



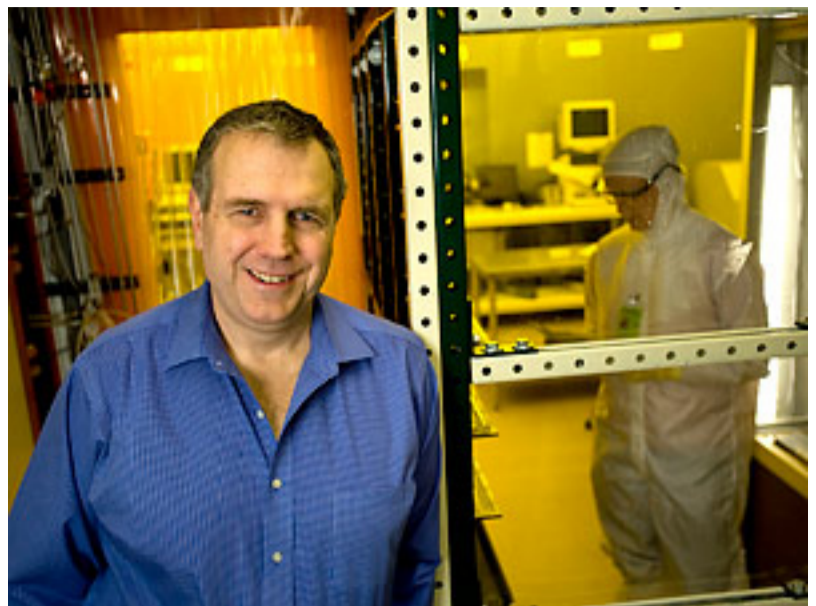
2010: A space odyssey

January 15, 2010

The University seeks a new building for physics and nanotechnology

By Deane Morrison

The demands of modern research are straining the University's physical capabilities, and without new space the U's Institute of Technology (IT) risks losing ground in bedrock areas for advances in medicine, technology, and our understanding of the Universe.



Clearly, the University of Minnesota, which boasts an outstanding record in physics and nanotechnology, must do more to stay in the game.

A new physics and nanotechnology building would give a big boost to the University's research competitiveness, says Steve Campbell, director of the U's Nanofabrication Center.

Accordingly, the University will ask the 2010 Minnesota Legislature to fund two-thirds of a new \$80 million building to house experimentalists in physics and nanotechnology.

Photo: Patrick O'Leary

Needed: 21st-century laboratories

The U's Tate Laboratory of Physics was designed for physics in another era, says Regents Professor of Physics Allen Goldman.

To renovate Tate, its heating, ventilation, and air conditioning "would have to be recreated," he says. Tate's infrastructure could never support modern research without a complete overhaul, but it is too costly to retrofit.

For example, physics professor Paul Crowell must work around Tate's poor environmental control. In his studies of optics and low-temperature physics, he reflects lasers off precisely positioned mirrors. A temperature rise of just a half-degree Celsius can change the distance between mirrors enough to ruin his data.

And the lack of space keeps the University from adding faculty in accordance with its size and caliber.

"During this decade, we have made six offers to experimentalists that were accepted and 15 that were declined," says Ron Poling, head of the School of Physics and Astronomy. "The single biggest factor ... is the lack of competitive experimental laboratories."

Needed: Room to build

Physics professor Kenneth Heller and his U colleagues are engaged in two national projects to study neutrinos, both of which require gargantuan detectors to pick up the elusive subatomic particles. But without a high bay in Tate, they must build prototypes in a building a mile away.

"There, the loading dock can't accommodate big trucks," laments Heller. "Every time we have a delivery, we get a permit from the city, then close the street behind the building, bring in the truck and a crane, and have students carry material inside." And no deliveries are possible in slippery winter conditions.

But since they must build their next detector soon, they will rent and renovate another space outside the University at a cost of about \$2.5 million.

Needed: Space to collaborate

In addition to a high bay, a new physics and nanotechnology building would house the Nanofabrication Center, which helps hundreds of clients from universities and companies across the country construct nanotechnology-based devices.

But applying nanotechnology in key areas like energy, information devices, and medicine requires shoulder-to-shoulder collaboration among engineers and professionals from biology, medicine, materials science, and physics.

"The most common example is that we need wet biology labs where you can culture human cells, bacteria, etc. next to a clean room for [device] fabrication," says Steve Campbell, director of the center. "... [W]e have inadequate square footage and equipment, and we don't even have the facilities to put equipment in."

With the collaboration a new building would allow, the University will become a stronger competitor for large federal grants in nanotechnology, which ranks second to cancer in federally sponsored research support.

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If built, the new building would feature the ventilation and temperature control necessary for experiments in biophysics and solid-state physics, a Class 10 clean room for biomedical applications of physics and nanotechnology, and a high bay area for constructing the large detectors needed to reveal nature's ultimate secrets.

The building would also have space for resesarch groups to meet and students to gather and help each other with problems.



Keeping tabs on forests

January 19, 2010

New software from the U helps global climate change research

By Deane Morrison

In the wake of the recent U.N. climate change conference in Copenhagen, the United States and five other nations have pledged \$3.5 billion to preserve forests.

This creates the need for better technology to track changes in the world's forest ecosystems over time. And University of Minnesota computer scientist [Vipin Kumar](#), along with his research team, is developing it.

Forest losses and degradation account for as much as 20 percent of greenhouse gas emissions, second only to fossil fuel emissions. When forests are destroyed or degraded, not only can trees no longer remove and store carbon dioxide from the air, but the burning or rotting of trees releases any carbon they had previously stored.

Yet the amounts of greenhouse gas emissions from forest degradation have been some of the hardest elements of the global carbon cycle to pin down.

Tracking the planet's trees

Kumar's software allows researchers to track the growth and degradation of forests around the world and how they have changed due to fires, logging, droughts, floods, farming, and other activities. Policymakers can then use the data to allocate resources where they will do the most good.

"Our focus is on creating a planetary-scale information system," says Kumar, professor and head of the Department of Computer Science and Engineering. "We are developing algorithms that take NASA satellite data and use it to identify and create a history of changes in the world's ecosystems."

These new data mining methods have dramatically advanced the ability to monitor global land cover using satellite data. Kumar's system will help climate researchers study ecosystem disturbances and their relationship to global climate variability and human activity.

A new global network

The University recently entered a partnership with the Planetary Skin Institute, which began as a collaboration between NASA and Cisco Systems Inc. to develop a global "nervous system" called Planetary Skin. It will integrate data from sensors monitoring the air, sea, and land in a form that policymakers can use. The Kumar team's software will be incorporated into the first prototype of the Planetary Skin, to be released this year.

