

# StoutQuest

The Journal of Research at University of Wisconsin-Stout 2007

## Sinkholes: Saltwater studies in the Great Lakes



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The Journal of Research at University of Wisconsin-Stout

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**Sue Foxwell**, Executive Editor  
and Research Administrator

**Laura Short**, Writer

**Hannah Flom**, Writer

715/232-1126

stoutquest@uwstout.edu

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## Chancellor's Message

Welcome to the inaugural issue of *StoutQuest*, which features a sampling of the research and creative work being done by the faculty, staff and students of the University of Wisconsin-Stout.

UW-Stout is working hard to increase the amount of innovative research on its campus; involvement and innovation typify a way of life at this university.

The campus, with a world-class faculty and staff, draws students from around the Chippewa Valley, Wisconsin, the United States and the world. Students benefit from an educational philosophy that produces graduates who live, think and work creatively.

Programs are taught using applied-learning techniques. Students partner with industry on real-world projects and, with their professors, collaborate across disciplines. UW-Stout's applied-learning philosophy translates new ideas, technologies and business models into successful solutions for business, industry and society.

I believe you will see these traits come through in the magazine articles. Please enjoy *StoutQuest* and share it with others.



Charles W. Sorensen  
Chancellor

## About Research at University of Wisconsin-Stout

Applied research has a long history at University of Wisconsin-Stout. Since the institution's founding in 1891, students, staff and faculty members have benefited from a culture that is guided by principles of putting theory into practice. Today, real-world projects are regular occurrences in the environment of teaching, learning and discovery at UW-Stout. And, since the university was designated Wisconsin's Polytechnic University by the UW System Board of Regents in the spring of 2007, UW-Stout has placed even greater emphasis on its research agenda.

## About StoutQuest

*StoutQuest* is the UW-Stout journal of faculty and staff research. The journal highlights the growing and diverse scholarship and applied research that happens every day among faculty, staff and students of Wisconsin's Polytechnic University.

## For more information about UW-Stout Research Services

### Research Services

152 Vocational Rehabilitation Building  
University of Wisconsin-Stout  
Menomonie, Wisconsin 54751

**Phone:** 715/232-1126

**Fax:** 715/232-1749

**Online:** [www.uwstout.edu/rs/](http://www.uwstout.edu/rs/)

**On the cover:** UW-Stout students **Heidi Zajack** and **Jeff Berkebile** collect water and sediment samples from Lake Huron. Back on campus, the two worked with first-year students to process the samples and generate data as part of their studies on saltwater sinkholes in the Great Lakes. The project is funded by the National Science Foundation and is a collaboration with Grand Valley State University.

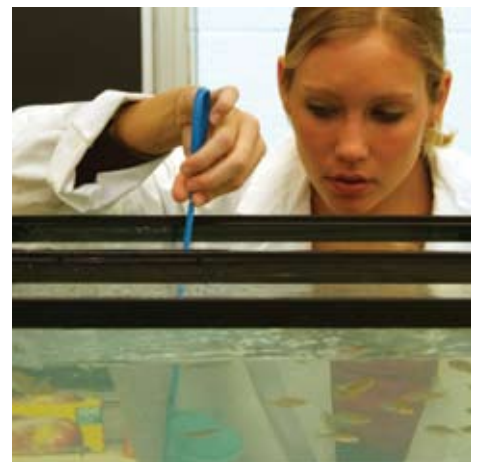
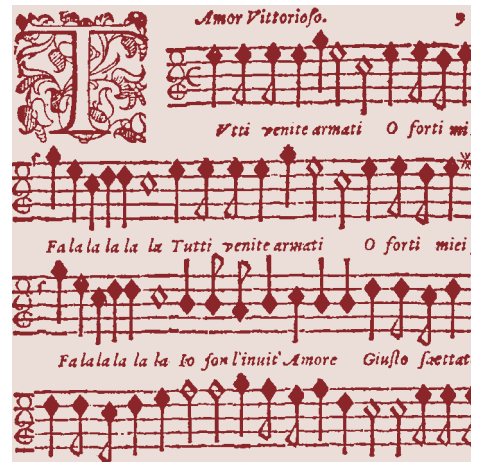


**STOUT**  
UNIVERSITY OF WISCONSIN  
WISCONSIN'S POLYTECHNIC UNIVERSITY

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# Brain and behavior: can we relate?

Student **Chelsea Treiber** sits down in front of a computer as **Jo Hopp**, Ph.D., assistant professor of physics, places electrodes at her temples. Additional electrodes are taped above and below her eye.

Treiber and Hopp are about to demonstrate some of the research students conduct in the new cognitive-neuroscience laboratory, funded by the National Science Foundation, known as C-NERVE. C-NERVE stands for Cognitive Neuroscience Education and Research-Valued Experience. Cognitive neuroscience is the interdisciplinary study of how the brain makes the mind, and how the mind makes the brain.

As Treiber shifts her body forward in order to place her jaw on a chin pad, her eyes begin to follow a mark on the computer screen in front of her. Her eye movements are recorded graphically on another computer screen. Blue and red lines trace the peaks and valleys of her vertical and horizontal eye movements in a process called electrooculography.

"This type of research can be applied in advertising studies," **Richard Tafalla**, Ph.D., project director and professor of psychology, said.

"Advertisers can learn where viewers' eyes focus during a commercial or on a print ad. Do they look at the product? For how long? Is there something else in the commercial that distracts them from looking at the product?" Tafalla explained. Monitoring eye movements is only one type of research students pursue in the C-NERVE lab.

During a three-year period, C-NERVE students rotate through four interdisciplinary lab experiences led by psychology instructors. They study stress and arousal under Tafalla, memory under **Desiree Budd**, Ph.D., reasoning under **Mike Donnelly**, Ph.D., and social experiments under

**Peizhong Li**, Ph.D. The students also carry out research projects using one or more of the psychophysiological measures.

