

COLLEGE OF SCIENCE, ENGINEERING AND TECHNOLOGY
JUNE/JULY/AUGUST 2007

GOOD NEWS

BIOLOGICAL SCIENCES

Ruhland, C.T., Fogal*, M.J., Buyarski*, C.R. and M.A. Krna[†]. (2007) Solar ultraviolet-B radiation increases total phenolic content and ferric-reducing antioxidant power (FRAP) in *Avena sativa*. *Molecules* 12: 1220-1232.

Dr. Dorothy Wrigley, Professor, presented a research poster at the annual Society for Industrial Microbiology meeting July 29 in Denver. Coauthors for "Evidence that *Bacillus cereus* resistance to nisin involves interactions between cells" were MSU alumnae Mansoorah Khaliq (BS '02, MS '04) (now at Perdue U) and Robert Tymchuk (BS'07).

CHEMISTRY AND GEOLOGY

Dr. Danae R. Quirk Dorr coauthored "Nitrogen mustard-induced cross-linking of the human DNA repair protein alkylguanine DNA alkyltransferase to its DNA substrate", a poster presentation. (abstract # TOXI 038) that was given at the 234th American Chemical Society National Meeting in Boston, MA. The other authors include: R. Loeber, M. Goggins, A. Pegg, and N. Tretyakova.

Dr. Danae R. Quirk Dorr wrote the Student Study Guide and Solutions Manual along with the Instructor's Manual for the 6th Edition of General, Organic and Biochemistry (McGraw Hill) in collaboration with authors of the text, Kate Denniston and Joe Topping.

James Bailey (Political Science and Law Enforcement) and **Daniel Swart**, Assistant Professor, presented *Blood Stained Footwear Impressions: Leuco Crystal Violet Development Compared to Digital Infrared Photography* at the 9th Indo-Pacific Congress on Legal Medicine & Forensic Science in July 2007 in Colombo, Sri Lanka.

James Bailey (Political Science and Law Enforcement), **Daniel Swart** (Chemistry and Geology), and Heather Finch (Chemistry Alumnus) published the following: Bailey, J.A., Swart, D.J., Finch, H.L., "Limit of Detection with Sodium Rhodizonate: Bullet Wipe Patterns with Selected Ammunition Examined for Lead," *AFTE Journal*, Vol. 39, No. 2, 2007, pp. 95-99.

COMPUTER SCIENCE

Manning, Anna M., **David J. Haglin** and John A. Keane, "A Recursive Search Algorithm for Statistical Disclosure Assessment," *Data Mining and Knowledge Discovery*, in press. ISI Impact Factor (2006): 2.295

Dr. Rebecca Bates, Associate Professor, had the following conference paper published: C. Allendoerfer, S. Jones, J. Hernandez, R. Bates, R. Adams, "Diversity in Engineering Education Research: Insights from Three Study Designs", Proc. ASEE Annual Conference & Exposition, 2007.

Dr. Bates taught the Project Lead the Way Gateway to Technology curriculum to Minnesota middle school teachers at St. Cloud State University from June 17-29, 2007.

Dr. Rebecca Bates and Nancy Drescher of English have the paper "Linguistic Construction of Identity" accepted at the Conference on Culture, Language, and Social Practice in Boulder, Colorado, October 5-7, 2007.

Dr. Rebecca Bates has the following special session accepted at the Frontiers in Education conference in Milwaukee, WI, October 10-13, 2007. "Special Session - Communities of Practice: How Do We Investigate Diversity and Global Engineering?" C. Allendoerfer, R. Bates, K. High, L. Meadows, K. Masters, C. Stwalley and R. Adams are the session planners. During this session, she will present her own work on developing a research study to look at learning styles in engineering education.

ELECTRICAL AND COMPUTER ENGINEERING AND TECHNOLOGY

Dr. Qun Zhang, Assistant Professor, submitted an NSF CCLI proposal (PI, "Developing and Evaluating GUI based Open-Source Simulation Software for Teaching Fiber Optic Communication System Course").