The prototype will begin by tracking where and how much carbon is held in rain forests, but it is expected to expand to cover agriculture and degraded lands. Such data will be key in dealing with energy use, water scarcity, and food security, among other issues.

Kumar says he hopes to make his system publicly available.



Vipin Kumar and his team of graduate students—including Shyam Boriah—have developed software to keep tabs on the world's forest cover.

Photo: Jayme Halbritter

One of TIME's Top 50

The Planetary Skin platform was recently named one of TIME magazine's 50 Best Inventions of 2009. Through the partnership between the University and the Planetary Skin Institute, the institute will provide \$3.2 million to the University over three years. The partnership was announced at the recent U.N. Climate Change Conference in Copenhagen.



Researchers report first objective test for post-traumatic stress disorder

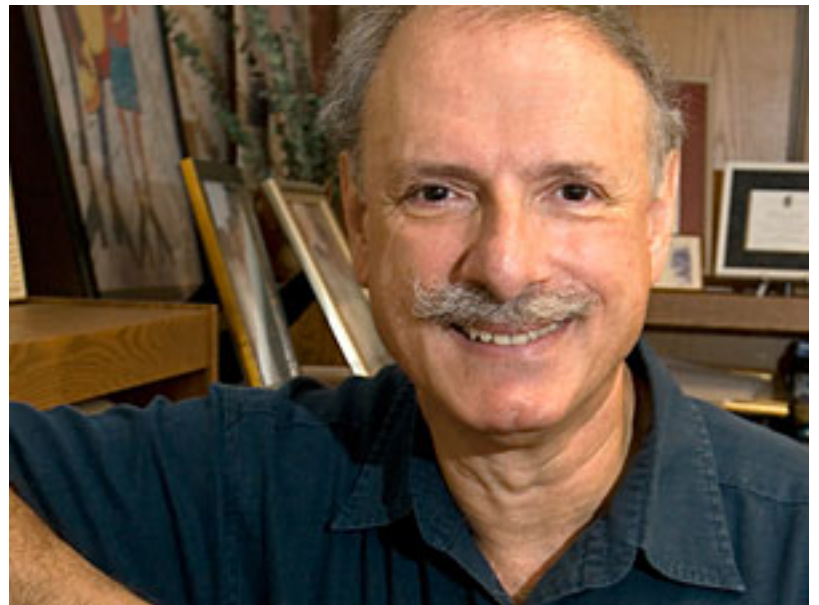
January 20, 2010

Discovery could lead to more reliable diagnoses of the debilitating condition

By Deane Morrison

Tapping into the "babble" between groups of neurons in the brain, University of Minnesota researchers have linked a pattern of signals to post-traumatic stress disorder (PTSD), a debilitating condition for which there is no objective test.

Such a test could give doctors a way to diagnose PTSD, assess its severity, and evaluate treatments. It could also guide those who decide who is entitled to disability payments or which soldiers are fit for redeployment.



Apostolos Georgopoulos and his colleagues have made fundamental advances in the science of psychiatric conditions.

Photo: Patrick O'Leary

Leading the study were [Apostolos Georgopoulos](#), Regents Professor of Neuroscience and director of the Brain Sciences Center at the Minneapolis Veterans Affairs Medical Center, and VA psychologist [Brian Engdahl](#), a clinical associate professor of psychology at the University. The work is [published online](#) in IOP Publishing's Journal of Neural Engineering.

Help for a private agony

PTSD patients typically suffer from nightmares and relive—involuntarily—traumatic experiences. The disorder can be caused by almost any situation of intense fear or violence, such as sexual assault, a car accident, or the horrors of battle.

"Across all types of disabling diseases, PTSD consistently ranks in the top 20, especially among women," says Engdahl. "The current lifetime prevalence is about 3.4 percent for men and 9.7 percent for women. The cost in human and economic terms is staggering."

As with nearly all mental disorders, PTSD leaves few clues for the outside world to latch onto. Neither X-rays nor brain scans like CT or MRI can identify patients who have it.

"It's like depression in that it can be hidden by the sufferer, it can be latent, and it can be re-activated," says Georgopoulos. "That's a major issue for the Army, which has to decide whether to re-deploy troops who have had it."

Many people who suffer from a stress disorder keep silent in order to protect their careers, says Engdahl, who has counseled PTSD patients. "But in talking to them, somehow the notion that high-technology could detect some abnormalities is comforting. An objective test for PTSD may help remove some of the stigma."

Magnetic signals tell the tale

The researchers examined 74 veterans of conflicts in World War II, Vietnam, Iraq, or Afghanistan who had been diagnosed with PTSD, along with 250 healthy volunteers. Using a [technique developed by Georgopoulos](#), they monitored magnetic signals from groups of neurons in communication with each other.

They noted a pattern of miscommunication that was nearly unique to PTSD patients. Overall, they were able to identify people as PTSD patients or healthy controls with more than 90 percent accuracy.

"Compared to evidence from functional MRI and other diagnostic tools currently being accepted by courts for other disorders, this test is much stronger and has a higher probability of being accepted as evidence by courts," Georgopoulos says.

The pattern seen in PTSD patients appears to be a flaring up of brain networks that have to do with reliving experiences. Also, the strength of the pattern mirrored the severity of symptoms, suggesting that the test may be used to monitor a patient's progress during treatment.



Beyond green

January 20, 2010

U student groups join forces on community sustainability project

By Rick Moore

Say this about members of the student group Greenlight: They're well on their way to filling up the little cart at the end of this month.

More about the "little cart" reference later. For now, this is a story about the students of Greenlight, their dedication to sustainability, and how their annual community project has become a model of interdisciplinary collaboration.

An action-based group

Students in the College of Design founded Greenlight in 2002. Their focus on sustainability has taken various forms, from hosting the weekly film series "Greenscreen" to managing the composting program in Rapson Hall.

These days, they put more emphasis on making Greenlight an action-based group, says member Amber Sausen, a third-year graduate student in architecture and sustainability. "There are plenty of places you can learn about sustainability," she says. "We are trying to do something about it within the college, within our own personal lives as students in the college, and then through our community-based 'charrettes.'"

A charrette (see sidebar) is essentially a design brainstorming session, and this year's Greenlight charrette will benefit Sparc, a community development organization in St. Paul. Elizabeth Turner, a Greenlight member and co-coordinator of the charrette, became familiar with Sparc as a research assistant for CURA this past summer.