Faculty members in biology, math, philosophy, physics, education and vocational rehabilitation also meet with the psychology instructors and C-NERVE students and share interests in the research.

To conduct their research, students use professional equipment in the lab to monitor physiological responses such as brain waves, eye movement, heart rate, muscle tension and sweat levels. Students are able to use the same type of equipment that scientists use in the medical research field.

Five students are testing the relationship between emotional arousal and detailed, lasting memories through galvanic skin responses, or the contraction of muscles that are stimulated by an electric current. The students are investigating how the emotional content of negative, positive and neutral pictures affects a person's ability to remember specific visual details. They also are researching post-event stress and how it influences memory for high or low arousal pictures. Both studies could contribute to better understanding of eyewitness memory and the persistence of traumatic memories.

"Memory isn't as accurate as we think it is," Budd said.

Three other students are conducting a study they have titled, "Deer in the Headlights." The students are researching the effects that recognition of another person's race may play in a participant's response time in remembering details. Participants in the study are shown pictures of a letterform and then are shown pictures of individuals of the same race or a different race. Participants' response time in remembering the letterform image—whether it was a normal image or a mirror image—is then tested. The research may contribute

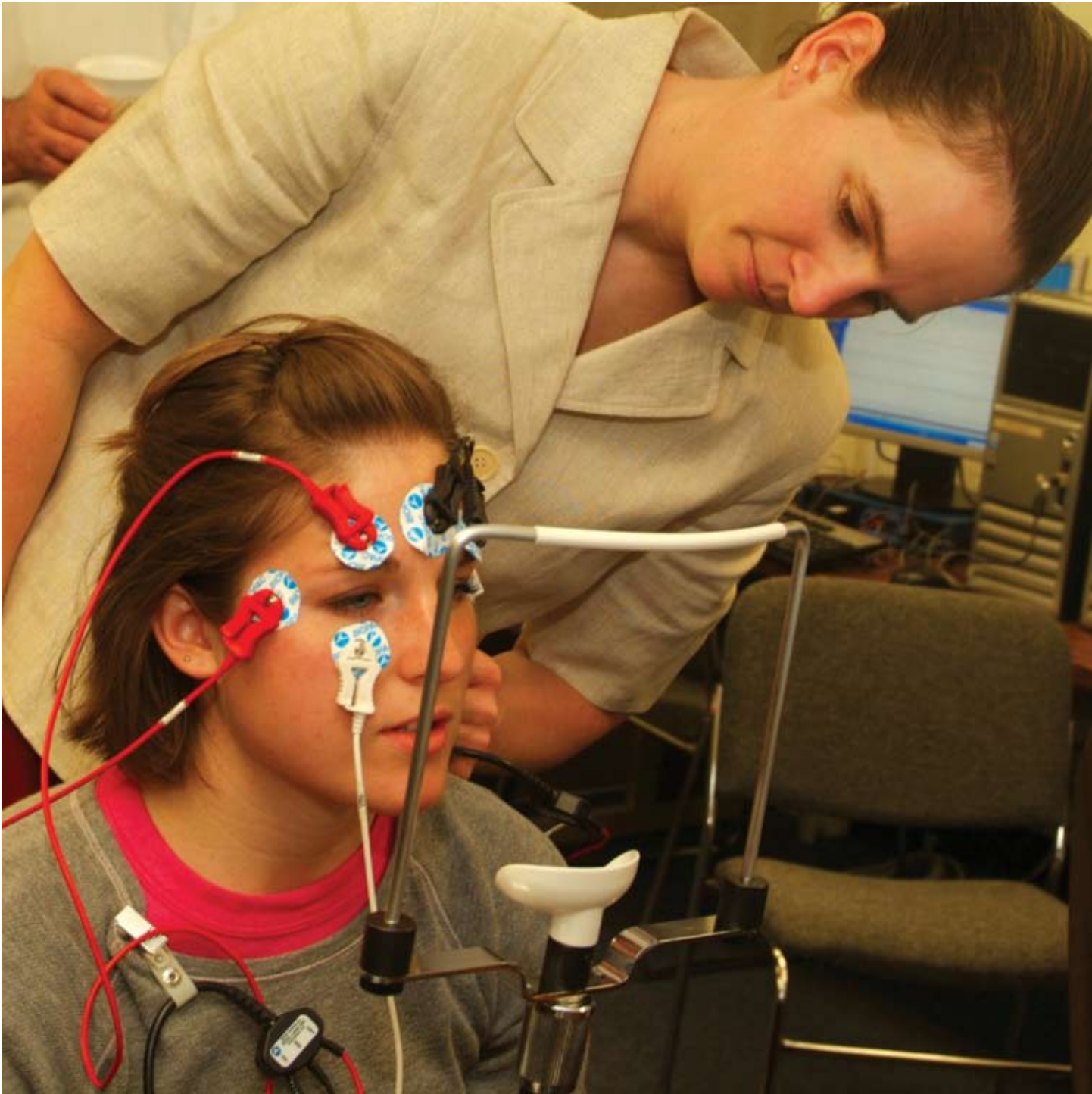
To conduct their research, students monitor brain waves, eye movement, heart rate, muscle tension and sweat levels. Students are able to use the same type of equipment that scientists use in the medical research field.

to communication studies, such as how individuals self-regulate their behavior in situations when they are uncertain how to respond to individuals of different races.

Students present their research findings at major conferences in the field and also land summer internships.

"The outcomes we strive for are to prepare students for graduate school and to prepare them for new, technology-oriented jobs in medical device research among other fields," Tafalla said.

**Right:** Assistant professor of physics Jo Hopp places electrodes on student Chelsea Treiber to track Treiber's eye movements.



