

**COLLEGE OF SCIENCE, ENGINEERING AND  
TECHNOLOGY  
SEPTEMBER 2005  
GOOD NEWS**

**BIOLOGICAL SCIENCES**

Dr. Steve Mercurio, Professor, was just accepted to go to the U.S. Environmental Protection Agency Mississippi River Basin Nutrients Science Workshop to present a poster and submit a manuscript based on the work done with undergraduates in the Environmental Toxicology class in the spring semester 2005. The paper and poster are: "Nitrates from Sediment-Filtered Blue Earth River Water are the Major Inputs to the Minnesota River and Overtly Lethal to *Xenopus* Tadpoles on a Linear Concentration Basis in Combination with other Unknown Contaminants." Maryellen D. Baskerville, Renae M. Haycraft, Jessica A. Horky, Eddie Kalombo, Gina S. Russ & Steven D. Mercurio

**CHEMISTRY AND GEOLOGY**

Dr. Jeff Pribyl, Professor, was a participating faculty member for the first ever Catalyst Summer Institute conducted by the St. Paul School District. Dr. Pribyl worked as part of a team of teachers and scientists during the week of June 20th, to help fourth grade teachers understand science better.

Many people wish that Earth's supply of oil was inexhaustible, and research is increasingly directed at determining if oilfields can in fact be replenished by fresh oil and gas that migrate from deeper within the sedimentary basin in which they are generated. In the South Eugene Island Block 330 Field, about 90 miles offshore Louisiana, Dr. Steven Losh, Assistant Professor, and co-workers have for the first time ever directly measured the speed at which a pulse of oil, gas, and brine is ascending a large fault (break in the Earth's crust) adjacent to a large oilfield. Losh and others have documented in the past that this fault has acted as a conduit for oil migration from depth into this field. In the current study, the group with which Dr. Losh worked compared two specially processed 3-D seismic reflection surveys of the same oilfield collected seven years apart. During that time period, a highly-anomalous reflection moved up the fault one kilometer, at an average speed of 140 meters per year. This reflection was intercepted by a well that penetrated the fault, and corresponds to an extremely highly-pressured oil-rich fluid. The pulse speed, while geologically rapid, is unfortunately much too slow for the oilfield to replenish within the timescale of production. The research results are reported in the September 1 issue of the journal, *Nature*.

**COMPUTER AND INFORMATION SCIENCE**

Richard Roiger, Professor, conducted a tutorial titled *Teaching an Introductory Course in Data Mining* at the Tenth Annual Conference on Innovation and Technology in Computer Science Education. The conference was held at the Universidade Nova de Lisboa, Monte da Caparica, Portugal (June 27-29). His paper with the same title appeared in the conference proceedings.

**Haglin, D., R. Roiger**, J. Hakkila, and T. Giblin, "A Tool for Public Analysis of Scientific Data," *Data Science Journal*, Vol. 4, pp. 39-53, August 2005.

Manning, A.M., and **D.J. Haglin**, "A new algorithm for finding minimal sample uniques for use in statistical disclosure assessment," In *Proceedings of the IEEE International Conference on Data Mining (ICDM)*, 2005.

Wells, M.G., "Application Programming Using Microfocus COBOL", Thomson Publishing, 2005, ISBN 0759362238.

**Wells, M. G.**, Klammer-Kruse, S., Zafar-Ahmed, D. S., Zafar-Ahmed, Q., Does the Addition of a Procedural Oriented Programming Language Increase Students' Confidence When Using Programming Concepts? To appear in 2005 Proceedings – National Decision Sciences Institute.

Dr. Mike Wells, Associate Professor, was the recipient of a 2004 Teaching Scholar Fellowship "Completing an Application Programming Textbook Manuscript for Submission for Textbook Publication".

Professor Ann Quade, Professor, co-authored the chapter, "Syntax and Semantics of Learning Object Metadata", for the text *Learning Objects*, published by Information Science Institute.

#### **ELECTRICAL AND COMPUTER ENGINEERING AND TECHNOLOGY**

Dr. Mark Dvorak, Assistant Professor, was awarded two US patents this summer: Ultra-wideband impulse generation and modulation circuit (6,911,874); and Multi-band voltage controlled oscillator (6,930,561).