Sparc recently acquired three acres of land next to Willow Reserve on St. Paul's North End, and is looking at options for a future housing development on the site.

Its goal—and the purpose of this year's charrette—is to develop ideas for a unique and forward-thinking development project "that embodies ideas of sustainability in the broadest way possible."

'Beyond green'

"Sparc was telling us about their dreams for the site, and the more we heard the more we realized we are not capable of fully developing ideas for this on our own," says Sausen.

That's when Greenlight decided to collaborate with other student groups to bring a wider range of expertise and interest to the effort.

"We put out the call for co-conspirators, as it were, and had a lot of response, which is pretty exciting," Sausen says. Other student groups involved with the project include Engineers Without Borders UMN, the Minnesota student chapter of the American Society of Landscape Architects (MASLA-sc), and Green Biz.

The latter, an organization founded last spring in the Carlson School of Management, "primarily focuses on the business aspects of being green," says member Ben Strasheim. The group is crafting a feasibility study for the Sparc development, investigating topics such as area demographics, economic needs, and what kinds of housing and retail are in the area.

The student chapter of MASLA is involved in both site and some regional-scale research, including topography, zoning, and city drainage infrastructure, says member Prescott Morrill.

"We were able to receive very generous funding because we were applying as multiple groups that were working together to put on this event," Sausen says.

A cart full of ideas

The charrette, which means "little cart" in French, will take place on January 29 and 30.

Ultimately, the event will be a chance for U students—and the community members who attend—to brainstorm truly fresh ideas, unshackled by the constraints facing working professionals.

"I use the word dream a lot, but I really think that's an important part of the creative, playful process that can happen in a charrette," says Sausen. "It doesn't have to be 'sustainability is going to save the world'; it can be fun, too."

The end product will be a large, narrative collage of words and images, says Turner, "a bunch of ideas but formulated in a consistent way."

"It's good experience for all of us," she adds, "and hopefully it'll turn out to be a good product for Sparc to use in the future."

For more information or to sign up to attend "Beyond Green: The Willow Reserve Design Charrette," visit [Greenlight](#).



Greenlight members examine maps, drawings, and ideas in preparation for their upcoming charrette January 29 and 30. The brainstorming sessions, aimed at producing ideas for a new housing development in St. Paul, are open to the public.

Photo: Patrick O'Leary

Jumping on the charrette

According to Amber Sausen and other sources, the word "charrette" comes from the French word for "little cart." At the Ecole de Beaux Arts in Paris during the 19th century, professors would circulate with little carts to collect final drawings from their students for competitions. Sometimes students would jump on the "charrette" to finish their drawings right at the deadline.



Creating community

January 21, 2010

U seeks new building for American Indian Learning Resource Center on Duluth campus

By Rick Moore

Soon after a conversation begins about the proposed new building on the Duluth campus, Greg Fox throws out a question: “Guess how many American Indian faculty and staff we have at the University of Minnesota Duluth (UMD)?”

The guess is woefully low, and Fox, UMD’s vice chancellor for finance and operations, says the correct answer is 31.

It was Fox’s way of suggesting that much of what goes on in the realm of American Indian education at UMD is below the public’s radar. For instance:

- UMD has the highest ratio of American Indian faculty and staff to students of any public university in the country;
- It has the only endowed chair in American Indian education;
- The University of Minnesota, in a joint program with the Duluth and Twin Cities campuses, graduates the second highest number of American Indian physicians in the country; and
- UMD has nearly 20 American Indian programs scattered throughout its campus.

“Scattered” is the operative word.

To unite those programs and provide better support for UMD’s students, both Indian and non-Indian, the University is proposing a new building to house UMD’s American Indian Learning Resource Center (AILRC). It’s part of the U’s [2010 Capital Request](#) to the Minnesota Legislature.

Bringing students and programs together

The new AILRC, standing at the southwest corner of campus, would serve as a gateway to UMD and to Minnesota’s American Indian culture.

“The building is not specifically for Indian students; it’s a gathering place for everyone to learn about our similarities and differences,” says Rick Smith, director of the AILRC. “It’s hard to have a respect for other cultures until you have an understanding of them.”

Smith points out that the majority of students taking American Indian classes are non-Indians themselves.

The building would consolidate a number of important American Indian programs, including: **Bridges to the Future** (baccalaureate and doctoral degree programs helping to increase the number of American Indian students in biomedical and behavioral sciences research); the **Center for American Indian and Minority Health** (support for students pursuing careers in health science); the **Center for Regional and Tribal Child Welfare Studies** (a place for strengthening social work skills); and the **Eni-gikendaasoyang Center for Indigenous Knowledge and Language Revitalization** (programs for people seeking educational careers based in indigenous knowledge and language).

In addition, the AILRC would house the second largest American Indian–specific library in the Upper Midwest (the Mishoomis Collection), as well as artworks from the campus’s Tweed Museum of Art.

The building would have approximately 19,000 square feet and include classrooms, a Great Room for campus events, and offices for student services. It would be the fifth LEED-certified building on campus.

According to UMD chancellor Kathryn Martin, the new building is important to the University, especially given its proximity to nearby reservations, collaborations, and outreach activities in the area. It would also be a great gathering place for UMD’s American Indian students.

“It helps them, and it also gives us a chance to host other events that honor American Indian traditions and give the greater community a chance to attend and participate,” says Martin. “We believe that having an American Indian Learning Resource Center that focuses on understanding and appreciating American Indian culture and the American Indian community is important, and a building like this will help us to do that.”



The new American Indian Learning Resource Center would have approximately 19,000 square feet and would stand in a prominent location on the southwest corner of the UMD campus.



Of principal interest

January 24, 2010

University alum and football player Tommy Watson overcomes childhood chaos

By Rick Moore

I looked around at our new home, the Triple A Motel—cigarette-burned carpet, one window, two beds, and a bathroom, \$35 per night—resting on the outskirts of Denver in a place called Commerce City. One lousy motel room to house nine miserable lives. It would be the first of two different motel rooms that we would call home over the next year and throughout the course of my eighth-grade year of school. Disheartened, at best, described my state of mind.
—Tommy Watson, from *A Face of Courage*



Tommy Watson, who received a B.S. from the University of Minnesota in 1997, helps lead a rousing rendition of the Palmer Lake Elementary school song.

Photo: Patrick O'Leary

The world of athletics is rife with tales of overcoming adversity, and we'll see our share during broadcast coverage of the 2010 Winter Olympics.

Stories range from athletes rehabilitating knee injuries to finding chemistry with new skating partners to forgetting crushing defeats. (You know, the whole "thrill of victory and agony of defeat" thing.)