# Delving into sinkholes



It all started with NOAA, pronounced Noah. But instead of an ark, it was a side-scanning sonar device owned and funded by the National Oceanic Atmospheric Administration. And instead of looking for dry land, it was searching the waters of Lake Huron for shipwrecks.

During this exploration process in 2002, a serendipitous discovery was made—sinkholes. The finding was of great interest to Steve Nold, Ph.D., UW-Stout associate professor of biology.

The sinkholes contain saltwater instead of the freshwater of the surrounding Great Lakes. Unique microbial communities exist at the bottom of these holes. The saltwater can be attributed to groundwater seepage through submerged vents, but the intrigue lies in the habitats caused by the seepage.

In fall of 2006, Nold, along with fellow sinkhole enthusiast, Bopi Biddanda, Ph.D., assistant professor at Grand Valley State University in Michigan, applied and received a National Science Foundation grant to study these unique habitats during the next two years. Many sinkholes have been discovered in Lake Huron, which is part of the Thunder Bay National Marine Sanctuary, but the project encompasses only three: Isolated Sinkhole, Middle Island Sinkhole and Misery Bay Sinkhole.

The project enables the applied science students in Nold's biology classes to do high-quality original research in the lab and field. During the summers, UW-Stout students explore Lake Huron's sinkholes. During fall and spring semesters, the students analyze the data and specimens collected. The results of the students' investigations will be used to help describe the diversity and activity of the bacteria living in sinkhole ecosystems.

Students use DNA-sequencing tools to study the microbial diversity. They also compare the different sinkholes to see if

**The project findings will impact the understanding of land-water interactions, and of smaller ecosystems that operate within the larger Great Lakes ecosystems.**

microbial activities change as the habitats change. Students under Nold's guidance develop hypotheses and test them.

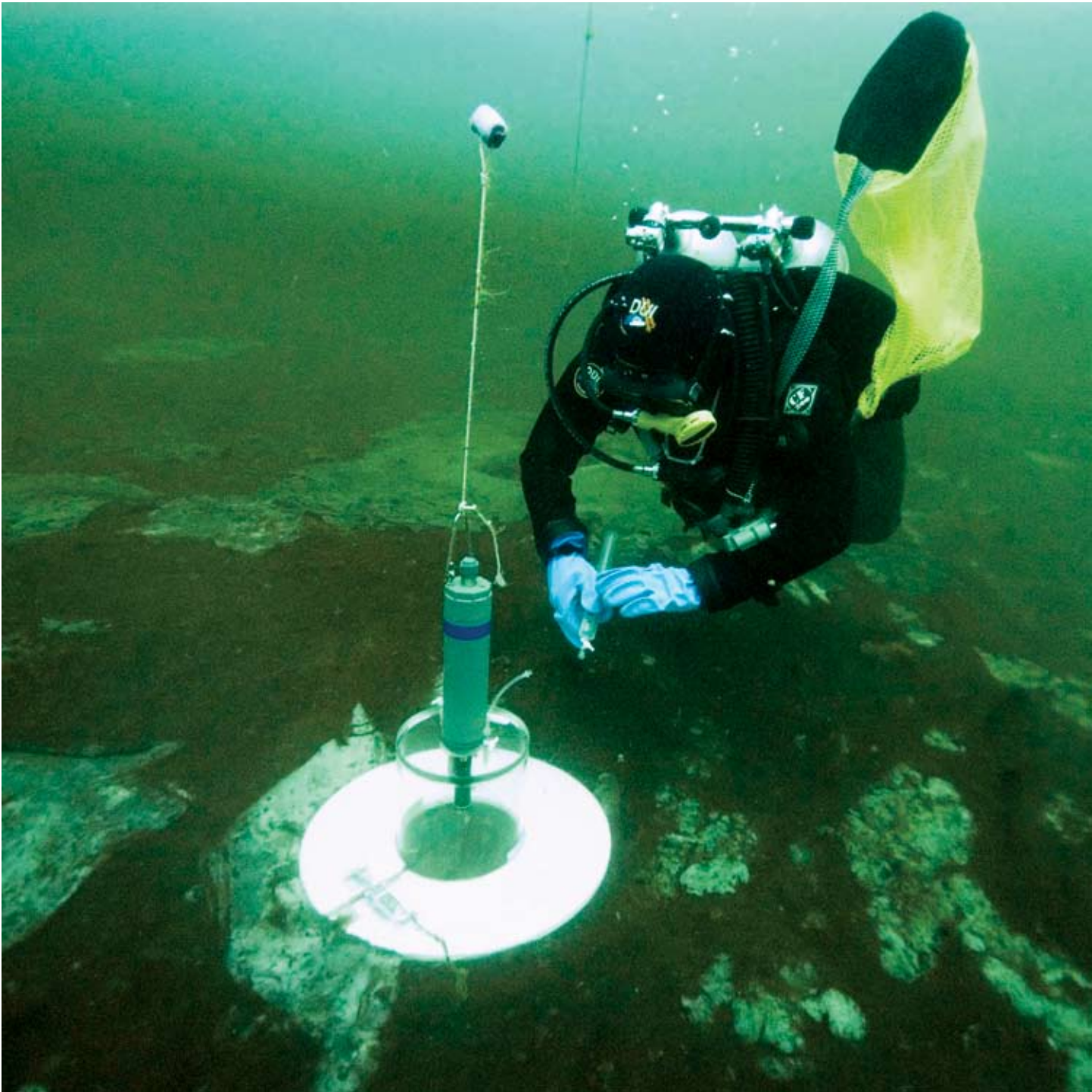
The project findings will impact the understanding of land-water interactions, and of smaller ecosystems that operate within the larger Great Lakes ecosystems. It will add to the understanding of biodiversity and preservation of life and of life processes in the biosphere.

Most importantly, though, the research has had impact on the students. Their experiences at UW-Stout and with this project have changed their career trajectories.

