

◀ MATHEMATICAL SCIENCES ▶

HIGHLIGHTS

◇ UNDERGRADUATE MAJOR ERIK WHEELER WAS ONE OF ONLY SEVEN STUDENTS INDUCTED INTO SEPTEMVIRI AND CHARLIE DOUGHTY WAS ONE OF ONLY THREE SENIOR MEN AT MSU GIVEN THE MAX WORTHINGTON AWARD. ERIK AVER WAS ONE OF ONLY EIGHT STUDENTS TO GRADUATE WITH A PERFECT 4.0 GPA.

◇ GRADUATE STUDENT KEVIN FLANAGAN WAS SELECTED AS THE OUTSTANDING GRADUATE TEACHING ASSISTANT IN THE COLLEGE OF LETTERS OF SCIENCE.

- ◇ ALUMNA SUSAN HINKINS (PH.D. 1979) WAS NAMED A FELLOW OF THE AMERICAN STATISTICAL ASSOCIATION.
- ◇ PROFESSOR JOHN BORKOWSKI WAS ON SABBATICAL WORKING WITH SCIENTISTS IN YELLOWSTONE NATIONAL PARK.
- ◇ OF 120 UNDERGRADUATE MAJORS, 5 WERE PRESIDENTIAL SCHOLARS AND 24 WERE IN THE HONORS PROGRAM.

Books	5
Book Chapters	4
Refereed Articles	33
Presentations	76
FTE Faculty	25.6
Majors	212
Grant Expenditures	\$633,895

SUMMARY

TEACHING

The Department of Mathematical Sciences delivered about 10% of the total student credit hours at MSU last year. We have 120 undergraduate majors seeking a B.S. degree in one of four options (Applied Mathematics, Mathematics, Mathematics Teaching, Statistics). In addition we have 63 M.S. students and 29 Ph.D. candidates. At the 2004 commencement exercises, the department awarded 22 Bachelor of Science degrees. Among our graduates were three students who graduated with highest honors, seven who graduated with honors, and three who completed the University Honors Program. Also awarded were 22 Master of Science degrees, one Doctor of Philosophy degree, and one Doctor of Education degree.

Our students have received several awards this year. Benjamin Bartle, John Cross, Charlie Doughty, Kori Smith, and Matthew Welch were Presidential Scholars. Erik Wheeler joined Charlie Doughty as a member of both Mortar Board and Septemviri. Cheryl Hitzeroth was one of twelve students to receive a Student of Achievement Award. Charlie Doughty received the Max Worthington Award. Sarah Jensen was one of the first MSU interns for Advanced Acoustics Concepts, Inc. Seth Timpano was MSU Rotary Students of the Month for April. Charlie Doughty was chair of the ASMSU Lively Arts and Lectures Series. Kevin Flanagan was selected as the Outstanding GTA in the College of Letters of Science, the second year in a row that this award went to a GTA in our department.

RESEARCH

Faculty in the Department of Mathematical Sciences have had a productive year in advancing their research programs. Our faculty are working on numerous interdisciplinary research programs involving

the Air Force Office of Scientific Research (AFOSR), the Biological Information Technology and Systems (BITS) grant, the Center for Biofilm Engineering (CBE), the Center for Computational Biology (CCB), the Center for Learning and Teaching in the West (CLTW), the Interagency Grizzly Bear Study Team, the Pacific Northwest National Laboratory (PNNL), the Solar Physics Group, the Systemic Initiative in Montana Mathematics and Science (SIMMS), the US Geological Survey (USGS), Yellowstone National Park, and the Western Transportation Institute (WTI). Cooperative on-campus projects involved the departments of Animal & Range Sciences, Cell Biology & Neuroscience, Chemical Engineering, Civil Engineering, Earth Sciences, Ecology, Education, Entomology, Land Resources & Environmental Sciences, Nursing, Physics, and Psychology.

Several faculty were invited to give international lectures this year. Jarrett Barber spoke in Toronto, Canada. John Borkowski spoke in both Toronto and Victoria, Canada. Tomas Gedeon was invited to Kamakura, Japan and also spoke on two different occasions at the Banff International Research Station in Banff, Canada. Jarek Kwapisz spoke at the University of Gdansk, Gdansk, Poland; the Mathematics Institute of the Polish Academy of Sciences, in Warsaw, Poland; the Max Planck Institute in Bonn, Germany; and the Banff International Research Station in Banff, Canada. Jennie Luebeck spoke in Vancouver, Canada. Lisa Stanley was invited to speak in the Bahamas while Curt Vogel gave talks in Glasgow, Scotland and at the Banff International Research Station in Banff, Canada. Of more local interest, both John Borkowski and Steve Cherry, continue separate funded research projects with the US Geological Survey concerning wildlife habitat in and around Yellowstone National Park. Each also has separate funded projects with the National Park Service involving habitat studies in Yellowstone. John Borkowski received a faculty fellowship from the Pacific Northwest National Laboratory and a sabbatical to participate in the Sabbatical in the Parks program in Yellowstone. Maurice Burke is nearing completion as the editor of four books in the Navigations Series for the National Council of Teachers of Mathematics.