A paper has been accepted for publication in the 2005 ASEE North Midwest Conference Proceedings, October 13-14, 2005, "Sensor Training for Engineering Students" by **Gale Allen**, Assistant Professor, Dan Hanson (graduated Spring and is now with Dataradio in Waseca) and David Jones (Emerson Process Management).

**Dr. George O'Clock**, Professor, taught EE Circuits and EE Design courses during the Spring Semester at the South Dakota School of Mines and Technology - SDSM&T (Rapid City, SD). While teaching at SDSM&T, he was inducted into Tau Beta Pi. In addition, Professor O'Clock recently published a book entitled *Isaiah's Leper* (iUniverse Publishers), which is concerned with the wide variety of conflicts between religion and spirituality. Dr. O'Clock is currently working on portions of several books involving Native American spirituality with another author who lives in Colorado. Professor O'Clock has also completed negotiations with Artech House Publishers (Boston, MA) on a book for their upcoming Biomedical Engineering series entitled *Electrotherapeutic Devices: Theory, Design and Applications*. The electrotherapeutic device that Dr. O'Clock patented with Dr. John Jarding (Rapid City, SD) for the treatment of macular degeneration, passed the FDA feasibility phase in the first part of its double-blind clinical trial sequence. The device is now entering the FDA pre-market approval

(PMA) phase of the clinical trials. This effort started in 1998, and should be finished by December of 2005.

During his sabbatical leave, Dr. Tom Hendrickson, Professor, traveled in Europe and Asia. During the trip he visited 16 universities; looked at a variety of technological projects including Motorola's XRay labs, Spain's 1,000 roof solar project, Germany's terrawatt wind project, etc. He also visited a number of ancient sites in Turkey, Greece, Italy, and the Baltics. He took over 400 pictures for possible use in his courses and brought back a wealth of information.

During the second half of Professor Hendrickson's sabbatical he taught mathematics at Tumaini Univeristy in Iringa, Tanzania. While in Iringa he also conducted research into the structure of technology. Currently Professor Hendrickson and his wife are involved in projects to bring water to a drought area, helped start an HIV/AIDs project, and have started a language project with the university.

During Professor Han-Way Huang's sabbatical he finished writing the Freescale "HCS12/9S12--Hardware and Software Interfacing" textbook, to be published in July 2005. Professor Huang is now revising the 8051 book he previously published. Dr. Huang also attended the Microchip Master's Conference in July 2005.

Mr. Andy Miner is returning to support our growing and evolving programs. During the summer Andy had been implementing designs for the FSRC center – supporting our accreditation efforts – gardening and fishing.

Dr. Rajiv Kapadia, Associate Professor, began his duties as Director of the Honors Program and will be on 50% release time from the department

Professor Mark Dvorak, Assistant Professor, continues his research and consulting with NEXTNET, designing next generation communication systems. During this past summer Professor Dvorak completed a paper for them about his summer research entitled "Report on Steerable Antenna Research."

Professor R. Nair will be presenting a paper in India on antenna design.

Professor Julio Mandojana has co-authored a paper with Dr. Louis Schwartzkopf and Wayne Allen on Oil and Involution: The Link Between Population and Resources that was presented at the American Association of Physics Teachers Summer meeting in Salt Lake City, UT.

Drs. Muhammad Khaliq, Professor, and Gale Allen, Associate Professor, worked diligently at creating labs to support the department's installation of LabView and its integration into the curriculum.

Dr. Bill Hudson, Professor, continued his involvement with the Force Science Research Center

- During the summer Professor Hudson sponsored a McNair Scholar Student
- Completed data analysis for the LA Sheriffs department support staff on over 1000 police officers involved in shootings. This research represents the largest and most comprehensive effort to date
- Complete a study of shell casing ejection patterns with the LA sheriffs department involving over 100 officers and many thousand rounds of ammunition – what was found is that what had been claimed in court by many claiming to be experts was incorrect
- Provided Training for the British Diplomatic Protection Group – they have now provided \$70,000 dollars to support another center research project
- Dr. Hudson was asked to take the lead in providing ABET accreditation training for Electrical and Computer Engineering Department Heads at their annual meeting in March in Hawaii

