The Department of Mathematical Sciences hosted Computation, Control, & Biological Systems VIII, July 29 - August 1, an international conference involving over 40 mathematicians and scientists from around the world, organized by Professors Lisa Stanley and Isaac Klapper.

Graduate student Erin Austin was selected as the Outstanding Graduate Teaching Assistant in the College of Letters of Science.

Professor Emeritus Ken Tiahrt received the first ever Chapter Service Award from the Montana Chapter of the American Statistical Association.

The Department of Mathematical Sciences delivered 10% of the total student credit hours at MSU last year.

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**Highlights**

- Books: 1
- Book Chapters: 6
- Refereed Articles: 35
- Presentations: 78
- FTE Faculty: 31
- Majors: 175
- Grant Expenditures: $402,106

**Summary**

**Teaching**

The Department of Mathematical Sciences delivered about 10% of the total student credit hours at MSU last year. We have 133 undergraduate majors seeking a B.S. degree in one of four options (Applied Mathematics, Mathematics, Mathematics Teaching, Statistics). In addition we have 67 M.S. students and 23 Ph.D. candidates. At the 2003 commencement exercises, the department awarded 31 Bachelor of Science degrees. Among our graduates were nine students who graduated with highest honors, seven who graduated with honors, and two who completed the University Honors Program. Also awarded were 22 Master of Science degrees, six Doctor of Philosophy degrees, and one Doctor of Education degree.

Our students have received several awards this year. Jared Barber, Benjamin Bartle, John Cross, Charlie Doughty, Kori Smith, and Matthew Welch were Presidential Scholars. Jared Barber and Charlie Doughty were selected for the MSU Alumni Association and Bozeman Area Chamber of Commerce Awards for Excellence. Charlie Doughty was inducted into Septemviri and also received the Christy Scholarship. Erin Austin was selected as the Outstanding GTA in the College of Letters of Science.

**Research**

Faculty in the Department of Mathematical Sciences have had a productive year in advancing their research programs. Our faculty are involved in numerous interdisciplinary research programs including 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 Solar Physics Group, the Systemic Initiative in Montana Mathematics and Science (SIMMS), and the Western Transportation...

Several faculty were invited to give international lectures this year. Warren Esty spoke in Madrid, Spain. Tomas Gedeon was invited to the United Kingdom and gave lectures at Oxford University and the University of Southampton. He also gave a talk in Whistler, British Columbia while Marty Hamilton spoke in Victoria, British Columbia. Isaac Klapper gave lectures in Sydney, Australia, and both Montreal and Banff, Canada. Jarek Kwapisz spoke at Université Joseph Fourier, Grenoble, France and Centre d'Orsay, Université Paris-Sud, Paris, France. Jim Robison-Cox spoke at the Technische Universität, Wien, Vienna, Austria. Linda Simonsen spoke in Kiel, Germany. Curt Vogel spoke at the Australian National University in Canberra, Australia. Of more local interest, both John Borkowski and Steve Cherry, have begun separate funded research projects with the US Geological Survey concerning wildlife habitat in and around Yellowstone National Park. Each also has a separate funded project with the National Park Service involving habitat studies in Yellowstone. Lisa Stanley has begun a large Air Force funded project involving control and guidance of unmanned air vehicles while Curt Vogel continues funded work with the Air Force on atmospheric optics and giant telescopes. Finally, Maurice Burke is the editor of four books in the Navigations Series for the National Council of Teachers of Mathematics.

This year, Marcy Barge's Ph.D. student, Yurii Shvetsov, finished his degree. John Borkowski had two Ph.D. students finish. Boonorm Chomtee is now a professor in Thailand and Phil Turk also accepted a faculty position. Sanoe Koonprasert finished his Ph.D. under the direction of Ken Bowers and is now an Assistant Professor at King Mongkut's Institute of Technology in Bangkok, Thailand. Tomas Gedeon's Ph.D. student, Al Parker, finished his degree. Tomas also worked with Colette Campion, Matt Holzer, and Eric Siegfried on Undergraduate Scholars Program funded research projects. Ted Hodgson's doctoral student Kate Riley, finished and is now an Assistant Professor of Mathematics Education at Cal Poly at San Luis Obispo. Isaac Klapper directed Todd Shaw in a graduate research project involving biofilm modeling. Mark Pernarowski's Ph.D. student Roger Griffiths finished and has accepted a job as Assistant Professor of Mathematics at Mercyhurst College in Erie, Pennsylvania. Lisa Stanley directed Michael Larkin in a graduate research project involving unmanned air vehicles and worked with Chris Dagel on an undergraduate research project in engineering design. Curt Vogel directed a team including postdoc, Mike Flanagan, and two graduate students, Mark Campanelli and Jennifer Thorenson, that investigated 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. Lyle Andersen is a consultant to the tribal colleges in Montana and to the American Indian Science Engineering Society (AISES). Maurice Burke is on the Mathematics Standards Review Committee, convened by the Superintendent of Public Instruction. For the Montana Chapter of the American Statistical Association, Marty Hamilton was the President, Sherry Heis was the Secretary/Treasurer and John Borkowski was the Chapter Representative. Ted Hodgson is on the Mathematics Technology in Assessment Subcommittee convened by the Superintendent of Public Instruction while Ted and Linda Simonsen were 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 Associate Editor for Psychometrika and 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 both The Teacher's Teaching with Technology Program and the SIMMS-IM Dissemination Grant. Mark Pernarowski
served on an NSF-ITR review panel in computational biology. Linda Simonsen is part of the DFG/NSF (Germany and the United States) Mathematics and Science Education Research Group and also served on the Advisory Board for the Metro Math NSF Center in Philadelphia.