But few can compare to the tale of University alum Tommy Watson, who endured more emotional tumult as a child than most people will in a lifetime. In fact, he would be the first to tell you he's lucky to even be alive.

But luck has little to do with where Watson finds himself today: a University of Minnesota graduate on track to get his doctorate; an elementary school principal; and author of his own life story to date: *A Face of Courage: The Tommy Watson Story*.

Heroin, not heroine

Think your childhood was tough? Watson grew up in Five Points, an inner-city neighborhood of Denver riddled with poverty, drugs, and gang violence. His parents were heroin addicts who supported their habit by shoplifting.

By the time Watson reached the third grade he had lived in three different foster homes, three crisis centers, and three motel rooms, as well as in his grandmother's home three times.

Focusing on multiplication tables isn't easy when your parents are spending most of their energy on finding enough money to buy drugs.

In a strange twist of fate, it may have been his inability to promote himself at that tender age that kept an angry Watson from joining a gang.

"The reason I didn't end up joining is because I didn't feel that the members were taking me seriously about wanting to lead the gang as a third-grader."

Lead the gang?

"Yes, lead the gang. I had a lot of hurt and pain inside of me, and I was willing to administer that hurt and pain on others."

'Basketball saved my life'

At about that time his aunt "rescued" him and steered him from the streets to the basketball court.

"Basketball literally saved my life," Watson says. "Many of the things that I had been seeking from gangs I got from participating in sports—the collective relationships with other groups of guys, the celebration, the excitement and enthusiasm of participating in things that were recognized in the community. I wasn't a good athlete, but it was just the thrill of being connected with something bigger than yourself."

Watson began playing football too, and received another break when he was recruited as an athlete to attend Mullen High School across town. He took three buses to get to school and three to get home, which resulted in some 16-hour days.

The extra effort paid off. At Mullen, Watson became the top-rated football recruit in Colorado, and he caught the attention of Jim Wacker, who was about to become the head football coach at the University of Minnesota.

'Do or die' at the U

When Watson arrived at the University in the fall of 1992, his family life was still in chaos.

His mother, father, and little brother were all in prison, and his grandmother, who had been his last legal guardian, was in a nursing home with Alzheimer's disease. That doesn't even count the drama in his other siblings' lives.

"I came here on a Greyhound bus and had no home address back in Denver whatsoever," Watson says. "And it became do or die when it came to getting an education at the University of Minnesota, so the U of M is a very, very special place for me. ... The five years I spent at the U were the most stable years of my life."

Those were not glory years for the Golden Gopher football team. Chris Darkins, who would become a good friend of Watson, was the star running back, but the team's collective record in Watson's time was only 16-39.

He suffered a back injury in his junior year, and it was about that time that he realized his dream of playing in the National Football League was unrealistic, and that a degree was his key to success. So he asked his adviser what he needed to do to graduate.

"She and I put together a plan that was going to entail me missing football my senior year, and I committed to the plan," he said. "I would literally lock myself in my room, close the blinds, and unplug the phone, when everyone else was talking about going to Lake Calhoun."

"I knew that leaving the University of Minnesota without a degree was not going to be an option," he adds. "There was nothing but doom and gloom waiting for me back in Denver, and a lot of people waiting to tell me that they were right—that I wasn't going to make it."

They were wrong.

A rousing principal

Watson is now the principal at Palmer Lake Elementary, a school of about 700 kids—75 percent students of color—nestled in a quiet area of Brooklyn Park near its namesake small lake.

He's a big man in a land of small desks and low drinking fountains, and that has more to do with his calm, caring demeanor than the fact that he'd still fill out a football uniform well.

As he walks the halls, students beam "Good morning Mr. Watson!" and he entices one class to sing Palmer Lake's school song, which has a very familiar ring.



He's a "high care, high demand" principal, and his own life experiences give him a unique ability to help others.

"When I have kids walk in through the door with those same [difficult] circumstances, I can always provide them with an element of hope that someday they'll get beyond that," he says.

Down the road, he envisions getting into personal executive coaching and motivational speaking.

"I'll always stay in the helping-people business," Watson says. "There's nothing like helping people live out their lives and dreams. I'm doing that as a principal, and we do that as educators now, but I'd like to broaden that horizon to be able to work with adults as well."

"... the reality of it all is this: had I not persevered through these many painful episodes of my life that often seemed hopeless, I would not have been standing where I was on one particular day—that special day in 1997 when I became the first person in my family to attend—and now graduate—from college. Wow! ..."

In the words of my good friend Jamil Salaam, "Often, during troubled and chaotic times, miracles are born."

Watson's book *A Face of Courage* is available at Barnes & Noble and amazon.com. You can contact him at tommywatson32@yahoo.com.



Rising tide of research

January 26, 2010

The U had a growth spurt in 2008

By Deane Morrison

The University of Minnesota has long been hailed as a major economic engine for the state.

That engine runs on research, and its horsepower is growing.

In the National Science Foundation (NSF)'s latest report on research expenditures by universities, the U posted a 9.5 percent increase from 2007 to 2008. That beat out all the others in the top 20 tracked by NSF, including private institutions.

The University remained in ninth position among public universities, but sliced away at the gap between it and eighth-ranked Penn State. The U also has posted a 30 percent increase in research expenditures since 2004, the third-highest growth in research volume among the 12 public institutions in the NSF top 20.

A crucial investment

When universities spend money on research, they create knowledge, apply knowledge to solving society's problems, and teach the next generation how to continue the journey.

All these lead to economic growth. On average, 32 jobs are created in Minnesota for each \$1 million in research funding at the University, according to the U's Office of the Vice President for Research. By that formula, the U's \$683 million in research expenditures in 2008 translates to 21,850 jobs.

A reliable yardstick

The NSF data are for R&D expenditures in science and engineering, but they closely reflect overall research expenditures, which include arts and humanities funding. The University uses the R&D data as its primary yardstick in tracking its rise through the ranks of U.S. universities because research is central to its mission and the numbers are free of subjective judgments.

"Research expenditures are a clear indicator of the quality and competitiveness of an institution's research enterprise," says R. Timothy Mulcahy, the University's vice president for research.

Also, he says, cuts in state funding to the University have been closely followed by declines in the U's research productivity. State funding plays a critical role in attracting and keeping the high-caliber faculty who form the backbone of the economic engine.