General Department Notes:

- Goodrich Graduate program is moving forward
- Internships with Daktronics (Brookings) have grown and they are hopeful that this will be extended even further
- Winland Electronics will be sponsoring our Senior Design this coming semester and also providing support for a Graduate Research Assistantship – with the hope of creating a innovative position to support
- MCG – Internships continue to expand – with a desire for customized training from the department

### **INTERIOR DESIGN AND CONSTRUCTION MANAGEMENT**

Rich Krohn, Assistant Professor, attended the Undergraduate Faculty Enhancement Workshop: Teaching the Material Science, Engineering and Field Aspect of Concrete June 27 - 29, 2005 sponsored by the Portland Cement Association in Chicago, IL. The workshop was a forum that introduced faculty to the most current research in concrete materials properties.

Participants were also introduced to techniques for effective facilitation/teaching of undergraduate concrete related courses, saw demonstrations on student laboratory experiments and exchanged information on successful implementation of concrete-related subject matter into curricula.

### **MATHEMATICS AND STATISTICS**

Dr. Pavel Kitsul, Associate Professor, received a memorandum of acknowledgment from the Minnesota Army National Guard Training and Community Center for his policy of providing additional academic support to MSU students called to their military duties.

Herbert C. Heien and **Mezbahur Rahman** (2005). "Revisiting the Digits of PI and Their Randomness", Forthcoming, the Journal of International Statistical Science (JISS), vol. 4.

During this past summer, Dr. Namyong Lee, Associate Professor, visited the Mathematical Bioscience Institute at Ohio State University and presented a talk "Class discovery and prediction of tumor subtypes".

Drs. Mary Ann Lee, Professor, and Kil S. Lee, Professor, taught a funded summer institute, Geometric Structures in School Mathematics for teachers in the Southern Minnesota Math Partnership.

### **MECHANICAL AND CIVIL ENGINEERING**

Aaron Budge, Assistant Professor, was invited to participate in several workshops during the course of the summer. He received a Faculty Improvement Grant from the university to attend the ExCEED Teaching Workshop, sponsored by the American Society of Civil Engineers. ExCEED is an acronym for Excellence in Civil Engineering Education. The week-long workshop involved a handful of faculty members from across the nation, and Dr. Budge was grateful to be selected as an ExCEED 2005 Fellow. He was also invited to participate in the Professor's Piling Institute, sponsored by the Pile Driving Contractor's Association. This deep foundations course was taught by renowned names in both academia and practice, and it was a busy week of designing and driving pile foundations

Dr. Deborah Nykanen, Assistant Professor, passed the Professional Engineers (P.E.) Exam and is now licensed in the State of Minnesota as a professional engineer (P.E.). Dr. Nykanen took the exam on April 15 and received word that she had passed in June.

Dr. Nykanen attended the 5th International GEWEX (Global Energy and Water Cycle Experiment) Science Conference in June and presented research on "Topographic and Meteorological Influences on the Space-Time Scaling of Heavy Convective Rainfall in Mountainous Regions"

In June, 2005, Dr. Patrick Tebbe, Assistant Professor, presented a paper entitled "Brainstorming Exercises as an Active Learning Component of Thermal Systems Courses," at the American Society for Engineering Education (ASEE). The paper received a Best Paper award from the Energy Conservation and Conversion Division.

Dr. Tebbe received notification in June 2005 that he had passed the Professional Engineering Examination and was registered as a Professional Engineer in Minnesota.

During July 2005, a group of mechanical engineering students got word that they had received 3rd place at the national level in the ASHRAE 2005 Student Design Project Competition (HVAC System Selection Category).

#### **PHYSICS AND ASTRONOMY**

**Schwartzkopf, L., Allen, W., Mandojana, J,** "Oil & Involution: The Link Between Population and Resources", AAPT (American Association of Physics Teachers) Conference in Salt Lake City, UT, August 2005.