Tomas Gedeon has begun work on the five-year, \$18,000,000 INBRE grant, involved with bioinformatics. Ted Hodgson spent a semester at Indiana University working on the Mathematics Through the Curriculum Project. Jennie Luebeck began work on the DOE-funded Creating Opportunities in Mathematics for Exemplary Teaching (COMET) project, for which she serves as the Evaluation Director. Jim Robison-Cox continues his work on an NSF-funded study into bias and exclusion. Lisa Stanley and Curt Vogel continue their work on separate large Air Force funded projects. Finally, Curt Vogel filed for a joint patent on the map-seeking algorithm for dewarping movement-induced blur between time-separated images.

This year, Robert Boik's Ph.D. student, Scott Hyde, finished his degree and is now an Assistant Professor of Mathematics in the Department of Mathematics at BYU-Hawaii, in Laie, Hawaii. Jennifer Kosiak finished her Ph.D. under Linda Simonsen and is now an Assistant Professor in the Mathematics Department at the University of Wisconsin-LaCrosse, in LaCrosse, Wisconsin. Lisa Stanley directed a team involving postdoc, Faranak Pahlevani, and graduate students, Michael Larkin and Mike Bowman, that investigated unmanned air vehicles. Curt Vogel, his postdoc, Qing Yang, and graduate student, Jennifer Thorenson, looked into atmospheric optics and the use of giant telescopes.

SERVICE

The Department of Mathematical Sciences serves the local and campus community, as well as the region, state and nation, in a variety of ways. All of the faculty contribute to department and campus activities. In addition, our faculty contribute to numerous efforts to improve our state. Maurice Burke is on the Mathematics Standards Review Committee, convened by the Superintendent of Public Instruction. Warren Esty is on the Mathematics Proficiency Steering Committee, convened by the Commissioner of Higher Education. For the Montana Chapter of the American Statistical Association, Sherry Heis was the Secretary/Treasurer and John Borkowski was the Chapter Representative. Linda Simonsen was on the Board of Directors of the Montana Council of Teachers of Mathematics.

Beyond the borders of Montana, several faculty contribute to their profession in a variety of ways. Lyle

Andersen is on the National Advisory Committee for the Big Sky Institute for Science and Natural History. Robert Boik is an Editorial Board member for Psychological Methods. John Borkowski is an Associate Editor for The American Statistician and the Journal of Probability and Statistical Science. Maurice Burke is on the National Advisory Board for the SIMMS-IM Dissemination Grant. Ted Hodgson served on an NSF-CCLI review panel and as a curriculum consultant for the Carnegie Learning Corporation. Linda Simonsen is the editor of Connecting Research to Teaching for the Mathematics Teacher and served on the Advisory Board for the Metro Math NSF Center in Philadelphia.

PUBLICATIONS

A. BOOKS / EDITED COLLECTIONS / FULL-LENGTH WORKS

BOWERS, S.

Introductory Algebra, S. Bowers, M. Pohl, M. Sojda, and S. Thompson, 3rd Edition, (2004).

ESTY, W.

The Language of Mathematics, W. Esty, 2004 Edition, (2004).

POHL, M.

Introductory Algebra, S. Bowers, M. Pohl, M. Sojda, and S. Thompson, 3rd Edition, (2004).

SOJDA, M.

Introductory Algebra, S. Bowers, M. Pohl, M. Sojda, and S. Thompson, 3rd Edition, (2004).

THOMPSON, S.

Introductory Algebra, S. Bowers, M. Pohl, M. Sojda, and S. Thompson, 3rd Edition, (2004).

B. BOOK CHAPTERS

BOIK, R.

“Commentary on ‘Why Likelihood,’” R.J. Boik, in M.L. Taper and S. Lele (Eds), *The Nature of Scientific Evidence: Statistical, Philosophical, and Empirical Considerations*, University of Chicago Press, Chicago, Illinois, 167-180, (2004).

CHERRY, S.

“Commentary on ‘Constraints on Negative Relationships: Mathematical Causes and Ecological Consequences,’” S. Cherry, in M.L. Taper and S. Lele (Eds), *The Nature of Scientific Evidence: Statistical, Philosophical, and Empirical Considerations*, University of Chicago Press, Chicago, Illinois, 315-318, (2004).

SHARP, J.M.

“Thinking Engineering,” S. Martin, J. Sharp, and L. Zachary, in M. Jenice Goldston (Ed), *Stepping Up to Science and Math: Exploring the Natural Connections*, NSTA Press, Arlington, Virginia, 107-112, (2004).

“Spherical Geometry as a Professional Development Context for K-12 Mathematics,” J. Sharp, in Denisse Thompson & Tad Wanatabe (Eds), *The Work of Mathematics Teacher Educators: Exchanging Ideas for Effective Practice: AMTE 2004 Monograph*, Association of Mathematics Teacher Educators (AMTE), Jacksonville, Florida, 108-123, (2004).

C. REFEREED JOURNAL PIECES

ANDERSEN, L.