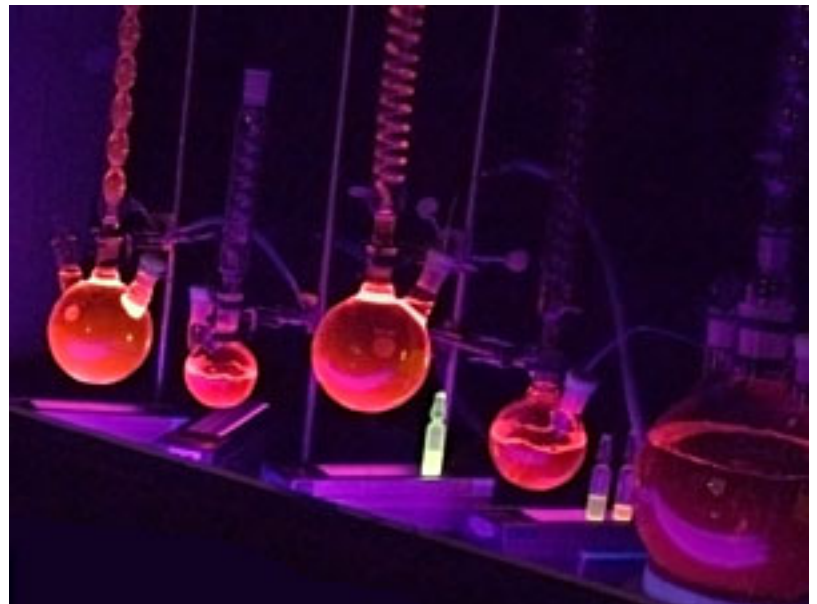
The University has set its sights on cracking the ranks of the top three public research universities. The gap in research expenditures between the U and number three—since 2005, UCLA and Michigan have traded the spot—shrank from \$237 million to \$193 million between 2005 and 2008. And the U narrowed the gap with Penn State from \$49 million to \$18 million between 2006 and 2008.

Early beneficiaries: students

Whether bound for research-heavy careers or not, students reap rich rewards from attending an institution where research takes center stage.

"University-level teaching that is not grounded in research quickly becomes stale, and with an ever-accelerating rate of change in all disciplines it is absolutely critical that students be exposed to and learn from researchers who are actively engaged in expanding the frontiers of knowledge," says Mulcahy.

"This environment also offers numerous opportunities to students to actually participate in research, providing them with critical training in rational thinking ... scientific reasoning ... and many other benefits, all foundations for effective lifelong learning."



As University research expenditures rise, so too do discoveries, employment, and opportunities for students.

Photo: Patrick O'Leary

A commercial success

The U is also reaping higher revenues from the commercialization of technology its researchers have developed. Revenues in FY 2009 rose from \$86.9 million to \$95.2 million. Most of that is due to royalties from the sale of the anti-HIV drug Ziagen, marketed by GlaxoSmithKline; other revenues rose from \$7.9 million to \$8.7 million.



Attachment: The gift that keeps on giving

January 28, 2010

University research shows how early bonding pays off

By Deane Morrison

One morning, children arrived at a nursery school to the sound of music.

Two children asked the same child to dance, and both were turned down. The first asked another child to dance, but the second went off in a corner.

Why the different reactions? It may be that one child enjoyed a more secure attachment to his or her parents.

These attachments are a focus of research at the University of Minnesota's Institute of Child Development (ICD). Since 1975 professors [Byron Egeland](#), [Alan Sroufe](#) and their colleagues have been conducting a study of how kids form secure attachments to parents and other caregivers and how these early bonds stand them in good stead in adult life.

"Secure attachment means the child is confident—not anxious—about the availability and responsiveness of an adult," says Sroufe. "That confidence is the basis for confidence in oneself and others, and the ability to form adult relationships."

Early signposts

A child who has a secure attachment to an adult is more likely to be interested in and engaged with other kids, not hovering around the teacher but seeking comfort there if need be. Secure kids are also better able to take no for an answer when asking others to play—or dance—with them.

"A secure kid may not even experience personal rejection," Sroufe says. "But the anxious one might think, 'No one wants me.'"

Another sign of a secure attachment can be seen as early as age 2, according to research by Martha Farrell Erickson, a child-rearing expert who studied under Egeland.

"[Erickson] showed that securely attached kids at age 2 are likely to be more compliant to the guidance of the mother," he says. For example, when given a puzzle, the child will happily accept and respond to the mother's help.

A how-to for parents

Building a secure attachment rests on a parent's ability to respond to a baby's needs in a way that leads the baby to expect the parent will be there to offer comfort or guidance.

To do this, says Sroufe, a parent must "follow the baby's lead." That is, parents should hold a baby when the baby—not the parent—wants it and let the child play without undue direction.

Also, says Egeland, it's important to balance the desire to help with respect for the child's autonomy. For example, if ants appear on the floor, young children ought to watch them and "figure them out" on their own.

But parents who are emotionally unresponsive to kids in the early years—be it from stress or not having their own emotional needs met—can wreak devastation.

"It shows up in lower IQ scores, as well as grades and emotional troubles," says Egeland.

Later life effects

Now that the children who entered the study in 1975 have grown, the researchers are studying how patterns of attachment and other factors relate to social relations in the adult world. Professors [Andrew Collins](#) of ICD and [Jeffrey Simpson](#), psychology, are particularly involved in this aspect of the project.

In general, secure patterns of attachment early in life tend to lead to good social skills later on. For example, Collins and his colleagues report that people who had secure early attachments tend to have less difficulty achieving mutually beneficial adult relationships.

And just as a baby's development hinges on its relationship with its parents, the act of parenting takes place in a broader social support system. And so the researchers stress the need to support whole families.

"Any change in policy that makes life more stressful for parents or decreases support for them is detrimental to attachment for children," Sroufe says.



University research has shown the importance of secure attachments between parents and children.



Improving the climate

February 1, 2010

U seeks renovation to Folwell Hall to enhance learning experience for students

By Rick Moore

When it comes to historic treasures on the Twin Cities campus, the majestic Folwell Hall is in a rare class.

Built in 1907 and named after William Watts Folwell—the first president of the University of Minnesota—the iconic building at Pleasant Street and University Avenue is a visual smorgasbord from the outside, adorned with an array of gargoyles, sculpted faces and animals, and no fewer than 26 (mostly) fake chimneys. It's a fixture on the National Register of Historic Places, and its recent exterior renovation received a Minneapolis Heritage Preservation Award.



Folwell Hall was constructed in 1906-07 as a replacement for Old Main, the first building on the University of Minnesota campus (which was destroyed by fire in 1904). It's named after William Watts Folwell, who became the U's first president in 1869 (when there were fewer than 250 students) and served until 1884.

