pulses, properties and dynamics in mode locked lasers", September 13, 2008.

Department of Physics, Colorado State University, "Nonlinear waves in optics and fluid dynamics", November 17, 2008.

Beylkin, Greg

IPAM, "Algorithms and Challenges of Electron Microscope Tomography", January 29, 2008

Great Lakes Section SIAM Meeting: Snapshots of Applied Mathematics, U. of Michigan, "Fast algorithms for adaptive application of integral operators in high dimensions", April 12, 2008

SIAM Annual Meeting, San Diego, "Separated representations and algorithms for multidimensional operators", July 10, 2008 and with Lucas Monzon, "On multi-variable representations with sums of exponentials", July 11, 2008

Integral Geometry and Tomography, Conference dedicated to Jan Boman's 75th birthday, Stockholm University, Sweden, "Nonlinear inversion of band-limited Fourier transform", August 15, 2008

KTH, Stockholm, Sweden, "Discrete transforms for bandlimited functions in a disk", and "Separated representations and algorithms for multidimensional operators", August 20, 2008

International conference in honor of Jean Morlet, CIRM, Campus de Luminy, Marseille, "On approximation by Gaussians and its applications", October 28, 2008

COSI Seminar, University of Colorado at Boulder, Boulder, CO, "Discrete transforms for bandlimited functions in a disk", December 1, 2008

Bortz, David

Department of Mathematics, Pennsylvania State University, University Park, PA, Feb. 4, 2008.

Pikes Peak Regional Undergraduate Math. Conf., Colorado Springs, CO, Feb. 23, 2008.

Bioinformatics Supergroup, University of Colorado, Boulder, CO, Mar. 1, 2008.

SIAM Chapter, University of Colorado, Boulder, CO, Mar. 13, 2008.

National Renewable Energy Laboratory, Golden, CO, Mar. 20, 2008.

Atlantic Coast Symp. on the Math. Sci. in Biol. & Biomed. Raleigh, NC, Apr. 26, 2008.

Inverse Problems: Modeling & Simulation. Fethiye, Turkey, May 26, 2008.

SAMSI Meta-analysis Workshop, Research Triangle Park, NC, Jun. 4, 2008.

SIAM Annual Meeting, San Diego, CA, Jul. 10, 2008.

SIAM Conference on the Life Sciences, Montreal, Canada, Aug. 4, 2008.

Lloyd Roeling Mathematics Conference, Lafayette, LA, Oct. 10, 2008.

Society of Engineering Science Annual Technical Meeting, Champaign, IL, Oct. 14, 2008.

Department of Mathematics, Colorado State University, Fort Collins, CO, Nov. 6, 2008.

Joint Math & Biology Seminar, University of Colorado-Colorado Springs, Colorado Springs, CO, Nov. 20, 2008.

Corcoran, Jem

Department of Mathematics, Whitman College, Walla Walla, WA: "The Effect of Discretization on the Recovery of Bayesian Networks."

Fornberg, Bengt

Department of Psychology, University of Colorado, Boulder, CO

NCAR

University of Wyoming, Laramie, WY

Uppsala University, Uppsala, Sweden

Chonnam National University, Gwangju, South Korea

Max Planck Institute for Plasma Physics, Garching, Germany

University of Goettingen, Goettingen, Germany

Julien, Keith

Theme-of-The-Year Summer School on Geophysical Turbulent Phenomena, IMAGE, NCAR, Boulder, CO, "Generalized Quasi-geostrophy for Spatially Anisotropic Rotationally Constrained Flows", July 2008

Applied Mathematics Colloquium, Department of Mathematics, University of Wisconsin at Madison, Madison, WI, "Rotationally Constrained Rayleigh-Benard Convection", Nov. 2008.

Li, Congming

Colloquium, Dept. of Math., East China Normal University, ShangHai, PRChina, July, 2008

Colloquium, Dept. of Math., HeNan Normal University, XingXiang, Henan, PRChina.

Colloquium, Univ. of Science and Technology of China, HeFei, Anhui, P.R. China, Summer 2008

Lladser, Manuel

Analysis of Algorithms and Combinatorics Workshop, San Francisco, CA, "Markovian embeddings of general random strings", Jan 19, 2008

International Conference of Analysis of Algorithms, Maresias, Brazil, April 2008

Departamento de Educacion Matematica, Universidad Catolica Silva Henriquez, Chile, June 2008

Centro Innovo, Universidad de Santiago de Chile, June 2008

Probability Seminar, Centro de Modelamiento Matematico, Universidad de Chile, June 2008

Bioinformatics Supergroup, University of Colorado, Boulder, CO, October 2008

Manteuffel, Tom

South African Numerical Analysis Conference (SANUM), Stellenbosch University, March 26-28, 2008, "Plenary Address"

DOE Conference on Computational Methods in Transport, Granlibakken Lodge, Tahoe City, CA, September 7-10, 2008

Martinsson, Gunnar

"Fast matrix computations via randomized sampling", Computational Science & Engineering Seminar, Georgia Tech, Dec. 2008.