Dr. Zhang presented and published two research papers in IEEE LEOS (Laser and Electro Optics Society) Summer Topical Meetings (Topics: Ultra-high Data-rate ($\geq 80\text{Gb/s}$) Transmissions), Portland, Oregon

Q. Zhang and C. R. Menyuk, "An exact analysis of RZ- vs. NRZ-DPSK performance in ASE noise limited high speed optical systems", pp 242-243, Proceedings of IEEE LEOS (Laser and Electro Optics Society) Summer Topical Meetings, Portland, Oregon, July 2007.

Q. Zhang, A. Rahman, **M. A. Khaliq**, **H-W Huang** and R. Sultana, "Exact BER calculation and performance optimization for 80 Gb/s NRZ-DPSK transceiver with pre-emphasized electrical signal driving path", pp 260-261, Proceedings of IEEE LEOS (laser and electro optics society) Summer Topical Meetings, , Portland, Oregon, July 2007

Q. Zhang and M. Imran Hayee, "Symmetrized SSF scheme to control global simulation accuracy in fiber optic communication systems", paper submitted in Dec. 2006, revised paper finished and submitted in July and August 2007 (two rounds of revisions and submissions), under review, IEEE/OSA(Optical Society of America) Journal of Lightwave Technology.

Q. Zhang and H-W Huang, "On the use of Gaussian approximation for reliable performance evaluation in optical DPSK systems", paper submitted on Aug. 17, 2007, under review, International Journal of Performance Engineering.

INFORMATION SYSTEMS AND TECHNOLOGY

In July 2007, Dr. Christophe Veltsos, Assistant Professor, qualified as a Certified Information Systems Security Professional (CISSP). The CISSP is the most sought after information security certification and was the first such certification to be approved by the International Standards Organization (ISO).

The CISSP achievement is part of a continued specialization in information security. In February 2007, Dr. Veltsos joined the Minnesota chapter of the FBI Infragard®, a public/private cooperative effort dedicated to improving our national security. During the summer of 2007 he was a Field Assessor for the MnSCU Information Security Assessment Project, a state-wide effort in assessing and improving the information security posture of colleges and universities in Minnesota.

Dr. Veltsos is a member of the International Information Systems Security Certification Consortium, the Information Systems Security Association, the Business Continuity Planners Association, and a longstanding member of the Association of Computing Machinery and the Institute of Electrical and Electronic Engineers.

Dr. Mike Wells, Professor, received Research and Sponsored Program's Excellence Award for the contract negotiated with Maverick Software Consulting to establish Project Maverick. The Excellence Award goes to the grant or contract recovering the largest indirect cost for the university.

Dr. Wells was appointed to the MSU Research Graduate Faculty by the College of Graduate Studies.

On August 15, the one year anniversary of starting Project Maverick, the Information Systems & Technology Department recognized Martin Hebig, President of Maverick Software Consulting, for "Exceptional Support of Minnesota State Mankato" for his vision, entrepreneurship, and support of MSU students through Project Maverick.

Also on August 15, the Information Systems & Technology Department recognized Thomson Corporation as an "Outstanding Industry Partner" for its longstanding commitment, support and recruitment of Minnesota State Mankato students through Project Maverick. These awards were made in conjunction with student presentations highlighting projects completed while working on Project Maverick. The presentations were given to Thomson West staff, managers, directors, and vice presidents; including senior VP and Chief Technology Officer of Thomson West, Ken Ross.

The Information Systems & Technology Department recognized Brown Printing Company as "Outstanding Industry Partner" for its innovative approach, recruitment, and longstanding commitment to Minnesota State Mankato students through the Brown Technology Campus Cooperative.

Brown Printing Company started three scholarships through the Information Systems & Technology Department. These scholarships will be awarded beginning spring semester this academic year.

INTERIOR DESIGN AND CONSTRUCTION MANAGEMENT

Dr. Scott Fee, Assistant Professor, spent seven weeks in South Africa helping establish the Eden Rural Enterprise Campus, Africa's first green business school. Founded in 2006 in the small, rural, apartheid-era town of Karatara (kuh-RAH-truh), the school's mission is to show students from surrounding communities how to start, run and create wealth from small, sustainable entrepreneurial enterprises while practicing responsible stewardship of the natural environment. The goal for the next decade is to replicate the campus model throughout rural southern Africa and create what has never existed in this part of the world – a middle class.