“Water Quality Statistics,” T. Hodgson, L. Andersen, J. Robison-Cox, and C. Jones, *Teaching Statistics*, 26(1), 2-6, (2004).

BOIK, R.

“A Multivariate Statistical Model for Whole-Body Related Musculoskeletal Disorders,” H. Yerneni, R. Boik, R. Marley, and E. Mooney, *Proceedings of the 1st Annual Regional NORA (National Occupational Research Agenda) Young/New Investigators Symposium*, 223-234, (2004).

BORKOWSKI, J.

“Factorial Experiments when Factors are Not Necessarily Reset,” D. Webb, J.M. Lucas, and J.J. Borkowski, *Journal of Quality Technology*, 36, 1-11, (2004).

“Using Ecological Theory to Guide the Implementation of Augmentative Restoration,” E.C. Bard, R.L. Sheley, J. Jacobsen, and J.J. Borkowski, *Weed Technology*, 18, 1246-1249, (2004).

“Variation in Apparent Component Digestibility of Barley in the Rat from the Core Collection of the USDA National Small Grains Collection,” C.R. Kaiser, J.G.P.

Bowman, L.M.M. Surber, T.K. Blake, and J.J. Borkowski, *Animal Feed Science and Technology*, 113, 97-112, (2004).

BOWERS, K.

“Block Matrix Sinc-Galerkin Solution of the Wind-Driven Current Problem,” S. Koonprasert and K. Bowers, *Applied Mathematics and Computation*, 155(3), 607-635, (2004).

“The Fully Sinc-Galerkin Method for Time-Dependent Boundary Conditions,” S. Koonprasert and K. Bowers, *Numerical Methods for Partial Differential Equations*, 20(4), 494-526, (2004).

CHERRY, S.

“Possible Effects of Elk Harvest on Fall Distribution of Grizzly Bears in the Greater Yellowstone Ecosystem,” M.A. Haroldson, C.C. Schwartz, S. Cherry, and D. Moody, *The Journal of Wildlife Management*, 68, 129-137, (2004).

“Use and Interpretation of Logistic Regression in Habitat-Selection Studies,” K.A. Keating and S. Cherry, *The Journal of Wildlife Management*, 68, 774-789, (2004).

ESTY, W.

“Review of ‘Grade Inflation,’” W. Esty, *The Montana Professor*, 14(2), 44-47, (2004).

GEDEON, T.

“Bifurcation Structure of a Class of S_N -Invariant Constrained Optimization Problems,” A. Parker and T. Gedeon, *Journal of Dynamics and Differential Equations*, 16 (3), 629-678, (2004).

“Finding Neural Codes Using Random Projections,” B. Mumey, A. Sarkar, T. Gedeon, A. Dimitrov, and J. Miller, in E. deSchutter (Ed) *Neurocomputing, Computational Neuroscience: Trends in Research 2004*, 58-60:19-25, (2004).

“Phase Locking in Integrate-and-Fire Models With Refractory Periods and Modulation,” T. Gedeon and M. Holzer, *Journal of Mathematical Biology*, 49(6), 577-603, (2004).

GREENWOOD, M.

“Formulary Conversion from Doxazosin to Terazosin

for the Treatment of Benign Prostatic Hyperplasia in a Small Veterans Hospital,” W. Yamreudeewong, D. McPeak, and M. Greenwood, *Hospital Pharmacy*, 39, 47-51, (2004).

HAMILTON, M.

“Comparison of Fluorescent Microscopy and Solid Phase Cytometry for Counting Bacteria in Water,” J.T. Lisle, M.A. Hamilton, A.R. Willse, and G.A. McFeters, *Applied and Environmental Microbiology*, 70(9), 5343-5348, (2004).

“Statistical Quantification of the Detachment Rates and Size Distribution of Cell Clumps from Wild Type (PAO1) and Cell Signaling Mutant (JP1) *Pseudomonas aeruginosa* Biofilms,” S. Wilson, M.A. Hamilton, G.C. Hamilton, M.R. Schurman, and P. Stoodley, *Applied and Environmental Microbiology*, 70(10), 5847-5852, (2004).

“Hypothesis for the Role of Nutrient Starvation in Biofilm Detachment,” S.M. Hunt, E.M. Werner, B. Huang, M.A. Hamilton, and P.S. Stewart, *Applied and Environmental Microbiology*, 70(12), 7418-7425, (2004).

HODGSON, T.

“An Interactive Approach to Projectile Motion,” T. Hodgson and M. Fowler, *NCTM On-Math*, http://my.nctm.org/eresources/journal_home.asp?journal_id=6, (2004).

“Water Quality Statistics,” T. Hodgson, L. Andersen, J. Robison-Cox, and C. Jones, *Teaching Statistics*, 26(1), 2-6, (2004).

“Is Mathematics Now Throughout the Curriculum? Reflections on an MATC Project,” D. Maki, B. Ng, M. Frantz, and T. Hodgson, *FOCUS*, 24(6), 26-28, (2004).

“One Egg or Two?,” P. Kehle and T. Hodgson, *COMAP Consortium* 86, 13-18, (2004).