The students, many of them in their first year, are doing original research, Nold says. They are learning the very important skills of answering scientific questions and of learning how to look critically at the world. Nold is certain that many of them will go on to graduate school. Some already have.

He hopes they will come back to Wisconsin and work in biotechnological fields.

**Photos:** Scuba divers with the National Oceanic and Atmospheric Administration support the efforts of faculty and students from UW-Stout and Grand Valley State University by collecting bacteria samples from sinkholes in Lake Huron.



# What's in a bog?

Maxine Pettis, an undergraduate in applied science, waded into a bog on the UW-Stout campus in the fall of 2006. Judy Hayducsko, a water resources engineer with the Department of Natural Resources, and Krista James, M.S., lecturer in the biology department, joined her. They defined the boundaries of the wetland in preparation for implementing a restoration plan.

UW-Stout sits on what was once a tamarack bog. A one-acre remnant of the bog, which lies behind what is now the baseball diamond, survived and was purchased by the university. In December 2006, the wetland was officially designated an outdoor classroom—essentially a laboratory for wetland research.

Wetlands are critical ecosystems. They store water to prevent flooding, protect water quality and provide essential habitat for wildlife. The biology department and

the UW-Stout grounds department are working on management plans to protect native species and to control unwanted invasive plant species in their treasured wetland. A critical part of this plan is wetland delineation—a scientific process that defines the boundaries of a particular wetland.

Armed with a grant from the UW-Stout Student Research Fund, Pettis, the field investigator, used three parameters to delineate the bog—vegetation, soils, and hydrology. She then established a map outlining the wetland boundary of the bog.

Now that the area has been defined, biology faculty members will pursue further grant opportunities to continue the wetland restoration efforts.

**Right:** Maxine Pettis collects data on the hydrology and soils within UW-Stout's wetland.

The wetland was officially designated an outdoor classroom.



# Music revival

Patrick Liebergen, Ph.D., director of choral activities at UW-Stout, is known for resurrecting archaic music. He often is the first person to find pieces that have never been published.

Liebergen, who also is a professor in the speech communication, foreign languages, theatre and music department, researches extensively to find historic manuscripts and makes them performable for today's choirs. He adjusts the notation and provides a tremendous amount of information about a particular piece to make a choral work from the past accessible for today's performer.

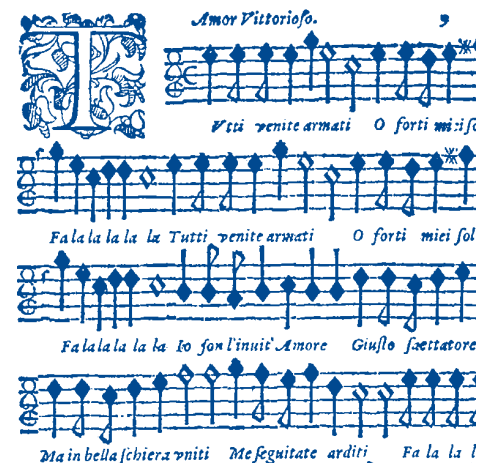
There is a great need for publications of this type because choral works in old notations often are unreadable today, Liebergen said.

Liebergen ensures the initial intention

of the composer by using only original sources. He introduces the work with an explanation of how he modernized the piece, providing the source of the original manuscript and what changes he made to the original in order to make it performable. He provides a pronunciation guide of the foreign language, tempo and dynamic indications; makes editorial suggestions; and shares background information about the composer's life and the composition of the work in his publications. In addition, Liebergen provides an accessible accompaniment, which is a reduction of the original orchestral score, for each edition.

One of Liebergen's most performed arrangements is his arrangement of Giulio Caccini's "Ava Maria," a 16th century vocal work, which he conducted in Carnegie Hall in November 2006.

Liebergen researches extensively to find historic manuscripts and makes them performable for today's choirs.



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# A joint effort

**Rajiv Asthana**, Ph.D., a professor in the manufacturing engineering program at UW-Stout, conducts research that may one day affect space power. His study of the joining of advanced composites—especially the durability of composite joints—has application in the area of propulsion.

Asthana—on sabbatical for the academic year 2007-08—is conducting this research under a contract with NASA Glenn Research Center in Cleveland.

His experimental research tests the brazing and diffusion bonding of a number of new and emerging ceramics and composites. These materials, created by combining silicon carbide, carbon, zirconium diboride and other refractory materials, are extraordinarily heat- and wear-resistant. In addition, Asthana is researching the bonding and metallization of functionally graded materials for use in segmented legs

and electrodes for NASA's advanced thermoelectric energy conversion system.

Before he returns to the classroom, Asthana will co-edit a book with NASA researchers on ceramic joining and integration technologies. According to Asthana there currently is no single coherent, unified body of knowledge on the subject.

"Books on ceramic integration are few, and books on integration of ceramic composites, virtually non-existent, even though the area is widely recognized as a critical technology sector," he said.

Asthana's expertise in joining takes him around the world giving presentations and chairing sessions at conferences. He also has edited journals and conference proceedings and written books. All such international collaborations and partnerships enrich Asthana's classroom experience, which for him is the ultimate bottom line.

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# Baldrige, five years later

UW-Stout became the first university to achieve the Malcolm Baldrige National Quality Award in 2001. Since then, the university has adopted the criteria of the award as a framework for assessment and improvement, and has seen positive results.

Provost **Julie Furst-Bowe**, Ed.D., and **Meridith Wentz**, Ph.D., director of Budget, Planning and Analysis, describe UW-Stout's continued progress in quality improvement in the October 2006 issue of the publication, *University Business*.

"Implementation of this framework has enabled UW-Stout to achieve a systems view of the campus," they wrote, "with greater emphasis among faculty, staff, administration, students and stakeholders."

