Undergraduate major Markus Hybner received an Award for Excellence and Benjamin Bartle was elected to mortar board.

Graduate student Jerome Trouba was selected as the Outstanding Graduate Teaching Assistant in the College of Letters of Science.

Professor John Lund received an Award for Excellence.

Professor Mark Pernarowski was the College of Letters and Science Outstanding Teacher.

Professor John Borkowski was one of four inaugural College of Letters and Science Distinguished Professors.

Of 128 undergraduate majors, 5 were Presidential Scholars and 20 were in the Honors Program.

### Highlights

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<td>Majors</td>
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### Summary

**TEACHING**

The Department of Mathematical Sciences delivered about 10% of the total student credit hours at MSU last year. We have 128 undergraduate majors seeking a B.S. degree in one of four options (Applied Mathematics, Mathematics, Mathematics Teaching, Statistics). In addition we have 86 M.S. students and 33 Ph.D. candidates. In 2006, the department awarded 27 Bachelor of Science degrees. Among these B.S. degrees were 4 who graduated with highest honors, seven who graduated with honors, and one who completed the University Honors Program. Also awarded in 2006 were 21 Master of Science degrees, three Doctor of Philosophy degrees, and one Doctor of Education degree.

Our students have received several awards this year. Benjamin Bartle, Matthew Beamer, Kevin Rice, Kori Smith, and Matthew Welch were Presidential Scholars. Tess Ritter was a Provost Scholar. Benjamin Bartle was selected as a member of Mortar Board. Markus Hybner received a Bozeman Area Chamber of Commerce and MSU Alumni Association Award for Excellence.

Jerome Trouba was honored as the Outstanding GTA in the College of Letters of Science, the fourth year in a row that this award went to a GTA in our department. Shane Nowack and Cindi Van Deventer were departmental Outstanding GTAs. Professor John Lund received the Bozeman Area Chamber of Commerce and MSU Alumni Association Award for Excellence. Professor Mark Pernarowski was recognized as the College of Letters and Science Outstanding Teacher.

**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 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 Big Sky Institute (BSI), the State of Montana Fish, Wildlife, & Parks Service, the US Geological Survey (USGS), Yellowstone National Park, and the Western Transportation Institute (WTI). Cooperative on-campus projects involved the departments of Agricultural Economics & Economics, 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. Marcy Barge spoke at the Generalized Substitutions, Tilings, and Numeration Conference in Marseille, France as well as at Delft University in Delft, Netherlands. John Borkowski was a Visiting Professor of Statistics in the Department of Mathematics and Statistics at Thammasat University in Bangkok, Thailand and gave addresses at the 2006 Conference on Applied Statistics in Pattaya Cholburee, Thailand; ICAQM 2006 in Taipei, Taiwan; Kasetsart University, Thailand; and Chaing Mai University, Thailand. Jack Dockery gave talks in Kyoto, Japan and Malmo University, Sweden. Tomas Gedeon spoke at the AIMS Annual Conference in Poitier, France. Isaac Klapper spoke at Malmo University, in Malmo, Sweden; Exeter University in the United Kingdom; and the Nordita/Neils Bohr Institute for Physics in Copenhagen, Denmark. Jarek Kwapisz spoke at the Mathematics of Fractals Conference at Kyoto University, Kyoto, Japan. Of more local interest, Steve Cherry continued a funded research project with the US Geological Survey concerning wildlife habitat in and around Yellowstone National Park. John Borkowski and Steve Cherry both have separate funded projects with the National Park Service involving habitat studies in Yellowstone. The last two of the four books in the Navigations Series for the National Council of Teachers of Mathematics were edited by Maurice Burke and appeared in print this year.