MATHEMATICS AND STATISTICS

A paper entitled "Critical Sets of Inertias for Matrix Patterns" by Dr. I.-J. Kim, Assistant Professor, has been accepted by the journal of Linear and Multilinear Algebra. This is a joint work with Drs. Olesky and van den Driessche at the University of Victoria, Canada, and the work of Dr. Kim was supported in part by a Faculty Research Grant from MSU.

Dr. I.-J. Kim made two research trips to the University of Wyoming this summer, from May 20 to May 26 and from August 13 to August 19. Each trip resulted in a co-authored paper with Dr. B.L. Shader at the University of Wyoming, submitted to a peer-reviewed journal. During the second trip to the University of Wyoming in August, Dr. Kim also developed research projects on sign patterns and graphs with Dr. Shader and researchers from Canada and the Netherlands.

Dr. I.-J. Kim attended New Directions Short Course on Compressive Sampling and Frontiers in Signal Processing from June 4 to 15 at the Institute for Mathematics and Its Applications (IMA). Dr. Kim received full travel and lodging support during the workshop from IMA. The lectures and group presentations (by participants) are available at <http://www.ima.umn.edu/2006-2007/ND6.4-15.07/>.

Drs. Jin Park, Assistant Professor, and Namyong Lee, Associate Professor, made a presentation/publication at CANCAM 2007 (21st Canadian Congress of Applied Mechanics), Toronto Canada: Park, J. Y. and Lee, N., "A Micromechanical Modeling Technique Applied to Pultruded Composites Containing Clay Particles," Proceedings of CANCAM 2007, Toronto, Canada, 2007.

A paper submitted by Dr. Jin Park and his graduate students, Timothy Fay and Tye Davis, was accepted by ASME International Congress 2007 as a full technical paper: Park, J. Y., Fay, T. and Davis, T., " A Study on Clay Particle Effect to the Mechanical Properties of Polymer Composites under Shear Loading," ASME International Congress and Exposition, Seattle, WA, 2007.

Mezbahur Rahman, Larry M. Pearson and Uros R. Martinovic (2007). "Method of Product Spacings in the Two-Parameter Gamma Distribution". Forthcoming: Journal of Statistical Research.

Mezbahur Rahman and Rumanur Rahman (2007). "Testing the Center Using Median", Forthcoming: International Journal of Statistical Sciences.

Mezbahur Rahman and Larry M. Pearson (2007). "A Note on the Modified Box-Cox Transformation". Festschrift in Honor of Distinguished Professor Mir Masoom Ali, Ball State University, Indiana, 106-115.

Presentations:

Mezbahur Rahman and Larry M. Pearson (2007). "A Note on the Modified Box-Cox Transformation". Conference in Honor of Distinguished Professor Mir Masoom Ali, Ball State University, Indiana, May 18-19.

Dr. Christopher Danielson, Assistant Professor, had a paper accepted by Mathematics Teacher for a focus issue on student learning of probability: Danielson, C. & Jenson, E. (In press). Probability in practice: The case of turkey Bingo. *Mathematics Teacher*.

Dr. Deepak Sanjel, Assistant Professor, organized and conducted a one day workshop on "Data Analysis Using SPSS " on Friday, May 25 9:00 am to 3:00pm. Registered: 34 (Faculty-21, Student-9, Staff-4); Participated: 22 (Faculty-14, Student-5, Staff-3)

Dr. Sanjel presented a poster session at United States Conference on Teaching Statistics. Ohio State University, May 17-19 2007. Title: Using Web Technology Desire2Learn (D2L) in Teaching Statistics.

Dr. Chia-chi Tung, "Semi-harmonicity, integral means and Euler type vector fields", Advances in Applied Clifford Algebras, vol. 17 (2007), 555-573 (<http://dx.doi.org/10.1007/s00006-007-0036-9>).

MECHANICAL AND CIVIL ENGINEERING

Dr. Aaron Budge, Assistant Professor, was invited to direct a portion of the field testing associated with the Pile Driving Contractors Association (PDCA) Professors' Driven Pile Institute, held in June in Logan, Utah. Professors from throughout the United States were treated to five days of intensive lectures and field exercises, which exposed them to driven pile design and design considerations, pile types, static analysis of pile groups, and other related topics.