Furst-Bowe and Wentz believe the Baldrige framework has led to improved con-

sensus on campus on priorities and shared decision making.

The Baldrige framework also has led to an increased international presence for the university. As an award recipient, UW-Stout is required to serve as a role model and ambassador for the Baldrige program. Over the past five years, UW-Stout representatives have shared their strategies and best practices worldwide by participating in approximately 25 speaking engagements each year; publishing articles, chapters of books and case studies; judging state quality programs; and welcoming award candidates to campus.

And the process continues. The leadership team will accept invitations to speak and consult on quality processes for years to come.

The Baldrige framework has led to an increased international presence for the university.



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# A hunt for grasshoppers

**Chuck Bomar**, Ph.D., professor of biology, was surveying grasshoppers in a high-quality remnant prairie along Cranberry Creek in southern Dunn County in 2001. He began to examine some red-legged grasshoppers, also known as *Melanoplus femurrubrum*.

Bomar felt the grasshoppers were highly variable in their appearance. He decided to examine these differences further.

Bomar and UW-Stout students **Tracy Campbell**, **Brady Hurtgen** and **Levi Stodola** gathered more specimens in the field. **Steve Nold**, Ph.D., associate professor of biology, taught the students to analyze the specimens at the molecular level during their regular coursework in the laboratory. The students extracted mitochondrial DNA and looked for patterns of mitochondrial sequence variation.

Mitochondrial DNA was used because of its conservative nature. Differences at this

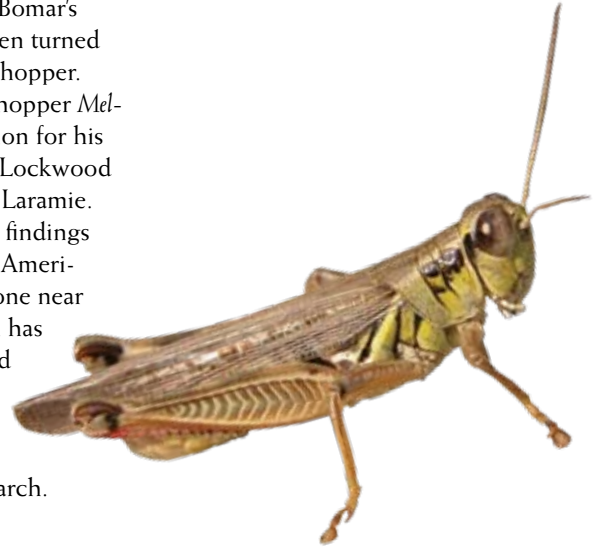
level would represent big differences at the species level.

Only through molecular biology were the students able to prove that Bomar's hunch was correct. The specimen turned out to be a new species of grasshopper.

Bomar named the new grasshopper *Melanoplus lockwoodi*, out of admiration for his graduate school adviser Jeffrey Lockwood at the University of Wyoming, Laramie.

So far there have been three findings of *Melanoplus lockwoodi* in North America—two in Dunn County and one near Calgary, Canada. Each location has been a high-quality, undisturbed remnant prairie. Information about the new species will be published in a future issue of the *Journal of Orthoptera Research*.

The specimen turned out to be a new species of grasshopper.



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# Designs for fun and credit

What could be more satisfying than being architects of fun?

Students in an Architectural Design I class taught by assistant professor and architect **Glendali Rodriguez**, Associate AIA, could answer that question. Twenty-four of them, over an eight-week period, participated in a service-learning project for the River Heights Elementary School community. Their mission was to submit a redesign of the school's playground as a class project.

The students, in teams and individually, collected input from the stakeholders through a community survey; closely examined the existing playground; researched products for surfacing, fencing, ice rinks and lighting; and compiled survey results.

Students used survey data to determine their direction, based on the respondents' most commonly used words of "safe" and

"fun." They also followed their imaginations and felt free to create.

"Service-learning projects bring out the best in students' efforts," Rodriguez said.

The students' designs included accessibility updates for children with disabilities. The modular equipment would rest on a rubberized surface for wheelchair mobility, and to cushion the inevitable fall.

One team designed an outdoor classroom which includes garden areas, a fish pond and boulders to sit on. Other teams designed traditional equipment—slides, teeter-totters, climbing structures—or activity centers with a sand-chair digger and an ice skating area.

As a result of the students' research and submitted creations, there has been forward motion with an architectural firm. A playground design committee was formed and some of the students from the initial project now voluntarily serve on it.

"Service-learning projects bring out the best in students' efforts."

» Glendali Rodriguez



# Commitment to community

Two UW-Stout faculty members and their students are committed to improving the lifestyles of children and their families in Dunn County.

**Carolyn Barnhart**, Ed.D., food and nutrition, and **Ann Parsons**, Ph.D., biology, have co-chaired an obesity research team since 2003. In 2005, the team collaborated with Red Cedar Medical Center to offer a camp for families. Most recently, Parsons and food and nutritional science graduate student **Diane Rasmussen** received a grant from the Wisconsin Office of Rural Health. The project—Family-Based Interventions to Reduce Childhood Obesity in Dunn County—ran from December 2006 to July 2007.

Stout undergraduates and graduate students in food and nutritional sciences were involved in the project along with staff from the Red Cedar Medical Center and the Dunn County Health Department.

The nine-week program targeted elementary-aged children from ages 8 to 10 and their families. The project initiated a family-based intervention program including assessment, education, family-specific action plan and follow-up support.

Twenty volunteer families—recruited through the public school districts in Dunn County—were educated through group sessions regarding healthy eating practices and the importance of physical activity. Each family received in-home evaluations and engaged in follow-up sessions with local experts depending on their particular needs.

At the culmination of the nine-week project, the researchers began assessing and evaluating the project to judge its effectiveness for future use.

The issue of obesity, the researchers believe, cannot be ignored.