KLAPPER, I.

“Commonality of Elastic Relaxation Times in Biofilms,” T. Shaw, M. Winston, C.J. Rupp, I. Klapper, and P. Stoodley, *Physical Review Letters* 93 098102, 1-4, (2004).

“Effect of Heterogeneous Structure in Mechanically Unstressed Biofilms on Overall Growth,” I. Klapper, *Bulletin of Mathematical Biology*, 66, 809-824, (2004).

KWAPISZ, J.

“Transfer Operator, Topological Entropy and Maximal

Measure for Cocyclic Subshifts,” J. Kwapisz, *Ergodic Theory and Dynamical Systems*, 24(4), 1173-1197, (2004).

PARKER, A.

“Bifurcation Structure of a Class of S_N -Invariant Constrained Optimization Problems,” A. Parker and T. Gedeon, *Journal of Dynamics and Differential Equations*, 16 (3), 629-678, (2004).

ROBISON-COX, J.

“Water Quality Statistics,” T. Hodgson, L. Andersen, J. Robison-Cox, and C. Jones, *Teaching Statistics*, 26(1), 2-6, (2004).

“Quantitative Evaluation of Sample Application Methods for Semipreparative Separations of Basic Proteins by Two-Dimensional Gel Electrophoresis,” R.C. Barry, B.L. Alsaker, J. Robison-Cox, and E.A. Dratz, *Electrophoresis*, 24(19-20), 3390-3404, (2004).

SHARP, J. M.

“Using the Van Hiele K-12 Geometry Learning Theory to Modify Engineering Mechanics Instruction,” J. Sharp and L.W. Zachary, *Journal of Science Engineering Mathematics and Technology Education: Innovations and Research*, 5(1-2), 35-41, (2004).

“Teachers Learning Mathematics to Modify Pedagogy,” J. Sharp and C. Ohana, *Academic Exchange Quarterly*, 8(2), 153-157, (2004).

“Thinking Engineering,” S. Martin, J. Sharp, and L. Zachary, *Science and Children*, 41(4), 18-23, (2004).

SHAW, T.

“Commonality of Elastic Relaxation Times in Biofilms,” T. Shaw, M. Winston, C.J. Rupp, I. Klapper, and P. Stoodley, *Physical Review Letters* 93 098102, 1-4, (2004).

STANLEY, L.

“Sensitivity Analysis for Actuator Placement on an Euler-Bernoulli Beam,” L. Stanley, *Proceedings of the 43rd IEEE Conference on Decision and Control*, 1532-1537, (2004).

VOGEL, C.

“Nonnegatively Constrained Convex Programming Method for Image Reconstruction,” J.M. Bardsley and C.R. Vogel, *SIAM Journal on Scientific Computing*, 25,

1326-1343, (2004).

“Sparse Matrix Methods for Wavefront Reconstruction Revisited,” C.R. Vogel, in D.B. Calia, B. L. Ellerbroek, and R. Ragazzoni (Eds), *Advancements in Adaptive Optics*, Proceedings of SPIE, 5490, 1327-1335, (2004).

PRESENTATIONS

BARBER, J.

“Hierarchical Spatial Modeling for Estimation of Population Size,” 2004 Joint Statistical Meetings, Toronto, Ontario, Canada, August 2004.

“Hierarchical Spatial Modeling for Estimation of Population Size,” Conference on New Developments of Statistical Analysis in Wildlife, Fisheries, and Ecological Research, The Fifth Winemiller Symposium, University of Missouri, Columbia, Missouri, October 2004.

BARGE, M.

“The Generalized Geometric Coincidence Conjecture and a Question of Hirsch,” Spring Topology and Dynamical Systems Conference, University of Alabama-Birmingham, Birmingham, Alabama, March 2004.

BORKOWSKI, J.

“Using Ecological Theory to Guide the Implementation of Augmentative Restoration,” Montana Weed Control Association Abstracts, Billings, Montana, January 2004.

“Using Computer Experiments to Assess the Impact of Filtering Rules on Peptide Labeling and Identification,” Pacific Northwest National Laboratory, Richland, Washington, May 2004.

“Augmentative Restoration: A Concept with Results,” Society for Ecological Restoration Abstracts, Victoria, British Columbia, Canada, August 2004.

“Using a Genetic Algorithm to Generate Mixture Designs,” 2004 Joint Statistical Meetings, Toronto, Ontario, Canada, August 2004.

“Space Filling Designs for High-Dimensional Constrained Mixture Experiments,” 2004 Fall Technical Conference, Roanoke, Virginia, October 2004.

BURKE, M.

“Technology and the Real Numbers: Studying Irrational Numbers at the High School Level, Part II,” Department of Mathematical Sciences Colloquium, University of Montana, Missoula, Montana, March 2004.

“Navigating Through Measurement in Grades 9-12,” 2004 National Council of Teachers of Mathematics Annual Meeting, Philadelphia, Pennsylvania, April 2004.