"Fast matrix computations via randomized sampling", computer science colloquium, University of Toronto, April 2008.

"Randomized methods for the approximation of matrices", applied mathematics seminar, University of Toronto, Jan. 2008.

"Fast numerical methods for solving linear PDEs", mechanical engineering colloquium, University of Pennsylvania, Jan. 2008.

"Fast numerical methods for solving linear PDEs", mathematics colloquium, University of Toronto, Jan. 2008.

McCormick, Steve

10th Copper Mountain Conference on Iterative Methods, Copper Mountain, Colorado, April 6-11.

AMG Summit, Lake City, CO, September 13-18.

Meiss, Jim

Conference on Undergraduate Research and Teaching, Montclair University, "Visualizing Dynamics: The Standard Mapping", June 5, 2008

International Symposium Hamsys-2008, Guanajuato, MX, "Generating Forms and Flux for Volume Preserving Maps", July 9, 2008,

APS Division of Plasma Physics Meeting, Dallas, TX, "Building on the Legacy of John Greene: The Transition to Chaos in Volume-Preserving Maps", Nov 21, 2008

Dept. of Mathematics, University of Colorado at Boulder, Boulder, CO, "Generating Forms for Volume Preserving Maps", Dec 9, 2008

Nelson, Mary

Joint Mathematics Meeting, San Diego, California, "Calculus I Oral Assessments: Improved Grades, Retention and Calculus II Success", January 2008

NTCM national conference, Reno, Nevada

Graduate Teaching Program, University of Colorado at Boulder, Boulder, CO, "What do we learn at the university that will prepare us for a job?", Spring 2008

Mathematics Department, University of Colorado at Fort Collins, Fort Collins, CO, Dec 11, 2008.

Freeman calculus workshop, Denver, CO

Segur, Harvey

Waves in Fluids workshop, Pacific Institute of Math. Sciences, Vancouver, BC, Canada, "Explosive instability due to 3-wave or 4-wave mixing, with or without dissipation", April 26, 2008

SIAM Conference on Nonlinear Waves and Coherent Structures, Rome, Italy, "Explosive instability due to 3-wave or 4-wave mixing, with or without dissipation", July 21, 2008

NSF-CBMS Regional Conference Howard University, Washington, DC May 13-18, 2008, "Water waves - theory and experiment", a series of 10 lectures.

Spring retreat of CU Presidential Teaching Scholars, Boulder, CO, "Perils in first-semester calculus", May 7, 2008

Tong, Tiejun

Department of Statistics, Colorado State University, Ft. Collins, CO, "Shrinkage Techniques in Microarray Data Analysis.", April 2008.

Eleventh Meeting of New Researchers in Statistics and Probability, Boulder, CO, "Shrinkage Techniques in Microarray Data Analysis.", July 2008.

Joint Statistical Meeting, Denver, CO, "Estimating the Proportion of True Null Hypotheses Using the Pattern of the Observed P-Values.", August 2008.

Outreach

Outreach activities help to share the knowledge and enthusiasm of the Department with others. The outreach efforts of the Department are an extension of its mission to provide education and training in applied mathematics. These efforts are focused in two areas: professional development for secondary math teachers and mathematical encouragement and enrichment for high school students.

Anne Dougherty

Outreach activity: Boulder Partnership for Excellent in Mathematics Education (BPEME) is a joint effort with Boulder Valley School District (BVSD), CU School of Education, the Freudenthal Institute, and Applied Mathematics. It is funded by the state of Colorado from 2006 through summer 2008. The primary goal is to improve student achievement in math, primarily among under-represented groups, through intensive professional development activities for middle school BVSD math teachers, including a two-week summer class. My role is advisory.

Outreach activity: Together with Applied Math Professor Congming Li, I work with the Colorado Math Circle (CMC). The CMC provides enrichment opportunities for advanced high school and middle school students through math talks and problem-solving sessions. There are 1-2 meetings held each month during the academic year.

Faculty Service to the University, Department, and Societies

Ablowitz, Mark

Served as chair to the "APPM PDE Prelim", "College Scholar Awards", and "Interdisciplinary Effort in Computational Science and Engineering" committees.

Beylkin, Gregory

Served on the "APPM Undergraduate" and "Biotechnology Initiative" committees.