Dr. Budge directed the lateral load testing segment of the field testing and provided the data collected to the participants.

Dr. Budge was selected to participate for a second year as an Assistant Mentor in the ExCEED Teaching Workshop, sponsored by the American Society of Civil Engineers. ExCEED is an acronym for Excellence in Civil Engineering Education. The workshop trains civil engineering faculty from throughout the nation to become more effective teachers. Mentors and Assistant Mentors involved in the program provide instruction to workshop participants, providing feedback and support to the faculty during the week-long workshop. The ExCEED program was held at the Northern Arizona University in Flagstaff, AZ during July.

Dr. Aaron Budge attended the Education Committee meeting for the Technical Council on Computing and Information Technology (TCCIT) of the American Society of Civil Engineers held at Carnegie Mellon University in Pittsburgh in July. After serving on the committee during the previous year, he was nominated and elected as secretary of this committee for the upcoming term.

Dr. Budge has been awarded two research contracts with the Minnesota Department of Transportation, each relating to driven pile foundation design and construction. One project began this summer and will be a joint effort involving MSU Mankato, the University of Massachusetts – Lowell, and Utah State University. The second project is a part of the Crosstown Project along the I-35W / Highway 62 interchange south of downtown Minneapolis.

PHYSICS AND ASTRONOMY

On September 13 the Department of Physics and Astronomy will be conducting a First Light Dedication of the new Baker Ritchey-Chretien telescope. The telescope was purchased with funds raised in a campaign spearheaded by Adam Mans, class of 1987.

Dr. Igor Kogoutiuk, Professor, has made a presentation at VII Latin American Workshop on Magnetism at Rio de Janeiro, Brazil. The presentation is coauthored by former Physics and Astronomy undergraduate student Eric Raymer. Dr. Kogoutiuk, in collaboration with Ukrainian scientists, has published a paper “Polaron Density of States of AlAs/GaAs/AlAs and PbS/PbTe/PbS type quantum well” at the journal “Condensed Matter Physics”.

Dr. Tom Brown, Mike Peters, Dr. Louis Schwartzkopf put on a Physics Show on July 27 for the ZAP Camp participants and their parents (sponsored by the Minnesota Center for Engineering & Manufacturing Excellence).

Dr. Louis Schwartzkopf, Professor, gave a presentation, "Envisioning a Post-Carbon World," at the American Association of Physics Teachers meeting in Greensboro, NC, July 30 -- August 1. Dr. Schwartzkopf presented a class, "Renewable Energy, Energy Independence, & Climate Change," to MSU for Seniors, August 16.

Mark A. Pickar, Professor, was a co-author in a paper published in *Physical Review C* **75**, 054001 (2007), entitled "Deuteron-deuteron elastic scattering at 231.8 MeV".

Dr. Hai-Sheng Wu, Professor, attended the *Intersolar 2007 Conference at Messe Freiburg*, Germany, from June 19 to June 23, 2007. The events also included the "*Visit the Research and Development Center (Forschungszentrum) in Karlsruhe*", and the "*Solar Project Excursion in Freiburg*". The exhibition of *Intersolar 2007* drew a participation of nearly a thousand global companies of solar cell and solar module manufacturing, solar panel installation and applications, solar heating and solar panel components. The event also drew tens of thousands of worldwide visitors.

Dr. Andy Roberts, Assistant Professor, gave a talk titled 'New PET Radiotracers from Improved Accelerator Targetry' at the 8th International Topical Meeting on Nuclear Applications and Utilization of Accelerators, held in Pocatello Idaho in August.

Dr. Tom Brown, Assistant Professor, designed and implemented a week long workshop for in-service middle and high school physics teachers with Eric Koser of West High School through the MnSTEP program. (Minnesota Science Teachers Education Project).