“Using *Navigations* to Deepen Understanding of Mathematical Connections,” 2004 National Council of Teachers of Mathematics Annual Meeting, Philadelphia, Pennsylvania, April 2004.

“The Mystery of the Square,” Montana Education Association/Montana Federation of Teachers Educators’ Conference, Helena, Montana, October 2004.

CHERRY, S.

“Establishing a Sampling Protocol,” Monitoring Whitebark Pine for Blister Rust: A Workshop, West Yellowstone, Montana, June 2004.

“Conceptual Framework for Monitoring Whitebark Pine in the Greater Yellowstone Network,” Greater Yellowstone Network Science Committee Meeting, Jackson, Wyoming, October 2004.

DOCKERY, J.

“Modeling Antibiotic Resistance in Biofilms,” Minisymposium on Mathematical Modelling of Biofilms, SIAM Conference on the Life Sciences, Portland, Oregon, July 2004.

ESTY, W.

“Teaching About How and Why ‘x’, ‘c’, and ‘P are used in Algebra,” Montana Education Association/Montana Federation of Teachers Educators’ Conference, Helena, Montana, October 2004.

GEDEON, T.

“Convergence of Map Seeking Circuits,” Japan-US Conference on Dynamics and Computation, Kamakura, Japan, March 2004.

“Dynamics of the NCR-Circuit,” Workshop on Dynamics, Control, and Computation in Biochemical

Networks, Banff International Research Station, Banff, Alberta, Canada, August 2004.

“Delay Model of Gene Regulation in Yeast,” Workshop on Functional Differential Equations, Banff International Research Station, Banff, Alberta, Canada, November 2004.

“Dynamics of the NCR-Circuit,” Workshop on Quantitative Mathematical Modeling of Gene Regulatory Networks, Mathematical Biosciences Institute, The Ohio State University, Columbus, Ohio, December 2004.

“Dynamics of the NCR-Circuit,” Applied Mathematics Seminar, Arizona State University, Tempe, Arizona, December 2004.

HAMILTON, M.

“Parallel Comparison of Antimicrobial Tests,” Antimicrobials Division, US Environmental Protection Agency (EPA), Arlington, Virginia, January 2004.

“Dried Surface Sporicide Tests: Collaborative Study of the Quantitative Carrier Test – Tier 1,” Biological and Economic Analysis Division, US Environmental Protection Agency (EPA), Ft. Meade, Maryland, January 2004.

“Regulatory Interactions: Working with the EPA,” CBE Technical Advisory Conference, Montana State University, Bozeman, Montana, February 2004.

“Statistical Thinking in Biofilm Research,” CBE Biofilm Methods Workshop, Montana State University, Bozeman, Montana, February 2004.

“Standardized Methods for the Biofilm Laboratory: Statistical Guidance,” CBE Technical Advisory Conference, Montana State University, Bozeman, Montana, June 2004.

“Biofilm Statistics,” Pan-American Advanced Studies Institutes (PASI) Workshops, Center for Biofilm Engineering, Montana State University, Bozeman, Montana, July 2004.

“Sporicide Efficacy Testing: Statistical Analysis of the Collaborative Study,” Interagency Expert Panel on Anthrax Test Methods and Surrogates, Ft. Meade, Maryland, August 2004.

“Parallel Testing to Determine the Influence of Biofilm Growth Conditions on Antimicrobial Log Reduction:

Preliminary Report,” Antimicrobials Division, US Environmental Protection Agency (EPA), Arlington, Virginia, September 2004.

“A Laboratory Hot Tub Model: Engineering Design, Standard Operating Procedure, and Performance Characteristics,” Antimicrobials Division, US Environmental Protection Agency (EPA), Arlington, Virginia, September 2004.

“Standard Biofilm Disinfectant Test Methods,” Symposium on Disinfectant Test Methods, AOAC International Meeting, St. Louis, Missouri, September 2004.

HASENBANK, J.

“Homework, Quizzes, and Student Motivation,” Northern Rocky Mountain Educational Research Association (NRMERA) 22nd Annual Conference, Custer, South Dakota, October 2004.

HITZEROTH, C.

“Eating Disorders: Psychological Consequences, Parental Roles, and the Cultural Spread,” 2004 Western Regional Honors Council Conference, Missoula, Montana, April 2004.

HODGSON, T.

“Building Bridges Between Middle and High School,” Spring Meeting of the Indiana Mathematics Initiative, Indianapolis, Indiana, February 2004.

“Modeling via Proportional Reasoning,” Spring Meeting of the Indiana Mathematics Initiative, Indianapolis, Indiana, February 2004.

“Striking a Balance Between Concepts and Procedures,” Montana Education Association/Montana Federation of Teachers Educators’ Conference, Helena, Montana, October 2004.

KLAPPER, I.

“Some Problems in Mathematical Biology,” Department of Mathematics, Tulane University, New Orleans, Louisiana, April 2004.

“Material Behavior of Biofilms,” Gordon Conference on Theoretical and Mathematical Biology, Tilton, New Hampshire, June 2004.

“Mechanical Properties of Biofilms,” Minisymposium

on Mathematical Modelling of Biofilms, SIAM Conference on the Life Sciences, Portland, Oregon, July 2004.