Bortz, David

Served as one of four departmental student advisors.

Served on the "APPM Undergraduate" and "APPM Assistant Professor Search" committees.

Corcoran, Jem

Acted as Research consultant for CU Denver Department of Psychiatry research project: "Martial Arts as Early Intervention for Teen Drug Abuse". PI: Robert Davies.

Served as one of four departmental student advisors.

Served on the "APPM Undergraduate", "APPM Graduate", and "APPM Instructor Search" committees.

Served as chair to the "Probability and Statistics Preliminary Examination" committee.

Member of the University Council on Research and Creative Work.

Curry, Jim

Acted as Chair to the department.

Dougherty, Anne

Served as Applied Math's representative to several College of Engineering programs: Explore Engineering for Admitted Students, March 8, 2008; Engineering Orientation August 20-21, 2008; and Engineering Sampler and Open House October 11, 2008.

Served as Applied Math's representative to the Undergraduate Education Council in the College of Engineering.

Faculty advisor for the CU Boulder SIAM undergraduate chapter. SIAM is the acronym for the Society for Industrial and

Applied Mathematics. (Luis Melara is co-advisor for spring 2008.)

Served as chair for "APPM Undergraduate" Committee

Acted as Associate Chair to the department.

Fornberg, Bengt

Served on the University's IGP (The Innovative Grant Program) review panel for Physical Sciences / Engineering.

Julien, Keith

Acted as Associate Graduate Chair to the department.

Served on "Arts and Science" and "Arts and Science Budget" Committees.

Li, Congming

Served as chair for the "Prelim for Applied Analysis" committee.

Served on "APPM Instructor Search" and "Budget and Compensation" committees.

Lladser, Manuel

Served on "APPM Graduate" committee.

Performed peer evaluation for APPM Instructor Adam Norris.

Aided University Biotech Initiative in recruitment of Alexandros Stamatakis.

Martinsson, Gunnar

Served on "APPM Graduate" and "APPM Assistant Professor Search" committees

Served as Co-chair for the "APPM Colloquium" committee

McCormick, Stephen

Served on the following committees: "APPM Graduate" , "Ad Hoc Executive" , "Post Doc Hiring" , "VIGRE III Proposal"

Meiss, Jim

Served on "APPM Graduate" and "PhD Preliminary Exam" committees

Nelson, Mary

I am contributing to Innovations in Engineering Education, Curriculum and Infrastructure (IEECI) (\$500,000) grant with members of the School of Engineering. It is a three year project

Support the Colorado LAtest effort; interviewing and hiring LAs, counseling prospective K-12 mathematics teachers, supervising the work of APPM learning assistants and assisting in the transformation of classes in Applied Mathematics.

Support DBER (Discipline Based Educational Research) portion of the LAtest grant on the Boulder campus. Meet every week with DBER faculty from Physics, Chemistry, Astronomy, Applied Mathematics, Biology, Geology, Mathematics and Education.

Served as a member of the steering committee for PTLC in 2007-8.

Participate in transforming the preparation of K-12 math and science teachers through the NMSI grant.

In Spring 2008 served as mentor and coach to PTLC project participant, Kendra Gale.

Assist on the K-12 tier of the LAtest grant, Visiting the classrooms of practicing teachers who were former LAs; observing and evaluating their teaching. Fall)* I was responsible for Nate Balk and Ian HerManyHorses.

I contribute to the CU Teach program on the Boulder campus. We are trying to improve the preparation of K-12 math and science teachers.

Restrepo, Juan

Served on "APPM Instructor Search" committee

Tong, Tiejun

Served on "Prob/Stat Qualifying" and "Prob/Stat Seminar" Committees

Served as Co-chair for the "APPM Colloquium" committee

Teaching Activities

Undergraduate Courses Taught by Department Faculty

SPRING 2008

<i>Course Number</i>	<i>Instructor</i>	<i>Course Title</i>
APPM 1345-001	Nelson, Mary	Calculus 1B with Algebra
APPM 1345-002	Melara, Luis	Calculus 1B with Algebra
APPM 1345-003	Radulescu, Anca	Calculus 1B with Algebra
APPM 1350-020	Radulescu, Anca	Calculus I for Engineers
APPM 1360-010	Nelson, Mary	Calculus II for Engineers
APPM 1360-020	Li, Congming	Calculus II for Engineers
APPM 2350-010	Norris, Adam	Calculus III for Engineers
APPM 2350-020	Melara, Luis	Calculus III for Engineers
APPM 2360	Martinsson, Gunnar	Introduction to Ordinary Differential Equations with Linear Algebra
APPM 3050	Norris, Adam	Scientific Computing in Matlab
APPM 3310	Dougherty, Anne	Matrix Methods
APPM 3570	Lladser, Manuel	Applied Probability
APPM 4360	Fornberg, Bengt	Complex Variables
APPM 4520	Tong, Tiejun	Introduction to Mathematical Statistics
APPM 4540	Corcoran, Jem	Introduction to Time Series
APPM 4660	Bortz, David M.	Numerical Methods II
HONR 1001	Dougherty, Anne	Honors Calculus Co-Seminar