But Folwell Hall's true value—past and future—is tied to the student learning that happens each semester within those walls and under the fake chimneys. And that's why the U is seeking funding in its [2010 Capital Request](#) for a much needed renovation to Folwell's interior.

A home for 12,000 students

Folwell is a workhorse when it comes to classroom space on the Twin Cities campus. Last year, more than 12,000 students enrolled in courses that met in Folwell's 30 classrooms, and the building teaches nearly 800 undergraduate majors.

But the workhorse is not built for comfort, by any stretch, and that makes learning difficult.

"With some of these classrooms, you have a choice between very noisy or very uncomfortable. Turn the air conditioner on and you can't hear. Turn the air conditioner off and everyone roasts," says Gary Oehlert, associate dean for planning in the College of Liberal Arts (CLA). "Improving the classrooms and creating a better educational experience so that students can learn languages and cultures, become better global citizens, and help Minnesota participate in the global economy is the goal. The real motivation here is about the students."

"The environment in which students learn languages is going to be dramatically improved [with the proposed renovation], both in terms of the HVAC/sound issues and comfort, and also in the connectivity of the classrooms to the world," adds Scott Elton, assistant to the associate dean for planning in CLA.

A hub of language instruction

Of the 40 world languages taught at the University, 27 are taught in Folwell Hall. That makes Folwell the largest foreign-language teaching center in Minnesota.

Some of those languages carry greater importance today than in decades past. Spanish, Chinese, and Japanese are some of the major languages related to U.S. trade interests. "We're also teaching Hindi and Urdu, as the Indian subcontinent is becoming more important economically," says Oehlert.

In addition, the U receives close to \$1 million each year in Title VI funds from the Department of Education to support the teaching of other critical-need and underserved languages taught in Folwell, including Arabic, Russian, Persian, Turkish, Korean, and Farsi.

"Those may be some of the more important languages from a national security perspective," Oehlert notes.

Preserving a landmark

The renovation would ensure that the interior of the building keeps pace with the demands of today's learning. The project would provide:

- technology-enhanced classrooms for the teaching and learning of foreign languages and culture;
- easy reconfiguration of classroom and office space; and
- improved mechanical and electrical systems, accessibility, and fire safety features.

And it will help make the learning experience memorable for students—in a positive way.

Junior Paul Strain, president of the Minnesota Student Association, is a biochemistry major with a minor in German studies. He's had a class in Folwell during each of his six semesters at the U and can testify to the current atmosphere in the building.

"It's hot during the summer, it's hot during the fall, it's hot during the spring, and it's almost way too hot in the winter," he says. "The HVAC system is just a mess, and the electronic capabilities aren't really conducive to the new ways of teaching.

"It's an old building, and it needs repair. And it sets a precedent if we don't take care of the buildings we have."



Going with the flow

February 1, 2010

Researchers find first evidence that water movements can mold fish bodies and swimming styles

By Deane Morrison

The water movements generated by fish as they swim could have a hand in shaping the form of their bodies and their swimming style.

So conclude researchers at the University of Minnesota's St. Anthony Falls Laboratory (SAFL), who have just found the first evidence that the way water moves over a fish, and at what velocity, could be an evolutionary force.

The study, published in the [Journal of Experimental Biology](#), aimed to find what shapes and swimming motions were most efficient—that is, used energy most judiciously—at different speeds.

That knowledge could guide the design of aquatic robots, which someday may be built to retrieve samples from toxic waste pools or the ocean depths; spy on unfriendly ships; or even deliver drugs via the human bloodstream.

Also, other researchers can adapt the methods to study how fluid environments shape other organisms, including birds and insects.

Eels and their eerie efficiency

The research began as a way to understand why fish are so different in shape and swimming styles, and how those traits might allow some to perform amazing feats, says SAFL director and civil engineering professor Fotis Sotiropoulos, co-author on the paper.

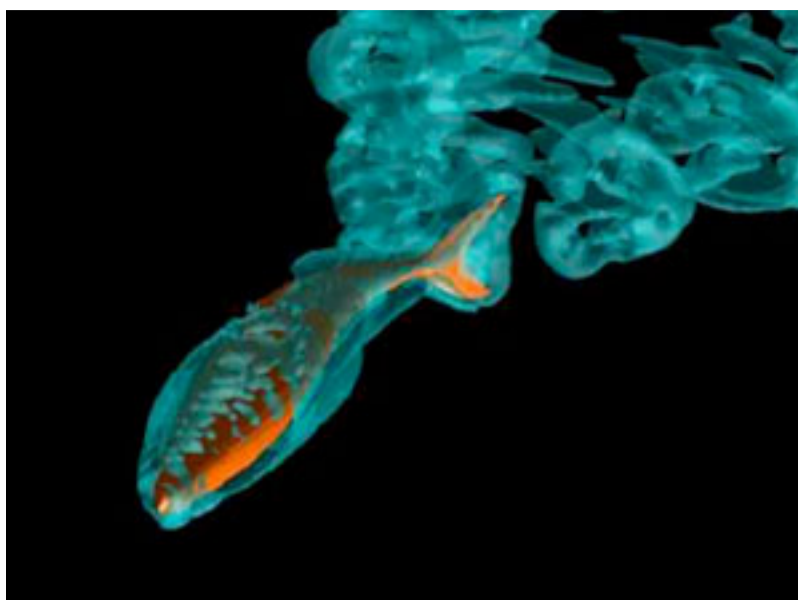
For instance, eels, which are shaped and swim similarly to lamprey, are neither large nor particularly fast. Yet some migrate a good 3,000 miles, from the coastal waters of Europe to the Sargasso Sea, to spawn.

"How can they swim efficiently enough to do this with limited energy reserves?" Sotiropoulos asked.

Patterns of water movements—hydrodynamics—generated by organisms were long suspected of having the power to steer the evolution of creatures that live in fluid environments. But this influence is hard to study in real fish, which have a habit of not performing on demand.

Hydrodynamic duo

Patterns of water movements—hydrodynamics—generated by organisms were long suspected of having the power to steer the evolution of creatures that live in fluid environments. But this influence is hard to study in real fish, which have a habit of not performing on demand.



This simulated mackerel swims most efficiently at relatively high speeds.

Image courtesy St. Anthony Falls Laboratory



Therefore, postdoctoral researcher Iman Borazjani and Sotiropoulos turned to their computers. They simulated two fish with the sleek, powerful shape of a mackerel: one that swam like a real mackerel and one that moved with the wriggling motion of an eel. They also made two lampreys, one that wriggled like a real lamprey and one that beat its tail like a mackerel.