Twenty volunteer families learned about healthy eating practices and the importance of physical activity.



# Scientific software

For the past 20 years, **Dennis Mikkelsen**, Ph.D., a professor in the department of mathematics, statistics and computer science, has collaborated with scientists at several neutron scattering facilities such as Argonne National Laboratory, the Los Alamos Neutron Science Center and Oak Ridge National Laboratory, developing software for visualizing and reducing raw data.

Since the instruments required for these experiments are specialized, no commercially available software provides the capabilities needed.

Neutron scattering experiments provide scientists with detailed information about the structure and dynamics of materials. Such experiments are carried out at a small number of advanced research facilities around the world.

These experiments produce data consisting of thousands of histograms record-

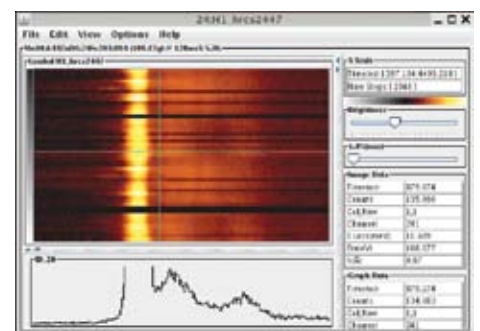
ing the times-of-flight of neutrons scattered by a sample material. This raw data needs to be visualized, reduced and analyzed to provide useful information about the sample, and for instrument diagnostics.

During the past five years Mikkelsen, together with wife **Ruth Mikkelsen**, Ph.D., received two grants from the National Science Foundation to continue and extend their work on the software, and to include undergraduate students in the process. These grants helped produce the “Integrated Spectral Analysis Workbench.”

The software package is a large system with more than 200,000 lines of code. It was developed in Java to provide portability between Windows, Macintosh and Linux computing platforms.

Recent work on the project has involved extending the software to new types of neutron scattering instruments, and adding new features requested by users.

The software package is a large system with more than 200,000 lines of code.



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# Go fish

The zebrafish has genetic similarities to us fellow vertebrates, humans. Therefore, it serves as a scientific model for the study of human cells.

This little striped fish, whose female lays approximately 400 eggs a day, develops in a unique way—a lapse of three days occurs from egg fertilization to the emergence of a free-swimming “junior” zebrafish. This three-day window is most opportune in studying genomics and molecular biology. Even more helpful is that the embryo is transparent and develops externally. If the genotype is modified during the egg stage, the results can be observed almost instantaneously.

That is why the zebrafish fits the bill for **Michael Pickart, Ph.D.**, assistant professor of biology. His goal is for students

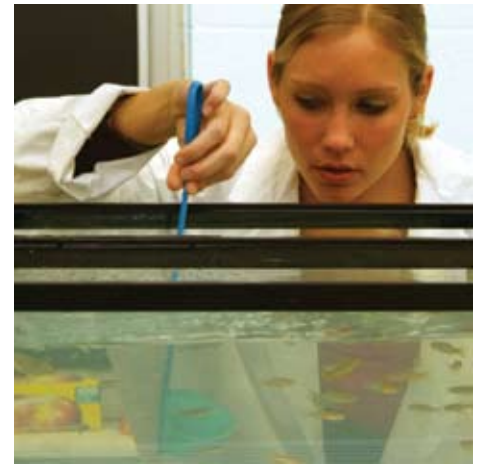
to work on real-world problems in drug and gene function.

In 2006, Pickart received a grant from the WiSys Technology Foundation to develop a zebrafish chemical genomics facility and to purchase chemical genomics equipment and supplies for the purpose of using zebrafish to screen chemical libraries for new biotechnological applications.

This is the first phase of development of the Genomics Technology Access Core Facility being developed at UW-Stout. The facility will provide access to state-of-the-art tools in genomics and molecular biology for students and eventually for local biotechnological industries.

As the facility grows, applied science students will be able to apply their research findings to human health issues.

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# All about pots and pans

In late fall 2006, **Cynthia Rohrer, Ph.D.**, assistant professor in food and nutrition, was approached with an intriguing offer. Representatives of Regal Ware Cookware were offering a grant to test four of their stainless steel saucepans. They needed data right away for suppliers in Japan.

Realizing the learning potential in the project, Rohrer agreed to take it on.

Rohrer, fellow assistant professor **Lamin Kassama, Ph.D.**, and undergraduate student **Andrea Kolbeck** were the project principal investigators. They administered functional tests—how each pan responded to heat with gas and electric cooking units—as well as tests to ascertain how each pan performed in cooking certain foods.

Regal Ware Cookware provided six recipes—translated from Japanese—to be tested with each saucepan and cooking unit. The tests revealed how each pan performed with each item. For example, did the pork cutlets brown differently depending on the pan and cooking unit? How long did it take to cook the shrimp and how easily did each pan come clean? Was the spinach tender and was the rice adequately fluffy?

One week and many hours later, Regal Ware Cookware had its answers.

Despite the shortage of the time allowed to complete the project, Rohrer said, “This grant project offered a wonderful opportunity for our students to experience an application in the food industry.”

“This grant project offered a wonderful opportunity for our students to experience an application in the food industry.”

» Cynthia Rohrer



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# Where is Wisconsin in U.S. history?

History instructors **Bob Zeidel**, Ph.D., of UW-Stout and **Kurt Leichtle**, Ph.D., of UW-River Falls have been on a three-year mission to localize American history in Wisconsin's K-12 classrooms.

The two faculty members are working with 30 history and social studies teachers to relate major topics in U.S. history to Wisconsin's history. The group meets three times a year throughout the state in locations that have ties to historical events.

The K-12 teachers deepen their own understanding of the state's history, and take this new knowledge back into the classroom with them, Zeidel said.