PUBLICATIONS

A. BOOKS / EDITED COLLECTIONS / FULL-LENGTH WORKS

HAMILTON, M.


B. BOOK CHAPTERS

ANDERSEN, L.


HODGSON, T.


LUEBECK, J.


SHARP, J.


SIMONSEN, L.


C. REFEREED JOURNAL PIECES

BANFIELD, J.


BARGE, M.


BOIK, R.


BORKOWSKI, J.


ESTY, W.


GEDEON, T.


GILLES, L.


HAMILTON, M.


HOLZER, M.

KIRKPATRICK, K.

KLAPPER, I.

KWAPISZ, J.

PARKER, A.


PERNAROWSKI, M.
SHARP, J.


“Using a Pattern Table to Solve Contextualized Proportions Problems,” J. Sharp and B. Adams, Mathematics Teaching in the Middle School, 8(8), 432-441, (2003).

SIMONSEN, L.


STANLEY, L.


VOGEL, C.


PRESENTATIONS

ANDERSEN, L.


“Looking to the Past as We Plan for the Future in Mathematics Education: The Role of Technology in Math Education,” North Dakota College Mathematics Teachers’ Group, Hankinson, North Dakota, October 2003.

BORKOWSKI, J.


BURKE, M.


“Navigating Through Algebra in Grades 9-12,” Western Regional Conference of the National Council of Teachers of Mathematics Colloquium, Salt Lake City, Utah, October 2003.

“Navigating Through Measurement in Grades 9-12,” Western Regional Conference of the National Council of Teachers of Mathematics, Salt Lake City, Utah, October 2003.

“Using Technology to Study the Irrational Numbers,” Mathematics Department Colloquium, Weber State University, Ogden, Utah, October 2003.

CHERRY, S.


DOCKERY, J.


EGUCHI, T.


ESTY, W.


GEDEON, T.

“Mathematical Properties of Information Distortion,” Neural Coding Workshop, Mathematical Biosciences Institute, The Ohio State University, Columbus, Ohio, February 2003.


“Symmetry Breaking Bifurcations, Normalized Cuts and the Neural Coding Problem,” Workshop on Nonlinear Dynamics and Life Sciences, University of Southampton, United Kingdom, October 2003.


HAMILTON, M.


HODGSON, T.


“Just What is Appropriate Use of Technology?,” Annual Meeting of the Montana Education Association/Montana Federation of Teachers, Billings, Montana, October 2003.

HOLZER, M.


HYDE, S.


KLAPPER, I.


“Collaborating for Effective Professional Development in Mathematics and Science Education in Rural Reservation Schools,” American Indian Higher Education Consortium, Fargo, North Dakota, April 2003.

KWAPISZ, J.


LUEBECK, J.


PARKER, A.


"Solving the Neural Coding Problem using Bifurcation Theory," Computation, Control, and Biological Systems VIII, Montana State University, Bozeman, Montana, July 2003.


PERNAROWSKI, M.

“Return Map Characterizations for a Model of Bursting with Two Slow Variables,” Department of Mathematics Colloquium, University of Montana, Missoula, Montana, October 2003.

RILEY, K.

“An Investigation of Prospective Secondary Mathematics Teachers’ Conceptions of Proof,”


ROBISON-COX, J.


SHARP, J.


SHAW, T.


SHVETSOV, Y.


SIMONSEN, L.


STANLEY, L.


VOGEL, C.


“Multiconjugate Adaptive Optics,” Computation, Control, and Biological Systems VIII, Montana State
University, Bozeman, Montana, July 2003.


<table>
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KWAPISZ, J.

PERNAROWSKI, M.

ROBISON-COX, J.


SHARP, J.

SIMONSEN, L.


STANLEY, L.

VOGEL, C.
"Summer Internship with the College of Optometry at the University of Houston," Center for Adaptive Optics MiniGrant, $2,100, (2003).
B. FUNDED INTERNAL GRANTS

KLAPPER, I.
“Biofilm Mechanics,” BEST Award, $6,600, (2003).

KWAPISZ, J.
“X-Ray and Dynamical Spectra of Substitution Tilings,”
BEST Award, $6,600, (2003).

SOJDA, M.
“GTA Teaching Workshop,” Provost’s Office, $3,000,
(2003).