The researchers threw all four virtual fish into a virtual tank and tested their performance in two simulated environments. In one, the water movements over the fishes' bodies were similar to those generated by the slower swimming of a lamprey, and in the other they resembled those produced by the speedier mackerel.

The results showed that all fish swam more efficiently if they had the body form or swimming style appropriate to the speed. That is, at slower speeds, fish shaped and moving like lamprey could swim most efficiently; for a real fish, that would mean being the last one to tire out. Likewise, swimming at mackerel speeds was most efficient for fish shaped and moving like mackerel.

"From these experiments we can deduce that real mackerel and eels have evolved in response to the hydrodynamic environments they generate and become adapted to them," says Sotiropoulos.

So how come slowpokes like goldfish don't look like lamprey?

"Our studies were only for fish swimming steadily for long periods. Both mackerel and lamprey migrate over long distances," says Borazjani. "Other fish, such as goldfish, may have been shaped by the need for other traits, such as maneuverability."

The study was funded by the National Center for Earth-surface Dynamics.



In their own element

February 2, 2010

New online chemistry course offers students greater flexibility

By Rick Moore

For months last year, U chemistry instructor Michelle Driessen dreaded the lectures for her fall 2009 class, Introductory Chemistry. It's not that she doesn't love to teach. It's just that she knew she'd be teaching in a room with no students.

Such is life when you're taping lessons for a new online course.

Driessen forged ahead last summer, taping her lectures in bite-sized topics and discovering a trick to engage her future audience: "I picked out a box on the wall in the back of the room and became friends with it," she jokes.

The result of her labor—and the University's eternal quest for the best teaching formats—is a new online course serving about 1,200 students. (Previously, Introductory Chemistry—a "bridge" course between high school chemistry and General Chemistry 1—was taught via four sections of 300 students.)

Students view lectures on their own time, complete weekly assignments, and take five exams in person. They can also sign up for optional in-person discussion sessions and chat with their instructor in person or by e-mail.

According to Driessen, the first semester of online chemistry at the U went well, and most students enjoyed the flexibility inherent in online learning.

"Not all the students like the format," Driessen notes, but in general, the enthusiasm level was quite high. "There's a group of students who like the flexibility and they like not having to come to lecture every day. A couple of them told me, 'I watched the lectures on the bus on the commute in using my iPod.'"

"It's not perfect for everyone," says Bill Tolman, chemistry department chair. "Going online for every class is not a good idea because some students don't learn well that way, and I think some students prefer face time in the classroom. It's going to be best applicable for lower-division classes with multiple sections, where you only take a part of the course and do it this way."

Play. Pause. Replay.

Student reaction to the course was generally favorable.

"It was nice that you could do it on your own time, and I liked that her lecture videos were short clips [according to topic]," says Hannah Dyrud, a first-year pre-nursing student. "I think it worked well online, although I enjoy chemistry and I guess you could say it comes easy for me. I don't know how easy [the format] would be for someone who would struggle with chemistry."

Indeed, that sentiment was borne out in some student evaluations. "I never want to take an online course again, especially not chemistry," said one. "It is difficult to understand complex equations when you cannot directly ask your teacher questions while you are learning the subject matter, and when you are not actually in the classroom."

On the other hand, some students cherished the break from the classroom.

"Chem 1015 gave me the flexibility to view and even review the lectures on my own without the hassle and time required for me to commute to and from class," says Kim Pham, a second-degree student who previously majored in sociology and English literature. "And I found that the weekly homework quizzes kept me on pace without monopolizing when and how I study."

"If I had questions, I'd ask the professor or classmates in the discussion forum. The professor would respond within a day or two and any student could respond to me and often did. Without the online format, I'm pretty sure I wouldn't have access to everyone in such a way."

Faculty lines

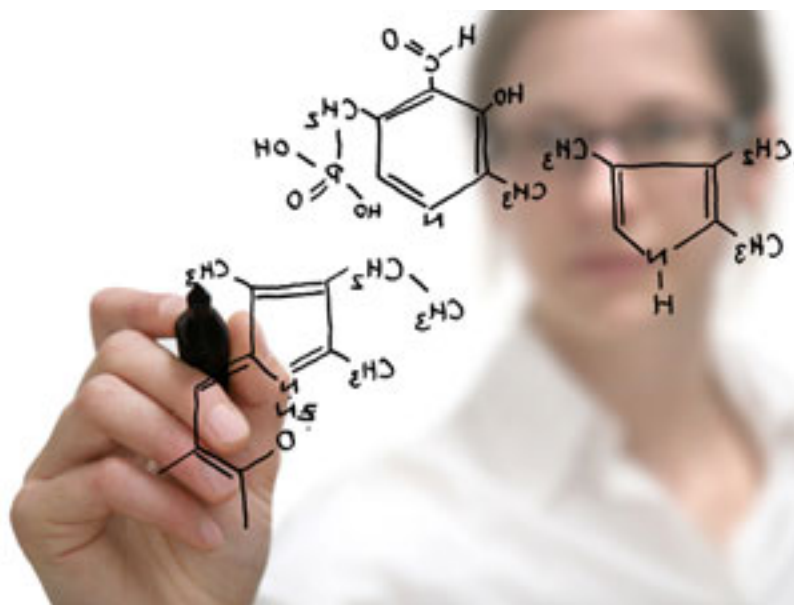
Driessen and Tolman stress that the instructor's time investment in an online course can be just as much—if not more—than in a traditional class, once you factor in the time spent answering student questions. Driessen estimates she spent eight hours a day answering e-mails during the first two weeks of the semester.

"It's just a different way of spending your time," Tolman says. "Instead of doing lecture prep and then standing up and lecturing, you're doing more informal, interactive work with students."

And the students, in turn, are doing much of their learning in as informal a manner as they choose.

Says Driessen: "A couple of them took me to the gym with them and said, 'I run on the treadmill while I watch my video.'"

Burning calories while learning how to balance chemical equations? That has to be worth some extra credit.



Instructor Michelle Driessen taped the lectures for her online Introductory Chemistry course this past summer according to topic, with topics ranging from 5 to 35 minutes.



Speaking out

February 11, 2010

Former Gopher star and current Team USA captain Natalie Darwitz talks hockey and the Olympics

By Rick Moore

Natalie Darwitz has been a hockey prodigy since she was old enough to first lace up skates.

After playing with boys teams till she was 13, she switched to the girls game as an eighth grader at Eagan High School, and scored a whopping 487 points (312 goals and 175 assists) in 102 games.