Dr. Russell Palma, Professor, received the following external research support: (1) Fulltime (\$24,800) external grant funding from the University of Minnesota for the summer of 2005. I continued my research on Genesis Mission nitrogen and noble gas isotopic studies. (2) External grant funding (~\$1200) for attendance at the international, invitation only, *Origins of Solar Systems*, Gordon Research Conference, Connecticut College, New London, CT, June 26 July 1, 2005. My research group gave a presentation entitled "Genesis Mission: Initial Composition of the Solar System". (3) External funding (\$4800) to support a Minnesota State University physics graduate student (Jeffrey Burkett) for the 2005 summer.

Dr. Palma supported the following two students in his research:

(1) Physics graduate student Jeffrey Burkett was supported by an external grant to study gold foil samples from NASA/JPL's Genesis Mission. He is examining how the mercury vapor deposition nitrogen gas release technique affects the gold foil. His stipend was \$4800 for the 2005 summer. (2) Physics undergraduate Jacob Simones was supported by an internal grant to do research related to analysis of NASA/JPL Genesis and Stardust samples. He was in residence at the University of Minnesota Noble Gas Mass Spectrometry Lab and received a \$4000 stipend for the 2005 summer.

Dr. Palma gave the following research presentations:

(1) "Genesis Mission: Initial Composition of the Solar System", *Origins of Solar Systems*, Gordon Research Conference, Connecticut College, New London, CT, June 27, 2005. (2) "Exploring the Early Solar System: NASA/JPL's Genesis and Stardust Missions", *Minnesota Astronomical Society*, Minnesota Science Museum, St. Paul, MN, August 4, 2005.

Dr. Hai-Sheng Wu, Associate Professor, has attended the 50<sup>th</sup> SPIE International Symposium on Optics & Photonics from July 31 to August 4, 2005 at the San Diego Convention Center, CA.

He, as the first author, presented a paper entitled "*Combinatorial fabrication and study of white organic light-emitting devices based on non-doping ultrathin 5, 6, 11, 12 tetraphenylanthracene (rubrene) yellowing emitting layer*", (paper number 5937-66)

at the conference in the session of Organic Light-Emitting Materials and Devices IX. The paper was accepted for publication in the October issue of the 2005 SPIE Proceedings.

Dr. Wu has refereed an SPIE conference paper entitled “*Driving circuit of a full color organic light-emitting diodes*” for the publication in the October issue of 2005 SPIE Proceedings.

Dr. Wu gave a talk: “*A New Platform for Photoluminescence-Based Chemical and Biological Sensors: Structural Integration with an Organic Light Emitting Device (OLED)*” in the Physics Seminar on April 21<sup>st</sup>, 2005.

Dr. Wu gave a presentation on Newton’s laws of force and the physics of rocket motion at Boys Scouts Troop 95’s “boy scout space exploration merit badge” event meeting on March 21, 2005 in Mankato Moose Lodge. He also gave a demonstration on rocket propulsion during the presentation.

Dr. Louis Schwartzkopf, Professor, gave a talk, "Oil and Involution: The Link between Population and Resources," at the meeting of the American Association of Physics Teachers, August 8-10, in Salt Lake City, Utah.

Dr. Igor Kogoutiuk, Associate Professor, has made presentations at three prestigious international conferences this summer: The International Conference on Strongly Correlated Electron Systems, in Vienna, Austria; a workshop-conference on Anomalous Phenomena in Strongly Correlated Electron Materials, in Wrocław, Poland; and the Fifth International School-Conference “Semiconductors Physics Urgent Problems” in Drohobych, Ukraine. The coauthors of the presentations and published abstracts and materials are Physics graduate students Hanna Terletska and Roman Filipovych.

Dr. Igor Kogoutiuk has made five recruitment/retention presentations about education at MSU-Mankato for students and faculty at Polish and Ukrainian universities this summer.

Physics graduate student Hanna Terletska (advisor Dr. Igor Kogoutiuk) was accepted to seven PhD programs at US universities. She accepted the invitation and GA position and is studying now at Florida State University at Tallahassee.

### **WATER RESOURCES CENTER**

In August 2005, Dr. Shannon Fisher received approval of an EPA grant to conduct a Total Maximum Daily Load (TMDL) allocation evaluation for ammonia, turbidity, and fecal coliform in the Rock River. The \$64,000 grant received high priority because the project will assist in the recovery plan for the endangered Topeka Shiner through the development of a plan to reduce pollutants.