Steve Cherry is a member of the Interagency Grizzly Bear Study Team, the Northern Yellowstone Carnivore Working Group, and the Whitebark Pine Monitoring Working Group. Tomas Gedeon worked on the five-year, $18,000,000 INBRE grant, involved with bioinformatics; continued work on a $599,634 National Science Foundation grant on optimal sensor receptor arrays; and completed a $157,263 NSF/NIH grant to study NCR-circuit dynamics. Jennie Luebeck continued work on the $550,000 DOE-funded Creating Opportunities in Mathematics for Exemplary Teaching (COMET) project, for which she serves as the Evaluation Director. Lisa Davis continued her work on a large Air Force funded project concerning advanced guidance systems. Linda Simonsen continued work on the Big Sky Institute GK-12 project, a $1,768,000 NSF grant. Curt Vogel was funded by NSF on a project involving adaptive optics scanning laser ophthalmoscopy and The Optical Sciences Company on a project involving thirty meter telescopes.

This year, Tomas Gedeon’s Ph.D. student, Christina Hayes, finished her degree and is now teaching at Gettysburg College in Gettysburg, Pennsylvania. Lisa Davis directed a team involving postdocs, Faranak Pahlevani and John Singler, and graduate student, Jennifer Thorenson, that investigated unmanned air vehicles. Tomas Gedeon worked with graduate students Bree Cummins, Shaun Harker, and Kate Rardin on computational neuroscience. Jon Hasenbank completed his Ph.D. under Ted Hodgson and took a faculty position at the University of Wisconsin-LaCrosse in LaCrosse, Wisconsin. Isaac Klapper’s Ph.D. student, Barbara Szomolay, finished her degree and received a postdoctoral appointment at the Ohio State University. Curt Vogel and his postdoc, Qing Yang, 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. Steve Cherry served on the General Education Council for the
Commissioner of Higher Education. Warren Esty is on the Mathematics Higher Education Transfer Steering Committee, convened by the Commissioner of Higher Education and the P-20 Assessment Task Force, convened by the Montana Board of Regents. For the Montana Chapter of the American Statistical Association, Sherry Heis was the Secretary/Treasurer, Mark Greenwood was the President, and Jarrett Barber was the Chapter Representative. Jennie Luebeck was on both the Board of Directors of the Montana Council of Teachers of Mathematics and the Board of Directors of the Montana Learning Center for Mathematics and Science. Linda Simonsen served on the Fellow Selection Committee for both the Big Sky Institute for Science and Natural History and the Center for Learning and Teaching in the West.

Beyond the borders of Montana, several faculty contribute to their profession in a variety of ways. Robert Boik is an Editorial Board member for Psychological Methods. John Borkowski is an Associate Editor for both The American Statistician and the Journal of Probability and Statistical Science. Maurice Burke is the Chair of the National Advisory Board for the SIMMS-IM Dissemination Grant. Tomas Gedeon is an Associate Editor for the Rocky Mountain Journal of Mathematics. Ted Hodgson supervises the E-Teaching Tools section of the online journal, On-Math. Linda Simonsen is the co-editor of Connecting Research to Teaching for the Mathematics Teacher and served on the Advisory Board for the Metro Math NSF Center in Philadelphia, Pennsylvania.

A. BOOKS / EDITED COLLECTIONS / FULL-LENGTH WORKS

BURKE, M.


ESTY, W.


HODGSON, T.


B. TECHNICAL MANUSCRIPTS

BAKER, A.


BOIK, R.

Notes for Multivariate Analysis I, R. Boik, Department of Mathematical Sciences, Montana State University, Bozeman, Montana, (2006).

Notes for Advanced Mathematical Statistics, R. Boik, Department of Mathematical Sciences, Montana State University, Bozeman, Montana, (2006).

BORKOWSKI, J.


CHERRY, S.


ROBINSON-COX, J.


C. REFEREED JOURNAL ARTICLES

BAKER, V.


BANFIELD, J.


BARGE, M.


BOIK, R.


BORKOWSKI, J.


CHERRY, S.


DOCKERY, J.


ESTY, W.


GEDEON, T.


GREENWOOD, M.


HAALAND, B.


HAMILTON, M.


HODGSON, T.


KLAPPER, I.


KWAPISZ, J.


LUEBECK, J.


“Meeting in the Middle: Grades 6-8 Mathematics for Elementary and Secondary Majors,” J. Luebeck, chapter in the monograph *Preparing Future Science and Mathematics Teachers*.