“Biofilms as Soft Materials,” Conference on Modeling of Soft Materials, Institute for Mathematics and its Applications, University of Minnesota, Minneapolis, Minnesota, September 2004.

“Biofilm Mechanics,” Applied Mathematics Seminar, Department of Mathematics, University of North Carolina, Chapel Hill, North Carolina, November 2004.

“Large Jump Asymptotics for Computations with Highly Discontinuous Coefficients,” Numerical Methods Seminar, Department of Mathematics, North Carolina State University, Raleigh, North Carolina, November 2004.

KOSIAK, J.

“Improving Student Achievement in Mathematics in Low-Income, High Minority Schools through Teacher Learning and Access to Computer Technology,” 2004 National Council of Teachers of Mathematics Research Pre-session Conference, Philadelphia, Pennsylvania, April 2004.

“Factors Influencing Professional Development for Teachers of Native American Students,” National Council of Supervisors of Mathematics Meeting, Philadelphia, Pennsylvania, April 2004.

KWAPISZ, J.

“On the Problem of Embedding Pseudo-Anosov Maps into Hyperbolic Toral Automorphisms,” Institute of Mathematics, University of Gdansk, Gdansk, Poland, June 2004.

“Geometric Coincidence Conjecture for Tiling Spaces of Unimodular Pisot Substitutions,” Dynamics Seminar, Mathematics Institute of Polish Academy of Sciences, Warsaw, Poland, June 2004.

“Geometric Coincidence Conjecture for Tiling Spaces of Unimodular Pisot Substitutions,” Algebraic and Topological Dynamics Seminar, Max-Planck-Institut, Bonn, Germany, June 2004.

“Geometric Theory of Unimodular Pisot Substitutions,” Workshop on Aperiodic Order: Dynamical Systems, Combinatorics, and Operators, Banff International Research Station, Banff, Alberta, Canada, June 2004.

LATULIPPE, C.

“An Investigation of Pre-Service Teachers’ Views on Professional Development,” Northern Rocky Mountain Educational Research Association (NRMERA) 22nd Annual Conference, Custer, South Dakota, October 2004.

LUEBECK, J.

“The On-Line Mathematics Educator: Three Models for Supporting Teachers in Practice,” Research Council on Mathematics Learning Annual Conference, Oklahoma City, Oklahoma, February 2004.

“Confronting Assessment in Mathematics: Identifying Conceptual Change in an On-Line Environment,” National Association for Research in Science Teaching, Vancouver, British Columbia, Canada, April 2004.

PAHLEVANI, F.

“Sensitivity Analysis for Flows with Respect to the Eddy Viscosity Parameter,” Western Illinois University, Macomb, Illinois, April 2004.

“Sensitivity Analysis of Flows Using the Finite Element Method,” Finite Element Circus, Pittsburgh, Pennsylvania, April 2004.

“Sensitivity Analysis of Flows with Respect to the Eddy Viscosity Parameter,” Montana State University, Bozeman, Montana, April 2004.

“Sensitivity Analysis of Eddy Viscosity Models,” University of Pittsburgh, Pittsburgh, Pennsylvania, August 2004.

PARKER, A.

“Tracking Eye Motion from Retinal Scan Data with a Map Seeking Circuit,” Controlling Eye Movements Session, Center for Adaptive Optics Fall Retreat, Lake Arrowhead, California, November 2004.

SHARP, J. L.

“Statistical Screening for Shewanella Protein Complexes,” Pacific Northwest National Laboratory, Richland, Washington, August 2004.

SHAW, T.

“Biofilm Viscoelasticity,” Minisymposium on Mathematical Modelling of Biofilms, SIAM Conference on the Life Sciences, Portland, Oregon, July 2004.

SIEGFRIED, E.

“Modeling the Response of a Cricket Afferent Neuron to Wind Stimuli,” National Conference on Undergraduate Research, Indianapolis, Indiana, April 2004.

SIMONSEN, L.

“Teacher’s Discourse Moves: A Framework for Analyzing Discourse in Mathematics Classrooms,” Center for Teaching and Learning, Colorado State University, Fort Collins, Colorado, April 2004.

“Global Climate Change and the Wildlands of Montana: Promoting Scientific Understanding for K-12 Educators,” The American Geophysical Union Fall Meeting, San Francisco, California, December 2004.

SMITH, M.

“Augmented Cohomology of Tiling Spaces,” Spring Topology and Dynamical Systems Conference, University of Alabama-Birmingham, Birmingham, Alabama, March 2004.

STANLEY, L.

“An Introduction to the Continuous Sensitivity Equation Method,” Mathematics and Computer Science Division, Argonne National Laboratory, Argonne, Illinois, March 2004.

“Using Sensitivity Equations for Optimal Actuator Placement on an Euler-Bernoulli Beam,” Minisymposium on Computational Methods for Control Design for Distributed Parameter Systems, SIAM Annual Meeting, Portland, Oregon, July 2004.