SUMMER 2008

<i>Course Number</i>	<i>Instructor</i>	<i>Course Title</i>
APPM 4650	Norris, Adam	Intermediate Numerical Analysis I

FALL 2008

<i>Course Number</i>	<i>Instructor</i>	<i>Course Title</i>
APPM 1350-010	Nelson, Mary	Calculus I for Engineers
APPM 1350-030	Segur, Harvey	Calculus I for Engineers
APPM 1350-050	Bhat, Sujeet	Calculus I for Engineers
APPM 1350-060	Segur, Harvey	Calculus I for Engineers
APPM 1360-010	Nelson, Mary	Calculus II for Engineers
APPM 1360-020	Norris, Adam	Calculus II for Engineers
APPM 1360-030	Norris, Adam	Calculus II for Engineers
APPM 2350-010	Fornberg, Bengt	Calculus III for Engineers
APPM 2350-030	Fornberg, Bengt	Calculus III for Engineers
APPM 2360-020	Radulescu, Anca	Introduction to Ordinary Differential Equations with Linear Algebra
APPM 2360-030	Meiss, James D.	Introduction to Ordinary Differential Equations with Linear Algebra
APPM 2360-040	Restrepo, Juan	Introduction to Ordinary Differential Equations with Linear Algebra
APPM 3170	Lladser, Manuel	Discrete Applied Mathematics
APPM 4350	Ablowitz, Mark J.	Fourier Series and Boundary Value Problems
APPM 4380	Fornberg, Bengt	Mathematical Modeling
APPM 4520	Corcoran, Jem	Introduction to Mathematical Statistics
APPM 4560	Lladser, Manuel	Markov processes, queues, and Monte Carlo simulation

APPM 4720
HONR 1001

Dougherty, Anne
Dougherty, Anne

Applied Analysis 1
Honors Calculus Co-Seminar

Graduate Courses Taught by Department Faculty

SPRING 2008

<i>Course Number</i>	<i>Instructor</i>	<i>Course Title</i>
APPM 5360	Fornberg, Bengt	Complex Variables
APPM 5380	Fornberg, Bengt	Mathematical Modeling
APPM 5450	Martinsson, Gunnar	Applied Analysis II
APPM 5460	Meiss, James D.	Differential Equations and Dynamical Systems
APPM 5520	Tong, Tiejun	Introduction to Mathematical Statistics
APPM 5540	Corcoran, Jem	Introduction to Time Series
APPM 5610	Beylkin, Gregory	Numerical Analysis II
APPM 7400	Segur, Harvey	Water waves, theory, and experiment
APPM 8000	Manteuffel, Tom	Colloquium
APPM 8100-001	Ablowitz, Mark J.	Seminar in Nonlinear Waves
APPM 8100-002	Meiss, James D.	Seminar in Dynamical Systems
APPM 8600	Manteuffel, Tom	Seminar in Computational Mathematics

FALL 2008

<i>Course Number</i>	<i>Instructor</i>	<i>Course Title</i>
APPM 5350	Ablowitz, Mark J.	Fourier Series and Boundary Value Problems
APPM 5440	Li, Congming	Applied Analysis
APPM 5470	Curry, James H.	Partial Differential Equations
APPM 5520	Corcoran, Jem	Introduction to Mathematical Statistics
APPM 5560	Lladser, Manuel	Markov processes, queues, and Monte Carlo simulation
APPM 5600	Manteuffel, Tom	Numerical Analysis
APPM 7100	Meiss, James D.	Dynamical Systems
APPM 7400-001	Beylkin, Gregory	Wavelets and Imaging
APPM 7400-008	Corcoran, Jem	Stochastic Simulation
APPM 7400-003	Fornberg, Bengt	Radial Basis Functions
APPM 8100	Ablowitz, Mark J.	Seminar in Nonlinear Waves
APPM 8100	Meiss, James D.	Seminar in Dynamical Systems
APPM 8600	Manteuffel, Tom	Seminar in Computational Mathematics



Department of Applied Mathematics

526 UCB

1111 Engineering Drive

ECOT 225

Boulder, CO 80309

<http://amath.colorado.edu>