For instance, the group met in Portage, a town that was a fur trader post until the American Revolution. During this workshop on early U.S. history, the K-12 teachers learned about trading and the site's first white settlement.

Later, when the group studied the period between the Civil War and the early 20th century, they met in Madison with the Wisconsin Historical Society to examine its online collection of letters and photographs, and also in Downsville with the Dunn County Historical Society to learn how tree harvesting helped modernize the state.

This summer the group met in Milwaukee to learn more about the state's urbanization—the rise of its cities and industrial bases—and how the development of department stores and baseball teams affected its cultural identity.

Zeidel and Leichtle hope to receive another grant from the U.S. Department of Education soon so they can continue the project with a new group of teachers.

**Right:** Senior lecturer Bob Zeidel leads a workshop discussion on Wisconsin history.

The K-12 teachers deepen their own understanding of the state's history, and take this new knowledge back into the classroom with them.



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# Toy manufacturing teaches engineering skills

UW-Stout proposes the production of a toy train to teach technology and engineering concepts to young students.

The campus is part of a nine-university collaboration funded by the National Science Foundation to establish a Center for Learning and Teaching at Utah State University. The goal of the center is to improve the understanding of the learning and teaching of high school students and teachers as they apply engineering design processes to technological problems.

During the first two years, participating institutions identified, designed, and evaluated a unit of instruction based on the engineering strengths of their institutions. Professors in the UW-Stout School of Education, **Brian McAlister**, Ph.D., and **Ken Welty**, Ph.D., chose manufacturing and industrial engineering to represent UW-Stout.

In UW-Stout's study, eight high schools worked together to make wooden trains. Each school designed and implemented a production system that produced just one train car, such as an engine, coal car, passenger car, hopper car, tanker car or caboose. Each school shared their manufactured cars with fellow schools so that the students could assemble, package and distribute eight complete train sets.

All the train cars had to be manufactured to tight specifications for them to fit together properly and function as a whole. In the process, the students learned lean manufacturing concepts such as outsourcing, production tooling, statistical quality control, statistical process control, and just-in-time inventory control.

Follow-up studies will determine the effectiveness of the project and its impact on student learning.

In the process, the students learned lean manufacturing concepts.



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# Research news briefs

## Awards and achievements

### All fired up

**Robert Foley**, M.S., not only heats materials, he superheats them. For this, the associate professor of physics, was named the UW-Stout WiSys Innovation Scholar for 2006.

Foley developed a new method for superheating materials and for firing clay, enabling savings in time and energy. The technology uses a specialized clay bowl that endures great heat and fits inside a well-insulated microwave. The bowl absorbs the microwaves and heats the metal within the bowl. Foley has safely used his microwave technique to heat contents to nearly 1500 degrees Celsius.

Commercial applications include kits for hobbyists and artists who make metal jewelry. Artists also could use it to make pottery in one day—a process that normally takes three to seven days.

### Numbers guy makes math research compute for students

The ingenuity of **Christopher Bendel**, Ph.D., in taking the mystery out of math research for undergraduate students is just one of the reasons he was named UW-Stout's Outstanding Researcher for 2006.

Bendel, department chair and associate professor of mathematics, statistics, and computer science, engages undergraduate students by tapping into their skills in both math and computer programming. His goal is to have students apply their programming skills to unravel unsolved mathematical problems involving structures called Lie algebras.

Several students in the applied mathematics and computer science program have conducted research with Bendel. Some of the students' computations will contribute to an upcoming publication, and some have presented their work at regional events.

### Math gets a little TLC

**Jeanne Foley**, Ph.D., received a three-year, \$450,000 grant from the Fund for the Improvement of Postsecondary Education through the Department of Education. The grant will support the Math Teaching and Learning Center, or Math TLC, of which Foley is the director.

The lab is a technology-enhanced classroom dedicated to several sections of two first-year math courses. It is staffed with teachers as well as students trained as peer tutors. Special software gives students immediate feedback and also 24/7 online help for each problem. Homework assistance is available in class daily, and instructors closely monitor students' progress.

The method has achieved a 61 percent reduction in failure and withdrawal rates in Beginning Algebra and 23 percent in Intermediate Algebra.

### Creating a safer campus

The Counseling Center has received its second two-year, \$200,000 grant from the U.S. Department of Justice to fund its Campus Violence Prevention Project. The center received its first two-year grant in October 2004.

The project establishes a campus response to violence against women that prioritizes the needs and safety of student victims and creates positive social change within the campus community.

The pilot program is achieving higher reporting rates. While incident rates of campus sexual assaults at UW-Stout have remained the same, reporting rates have almost doubled. Higher numbers of reported incidents indicate campus reporting and support systems are working.

A campus community is being created where more victims feel confident enough to come forward and report.

## Pending patents and copyrights

### Building a better shoebox

Three students have invented see-through packaging using flexible bags and one piece of stiff cardboard-like material that protects shoes and is less expensive to manufacture and ship than shoeboxes. The design uses less storage space, is easy to assemble, requires no factory construction and leaves the shoes visible (*a plus for retailers and purchasers alike*). The materials also are recyclable, which may lead to tax breaks. Students **Alyssa Downing-Perrault**, **Brianne Hartung** and **Bradley Homan** won first place at the Flexible Packaging Association's Student Packaging Design 2005 Competition for their invention.

### Wearable shelter

Four students designed a multifunctional garment that takes the concept of packing light to the extreme. Students **Sara Barnes**, **Stephanie Herbert**, **Melissa Long** and **Laura Oliver** designed the Turtle Back Jacket—a garment that transitions from a jacket and backpack to a tent, sleeping bag and floatation device. Its applications range from short-term disaster aid to recreational outdoor use. Its potential market is estimated at \$20 million to \$25 million in sales.

For their creation, the students were named finalists in the 2005 Concept 2 Consumer Design Competition sponsored by the American Association of Textile Chemists and Colorists.