“Sensitivity Analysis for Actuator Placement on an Euler-Bernoulli Beam,” Session on Theory and Techniques for Distributed Parameter Control Design, 43rd IEEE Conference on Decision and Control (CDC), Paradise Island, Bahamas, December 2004.

TIMPANO, S.

“Modeling the Galactic Gravitational Wave Background,” 20th Pacific Coast Gravity Meeting, California Institute of Technology, Pasadena, California, March 2004.

VOGEL, C.

“Estimating Object Motion from Scanned Image Data,”

AFOSR-PRET Workshop, Maui, Hawaii, January 2004.

“Fundamentals of Computational Linear Algebra for Inverse Problems,” Adaptive Optics Workshop, UCLA Institute for Pure and Applied Mathematics, Los Angeles, California, January 2004.

“Fast Algorithms for AO Wavefront Estimation,” Lockheed Advanced Technology Center, Palo Alto, California, April 2004.

“Motion Detection and Image Dewarping in Adaptive Optics Retinal Scanning,” AFOSR Applied and Computational Math Grantees’ Meeting, Dayton, Ohio, June 2004.

“Sparse Matrix Methods for Wavefront Reconstruction,” SPIE Conference on Astronomical Telescopes and Instrumentation, Glasgow, Scotland, June 2004.

“Tracking Eye Motion From Retinal Scan Data,” Workshop on Mathematical Image Analysis and Processing, Banff International Research Station, Banff, Alberta, Canada, October 2004.

YANG, Q.

“Optimization of Bimorph Deformable Mirrors for the Hoku‘a-85 Adaptive Optics System,” Department of Physics, Michigan Technological University, Houghton, Michigan, January 2004.

“Adaptive Optics for Astronomical Telescopes,” Department of Physics, Montana State University, Bozeman, Montana, September 2004.

“Fourier-Domain Preconditioned Conjugate Gradient Algorithm for Atmospheric Tomography,” Center for Adaptive Optics Fall Retreat, Lake Arrowhead, California, November 2004.

GRANTS

A. FUNDED EXTERNAL GRANTS

ANDERSEN, L.

“Six Through Eight Mathematics Curriculum Revision Project,” NSF, PI: R. Billstein, co-PI: L. Andersen, T. Hodgson, and J. Williamson, \$1,610,000, (2002-2006).

BORKOWSKI, J.

“Evaluating the Yellowstone Grizzly Bear Cumulative Effects Model,” USGS – Interagency Grizzly Bear Study Team, PI: J.J. Borkowski, \$27,000, (2003-2004).

“Evaluating Wildlife Responses to Winter Human Use in Yellowstone National Park,” National Park Service, PI: J.J. Borkowski, \$15,000, (2003-2004).

“Evaluating Wildlife Responses to Winter Human Use in Yellowstone National Park,” National Park Service, PI: J.J. Borkowski, \$20,000, (2004-2005).

CHERRY, S.

“Evaluating Whitebark Pine Monitoring Protocols,” National Park Service, PI: S. Cherry, \$10,000, (2003-2004).

“Nonparametric Modeling of Species’ Habitat Selection Probabilities in Use-Availability Studies,” USGS, PI: S. Cherry, \$42,011, (2004-2005).

“Evaluation and Improvement of Food Monitoring Program for the Yellowstone Grizzly,” USGS – Interagency Grizzly Bear Study Team, PI: S. Cherry, \$12,000, (2004-2005).

DOCKERY, J.

“Modeling Antibiotic Susceptibility of Bacteria in Biofilm,” NIH, PI: P. Stewart, co-PI: J. Dockery, I. Klapper, and P. Stoodley, \$846,000, (2002-2006).

GEDEON, T.

“Structural and Functional Analysis of Complex Biological Systems,” NSF IGERT, PI: D. Dooley, co-PI: T. Gedeon, G. Jacobs, J. Miller, M. Pernarowski, and C. Vogel, \$2,699,300, (1999-2004).

“Topological Methods in Nonlinear Dynamics,” NSF International, co-PI: T. Gedeon, \$38,700, (2001-2004).

“Algorithms for Decoding and Modulations of Neural Spike Trains (Biological Information Technology and Systems),” NSF, PI: J. Miller, co-PI: T. Gedeon, B. Mumey, and R. Snyder, \$1,400,000, (2002-2006).

“Montana Institutional Development Award (IDeA) Network of Biological Research Excellence (INBRE),” NIH-NCRR (National Center for Research Resources), PI: Tim Ford, co-PI: Tomas Gedeon, Allen Harmsen, Brendan Mumey, Adele Pittendrigh, Martin Tientze, and

Sara Young, \$18,000,000, (2004-2009).

HAMILTON, M.

“Antimicrobial Test Methodology: Statistical Support,” EPA, PI: M. Hamilton, \$850,000, (2002-2006).

“Interdisciplinary Graduate Student Support Program,” NSF/EPSCoR, co-PI: A. Camper and M. Hamilton, \$40,000, (2002-2004).

“Research for the Manufacturing and Marketing of the Drip Flow Biofilm Reactor,” Montana Board of Commercialization and Technology, co-PI: D. Goeres and M. Hamilton, \$146,600, (2004-2005).