COLLEGE OF SCIENCE, ENGINEERING & TECHNOLOGY

3M GIVES POWERFUL NMR SPECTROMETER TO DEPARTMENT OF

CHEMISTRY AND GEOLOGY. One of Minnesota's most powerful nuclear magnetic resonance spectrometers now resides at Minnesota State Mankato, thanks to a recent gift from 3M Pharmaceuticals. The 500 megahertz NMR spectrometer, valued at \$850,000 when it was new seven years ago, was donated to the university's Chemistry and Geology Department earlier this month. The seven feet tall, three feet diameter, sixteen hundred pound instrument was installed earlier this month in Trafton Science Center, and is one of the state's most advanced NMR spectrometers outside of Minneapolis. The machine will be moved to the Trafton Science Center's southeast wing when the new addition is completed next year. The spectrometer replaces a much older, 200 megahertz instrument. The new instrument will allow chemistry faculty members and students to conduct advanced, state-of-the-art studies of compound structures, including drugs, proteins, biofluids and other complex compounds.

NMR spectroscopy is the preeminent scientific technique for obtaining physical, chemical, electronic and structural information about the dynamics and three-dimensional structure of organic and some inorganic and organometallic molecules. NMR spectrometers allow scientists to make new discoveries about molecular and cellular processes – discoveries that have led to breakthroughs in the repair of damaged DNA, cure of diseases such as Alzheimer's and Parkinson's, synthesis of new pharmaceuticals and protein interactions.

The spectrometers can analyze samples without destroying them, which means that expensive biological samples such as nucleic acids can be studied for many weeks before being subjected to destructive biochemical analysis. The new instrument provides Minnesota State Mankato scientists with a number of capabilities not previously available. The 50 MHz spectrometer can:

- Analyze samples as small as several micrograms, rather than several milligrams
- Analyze solids as well as liquids and solutions
- Analyze the spectra of many different nuclei (the old instrument could only analyze hydrogen and carbon).

The NMR spectrometer is similar to the magnetic resonance imagers used in hospitals and clinics, except NMRs use stronger magnetic fields and can study smaller samples.

CSET is the recipient of a second gift of instrumentation from 3M. This gift is valued at \$221,641 and will be important for the Departments of Biological Sciences and Chemistry and Geology. The appraised value of this equipment is \$500,000; the cost to purchase it used on the open market would be \$750,000 to \$1 million.

DEAN FREY NAMED TO ENERGY BOARD. John E. Frey, Dean of our College, has been appointed by Governor Tim Pawlenty to the NextGen Energy Board. The new board was proposed by Gov. Pawlenty as part of his Next Generation Energy Initiative. The board will provide recommendations to the Legislature and the governor about how the state can most efficiently achieve energy independence through agriculture and natural resource sustainability. One of the board's primary duties is to examine the future of bio-fuels, such as synthetic gases, biobutanol, hydrogen, methanol, biodiesel, and ethanol within Minnesota, and to develop grant programs to assist renewable energy facilities throughout the state.

MINNESOTA CENTER FOR ENGINEERING & MANUFACTURING EXCELLENCE
ZAP Camp, an event sponsored and initiated by the Minnesota Center for Engineering & Manufacturing Excellence here at MSU and South Central College here in North Mankato, took place during the week of July 23-27. The Camp introduced 32 Mankato area middle school students to engineering related topics. These topics included ethanol production, wind energy, solar energy, and simple mechanical motors. Students applied learned knowledge through various activities and games, as well as building various models. Tours of the Poet Ethanol Plant in Lake Crystal and the Garwin McNeilus Wind Farm in Dodge Center sought to reinforce the students' new found knowledge. In addition to projects held at MSU, students were also given the opportunity to design and mill an aluminum block using South Central College's Computer Integrated Machining System.

SUMMER TRAINING INSTITUTE. During the weeks of August 6 thru 17, high school teachers from several states participated in Project Lead The Way at MSU. The program's goal is to educate teachers in engineering so that they can pass on the knowledge to their students. The Project Lead The Way Program is part of a national effort to provide rigorous advance courses in high schools in science, math and technology. High school students who choose to take Lead The Way classes can earn college credits. Jim Mecklenberg, the program director of the two-week course at MSU, said this is the first time the university has hosted one of the events. The Project started in 2002 in Minnesota in the Twin Cities area. It has greatly grown since then. There are now 135 high schools and middle schools offering the advanced classes to their students.