PARKER, A.


PERNAROWSKI, M.


ROBINSON-COX, J.


SHARP, J.L.


VOGEL, C.


WELDER, R.


YANG, Q.


**PRESENTATIONS**

BARGE, M.


BORKOWSKI, J.


“Space Filling Designs for High-Dimensional Mixture Experiments with Multiple Component Constraints,” Kasetsart University, Bangkok, Thailand, June 2006.


“Space Filling Designs for High-Dimensional Mixture Experiments with Multiple Component Constraints,” Thammasat University, Bangkok, Thailand, Sept. 2006.


BURKE, M.


CHERRY, S.


DAVIS, L.

“Sensitivity Analysis and Control Systems Governed by...


DOCKERY, J.


“Opponent for Erik Alpkvist, PhD Candidate at Lund University,” Malmo University, Malmo, Sweden, December 2006.


ESTY, W.


“Explaining Variables and Their Uses,” Montana Education Association/Montana Federation of Teachers Educators’ Conference, Billings, Montana, October 2006.

GEDEON, T.


GREENWOOD, M.


HAMILTON, M.


HODGSON, T.


“Modeling in the Middle Grades,” Indiana Mathematics Initiative Workshop for Teachers in Grades 5-8, Terre Haute, Indiana, February 2006.
“Activities that Integrate Mathematics and Art,” 2006 Annual Meeting of the National Council of Teachers of Mathematics, St. Louis, Missouri, April 2006.


KLAPPER, I.


“Biofilms as Materials,” Applied Mathematics Seminar, Department of Mathematics, Exeter University, Exeter, United Kingdom, February 2006.

“Biofilms as Materials,” Biocomplexity Seminar, Nordita/Neils Bohr Institute for Physics, Copenhagen, Denmark, February 2006.


“Large Jump Asymptotics for Computations with Highly Discontinuous Coefficients,” Level Set Collective, Department of Mathematics, University of California at Los Angeles, Los Angeles, California, April 2006.


“A Physical View of Biofilm Structure,” Colloquium, Mathematical Biology Institute, Ohio State University, Columbus, Ohio, November 2006.

KWAPISZ, J.


LUEBECK, J.


PERNAROWSKI, M.

“Map Characterizations of a Model of Bursting Exhibiting Bistability,” Origin and Regulation of Bursting Activity in Neurons, Georgia State University, Atlanta, Georgia, April 2006.

SHARP, J.L.

“Inferring Protein-Protein Associations Using Pull-down Assay Experiments,” Clemson University, Clemson, South Carolina, November, 2006.


“Computational Approaches for Aggregating and Scoring Protein-Protein Interaction Data.” Genomes to Life Contractor-Grantee Workshop IV, North Bethesda, Maryland, February, 2006.

VOGEL, C.


“Retinal Stimulus Delivery Project,” University of California at Berkeley, Berkeley, California, January 2006.

“Data Driven Modeling and Analysis,” Meeting for the


“MEMS Device Modeling and Control,” ECE Department Colloquium, University of California Santa Cruz, Santa Cruz, California, February 2006.


WELDER, R.


A. FUNDED EXTERNAL GRANTS

ANDERSEN, L.


BORKOWSKI, J.


CHERRY, S.


DAVIS, L.


DOCKERY, J.


GEDEON, T.


HAMILTON, M.


HODGSON, T.


KLAPPER, I.


KWAPISZ, J.


LUEBECK, J.


SIMONSEN, L.


VOGEL, C.


B. FUNDED INTERNAL GRANTS

BARGE, M.


BORKOWSKI, J.


“Proposal for Establishing Collaborative Research with Faculty and Doctoral Students at Thammasat University in Thailand to Enhance Recruitment of Doctoral Students for MSU’s Doctoral Program,” MSU Faculty International Research and Development Program, PI: J. Borkowski, $1,500, (2006).

SIMONSEN, L.

“Content in Online Mathematical Discourse,” BEST Award, $7,000, (2006).