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## Center for Innovation and Development

### **Kitchens that measure up**

Not all chefs are the same height, but the heights of their work surfaces are. Until now. Researchers in the Stout Vocational Rehabilitation Institute and faculty members in the departments of food and nutrition and hospitality and tourism have designed height-adjustable and mobile cooktop and food preparation tables using a universal design philosophy.

The standard heights for work surfaces in the food industry are the ergonomic ideal for individuals between 5 feet 6 inches and 5 feet 8 inches tall. Taller or shorter individuals typically suffer from carpal tunnel syndrome or backaches over time. The new system meets the needs of 90 percent of users. Individuals from 4 feet 4 inches tall to 6 feet 7 inches tall can adjust the height of their cooktops for optimum comfort and safety.

### **No need to remove pants**

The next time you wear your winter-lined pants and the temperature heats up, you may not have to find a secluded area to remove the lining, thanks to two UW-Stout students.

Students **Pamela Anhalt** and **Karl Fels** invented a lining that is worn under pants, but can be taken off without removing the outer pants—and possibly without removing your shoes or boots, either. The novel lining can be worn under any type of pants to keep you warm in cold weather. Once removed, the lining can then be folded and packed into a pocket on the bottom of each pants leg.

The invention may have applications for the military, NASA and outdoor recreationists.

### **Ideal gift for college-bound students**

For college students tired of eating macaroni and cheese, they should try adding fried Canadian bacon, Cajun seasoning and herbs to the boxed staple. That recipe—and more than 100 recipes like it—are featured in the cooking recipe software “Cook’n for College Kids,” the brainchild of **Brian Bergquist**, Ph.D., associate professor of hospitality and tourism.

Bergquist approached DVO Enterprises, the company that publishes the Cook’n software series, to add recipes targeting college students. They agreed and recipes were collected from UW-Stout students in the food production laboratory. The recipes use inexpensive food and are easy for beginners, but will impress friends. The software, which is available on CD or DVD, also comes with tips for menu planning, shopping lists and nutrition.

*The Center for Innovation and Development, a part of the Stout Technology Transfer Institute, assists manufacturers, inventors and entrepreneurs in the community with feasibility assessment, product engineering and design, prototype development, product evaluation and patent advice. Eligible products are disclosed to WiSys in pursuit of license agreements. WiSys is the nonprofit technology transfer organization of the UW System comprehensive universities.*

### **A refrigerator for all users**

Individuals with limited mobility—including people who are elderly, physically disabled or use wheelchairs—have difficulty accessing conventional refrigerators. John Imre, of Chippewa Falls, approached the Center for Innovation and Development with the concept of a wheelchair-accessible refrigerator named the Freedom Fridge.

The refrigerator is height adjustable and its shelves rotate so contents are easily reached. The side of the refrigerator also may be semitransparent so contents can be viewed without opening the doors.

### **Door jambs made easy**

Building contractors may soon be able to use door jamb assemblies that adapt to variances in wall thickness.

Multiple sizes of door jambs are needed in construction to accommodate different building codes and wall sizes. However, most manufacturers make a single door jamb that contractors must custom fit with a wooden extension jamb. But wood can rot when exposed to moisture.

Scott Denning, of Hudson, approached the Center for Innovation and Development with a door jamb assembly made of interlocking parts that is adjustable in height, width and depth, based on the contractor’s needs. Plus it is made from cellular PVC, making it resistant to deterioration.

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## Student-focused activity

### Top ten in the nation

A three-student team made the top-10 in the Ecomagination Challenge, a national college competition sponsored by mtvU and GE, to invent campus greening projects.

**Jason Burbank**, **Tobias Leidke** and **Tim Parmer**, three art students studying industrial design under assistant professor **Noah Norton**, M.F.A., designed a simple and efficient system for composting large quantities of campus food waste. The composting system required a minimum of energy and labor. No other composting system could handle this amount of food waste with so little energy or labor use.

Judges selected their Happy MicroOrganism Compost Train project from more than 100 entries to join its top 10 list. Other student projects from universities such as Massachusetts Institute of Technology and the University of Michigan rounded out the finalists.

### Students take action with art

**Ambica Prakash**, M.F.A., assistant professor of art and design, introduced the students in her Graphic Design Two course to the United Nations' eight Millennium Development Goals through a poster assignment.

The "Take Action!" poster project required students to research and select data related to the issues of poverty and hunger, primary education, gender equality, child mortality, maternal health, HIV/AIDS, environmental sustainability and global partnerships for specific continents. The art students then designed graphics to communicate the information.

In a collaborative effort, students enrolled in Graphic Communications Practicum, led by professor of apparel and communication technologies **Jim Tenorio**, Ed.D., printed and bound the posters into a perforated-book format.

The result of the partnership was an effective visual system that built relationships between the research, design and printing processes.

### Students take charge, change the world

Each semester, students create social action groups through which they address community issues in Menomonie. The students are enrolled in the course, Abuse and the Family, taught by **Susan M. Wolfgram**, Ph.D., assistant professor of human development and family studies.

The social action group projects are an example of action learning, which emphasizes learning by doing, teamwork and problem solving to address social or organizational issues.

Last fall, students tackled social issues such as domestic violence, campus violence and teen dating violence. This past spring, students tackled social issues related to sexual assault, child abuse, bullying and elder assault. Many of the projects collaborated with UW-Stout's Campus Violence Prevention Project.

"These projects have helped students get jobs," Wolfgram said. "I help them highlight all the skills that they take away from these projects, including fundraising, event planning and working with groups."



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UNIVERSITY OF WISCONSIN  
WISCONSIN'S POLYTECHNIC UNIVERSITY

**Research Services**  
152 Vocational Rehabilitation Building  
221 10th Avenue, Menomonie, WI 54751