HODGSON, T.

“Six Through Eight Mathematics Curriculum Revision Project,” NSF, PI: R. Billstein, co-PI: L. Andersen, T. Hodgson, and J. Williamson, \$1,610,000, (2002-2006).

“Center for Teaching and Learning in the West,” NSF, PI: E. Swanson, co-PI: M. Anneking, T. Hodgson, B. Mayes, and G. Tuthill, \$9,980,000, (2001-2006).

KLAPPER, I.

“Modeling Antibiotic Susceptibility of Bacteria in Biofilm,” NIH, PI: P. Stewart, co-PI: J. Dockery, I. Klapper, and P. Stoodley, \$846,000, (2002-2006).

KWAPISZ, J.

“Torus Maps and Cocyclic Subshifts,” NSF, PI: J. Kwapisz, \$71,719, (2002-2005).

LUEBECK, J.

“Creating Opportunities in Mathematics for Exemplary Teaching (COMET),” US Department of Education Mathematics and Science Partnership Initiative, Montana Council of Teachers of Mathematics (MCTM), PI: Jean Howard (MCTM), co-PI: J. Luebeck, \$550,000, (2004-2006).

PERNAROWSKI, M.

“Structural and Functional Analysis of Complex Biological Systems,” NSF IGERT, PI: D. Dooley, co-PI: T. Gedeon, G. Jacobs, J. Miller, M. Pernarowski, and C. Vogel, \$2,699,300, (1999-2004).

ROBISON-COX, J.

“Center for Research on Chronic Health Conditions in Rural Dwellers,” National Institute for Nursing

Research, \$150,000, (2001-2006).

“From Bias to Exclusion: Why So Few Women at the Top?,” NSF, Co-PIs: R. Martell and J. Robison-Cox, \$86,819, (2003-2004).

SIMONSEN, L.

“Wildlife Education in Big Sky: Enhancing Teaching Skills Through Environmental Education in the Northern Rocky Mountains,” EPA, Environmental Education Grants Program, PI: L.J. Graumlich, Co-PI: L. Simonsen, \$57,667, (2003-2004)

“Wildlife Education in Big Sky: Enhancing Environmental Education for Montana Teachers,” Steel-Reese Foundation, PI: L.J. Graumlich, Co-PI: L. Simonsen, \$49,292, (2003-2004).

“Wildlife Education in Big Sky: Enhancing Environmental Education for Montana and Idaho’s Teachers,” Charlotte Martin Foundation, PI: L.J. Graumlich, Co-PI: L. Simonsen, \$49,292, (2003-2004)

“Wildlife Education in Big Sky: Enhancing Environmental Education for Montana and Wyoming’s Teachers,” Northern Environmental Support Trust, PI: L.J. Graumlich, Co-PI: L. Simonsen, \$15,000, (2003-2004).

STANLEY, L.

“Analysis and Computation of Shape Sensitivities for Elliptic Interface Problems,” NSF Applied Mathematics, PI: L. Stanley, \$72,832, (2000-2004).

“Sensitivity Analysis for the Optimal Design and Control of Advanced Guidance Systems,” DEPSCoR/AFOSR, PI: L. Stanley, \$750,000, (2003-2006).

VOGEL, C.

“Computational Methods in Advanced Imaging Sciences,” DEPSCoR/AFOSR, PI: C.R. Vogel, \$462,679, (2002-2005).

“Analysis, Modeling, and Simulation of Adaptive Optics Systems for Extremely Large Telescopes,” Center for Adaptive Optics, PI: D. Gavel, co-PI: C.R. Vogel, \$500,000, (2002-2004).

“Structural and Functional Analysis of Complex Biological Systems,” NSF IGERT, PI: D. Dooley, co-PI: T. Gedeon, G. Jacobs, J. Miller, M. Pernarowski, and C. Vogel, \$2,699,300, (1999-2004).

“Inverse Problems in Neurobiological Imaging,” NSF/EPSCoR, PI: C.R. Vogel, Co-PI: J. Miller, \$20,000, (2004-2005).

“Motion Tracking and Dewarping for Adaptive Optics Scanning Laser Ophthalmoscopy,” Center for Adaptive Optics, PI: C.R. Vogel, \$44,219, (2004-2005).

“Software for Adaptive Optics Scanning Laser Ophthalmoscopy (AOSLO) Retinal Tracking and Image Dewarping,” Bio-Engineering Research Partnership at the Center for Visual Science, NIH-NSF, co-PI: C. R. Vogel, \$14,793, (2004).

B. FUNDED INTERNAL GRANTS

BOIK, R.

“Exploratory and Confirmatory Principal Components and Influence Diagnostics for Principal Components,” BEST Award, \$6,600, (2004).

LUEBECK, J.

“Instructor Interventions on Conceptual Change and the Effectiveness of the Mathematics and Science Partnership (MSP),” BEST Award, \$4,500, (2004).

SOJDA, M.

“GTA Teaching Workshop,” Provost’s Office, \$1,000, (2004).