In three years at the University of Minnesota, Darwitz became the career Western Collegiate Hockey Association leader in points (246) and assists (144) and helped lead the Gophers win back-to-back national championships in 2004 and 2005.

Now Darwitz has taken her game to the next level... again. She has captained the U.S. Women's National Team to consecutive world championships, and her teammates voted her to be the captain of the 2010 Olympic team that, along with Canada, is considered a favorite for the gold medal.

It's hard to fathom that Darwitz grew up a shy kid, clinging to her mom's and dad's hips and preferring shoulder shrugs to spoken sentences. She came out of her shell, she says, about five years ago.

Make no mistake, Darwitz is no longer shy. She's at ease with the media, delightfully sarcastic, and quick with a hearty laugh.

On a snowy day in late January, the day before she would hop on a plane for the start of her five-week Great Olympic Adventure, Darwitz entertained a visitor at her figurative home ice—the Eagan Civic Arena—and answered questions about her life in hockey both as a Golden Gopher and now the captain of Team USA.

Q: You're a veteran now, but what was it like playing in the Olympics the first time in 2002 in Salt Lake City, representing the United States?

A: There were two times when it kind of hit me. When we got to the rink and we skated, there were the Olympic rings on the ice. One of my older teammates, who was in the '98 games, came up to me and said, "How does it feel to skate over the rings?" That's when it was like, "I can't believe this. How many people would love this opportunity right now to be in my skates doing this?"

Then, obviously, the opening ceremonies are another time when you're like, "Seriously, am I here right now?" You gotta pinch yourself.

Q: What's your schedule like in between games at the Olympics? Is there much free time?

A: When Coach [Mark] Johnson was in the Olympics in 1980, he said it was about the experience. He walked across the rink and watched [Eric] Heiden win five gold medals. He said, "That was a huge experience for me, seeing other athletes compete, and I want the same thing for you guys."

For a couple of hours each day that we have off, I'm sure we'll probably go out and do the spectator stuff, and hopefully see other events that are easy to get to. But on game days, none of that. We're pretty honed in.

Q: Aside from Canada (the other powerhouse in women's hockey), are there teams you're especially concerned about in Vancouver?

A: The two countries I worry about are Finland and Sweden. If those guys are hot, they can easily steal a game from you, and they have in the last couple of years, both from us and from Canada. So you've gotta be playing your best hockey. You can't take any game lightly, especially in the Olympics, because you can't get those games back. ... We have to take care of business.

Q: What's the best line you've ever skated on in terms of ability or chemistry?

A: The Kelly Stephens and Krissy Wendell (her teammates at the U from 2003-05) line by far. No question. To skate with those two and to be in sync as we were and to pretty much have a blindfold on and know where each other was going to be. ... I was pretty fortunate, and now looking back on it, I'm like, "Can I just have those two come back for one more year, one more month?"

Q: When you were at the U, what team did you consider to be your biggest rival, Wisconsin or UMD?

A: Wisconsin was tough, but I think we had the most passion against Duluth. [UMD was] a team where you just don't agree with what they do on and off the ice. You find joy and excitement—a lot of it—in beating them and seeing their faces at the end of the game. There was just not a lot of love for each other on the ice. You did one extra fist pump when you scored against those guys. (Laughs.)

Q: What would you rank as your top three moments in hockey to date?

A: For number three I'd go with the 2002 Olympics. Because it was in the United States, a lot of family and friends went, and it was my first Olympics.

My two other moments were probably in 2004 winning the national championship [for the Gophers], and then '05 is my number one—back-to-back titles. Obviously, the first national championship was huge to win. ... That was the first time I got to throw the gloves up and hog-pile on the goalie. ... To get that in '04 was amazing, but then to win back-to-back [titles] I think is one of the hardest things in sport to do. You have the bull's-eye on your back all year long.

Q: If you were to win the gold medal in Vancouver, where would that fit in on the list?

A: It'd probably be pretty close to number one. The last two years I've been fortunate enough to win world championships with the U.S. national team, but ask anybody two years down the road, three years down the road, who won the world championships, and no one's going to know.

I haven't played hockey the last four or five years every day to train for silver or bronze. It's obviously to get the gold. When you asked me about the top three, the Olympics is amazing to get to, but the reason I picked number one and number two is because we won.

The person who said winning doesn't mean anything must not have won anything. Because there's nothing quite like winning, you know?



In Natalie Darwitz's final game as a Golden Gopher, she scored the winning goal with just over a minute remaining against Harvard in the Frozen Four championship game. Darwitz was named Most Outstanding Player of the tournament and finished the season with an NCAA-record 114 points.

Photo: courtesy University Athletics

Gopher red, white, and blue

Darwitz is one of a half dozen women's hockey players in the Olympics with University of Minnesota connections. Gigi Marvin finished her Gopher career in 2009, and Jocelyne and Monique Lamoureux played at the U last year as freshmen before leaving the program. Angela Ruggiero is a graduate student at the U in kinesiology. And Gopher goaltender Noora Rätty will be playing for her home country of Finland in Vancouver.

The U.S. hockey team swept its first four games (over China, Russia, Finland, and Sweden) by a combined score of 40-2. In the 6-0 win over Finland, Darwitz netted a goal and two assists to give her 11 points in the 2010 Olympics—a new U.S. team record. The United States will face Canada in the gold medal game on Thursday, February 25, at 5:30 p.m. CST. It will be broadcast on MSNBC. For more information visit the [USA Hockey Web site](#).



Ecologist Peter Reich garners international award

February 17, 2010

Versatile Regents Professor recognized for basic discoveries about plants and the effects of climate change

University of Minnesota ecologist [Peter Reich](#) has won this year's BBVA Foundation Frontiers of Knowledge award in ecology and conservation biology.

The BBVA Foundation—the philanthropic arm of BBVA Group, a large Spanish banking and finance company—honored Reich for his work in global metabolic plant ecology. Most notably, he discovered universal rules of leaf design and the scaling of plant physiology from seedling to tree, from cell to ecosystem, and from the stand to the globe.

"This contribution radically improves our understanding of and ability to predict terrestrial ecosystem responses to global environmental change," his nomination says. "This includes responses of forests and grasslands to biodiversity loss, CO₂, and climate change."

Reich's nomination also cites his work as leader of a unique long-term field experiment that examines interactions of three well-documented global changes: plant species diversity, elevated atmospheric CO₂, and nitrogen pollution.

Reich is a Regents Professor in the University's forest resources department. He will receive the award, which includes a cash prize, in Madrid this summer.

The awards honor world-class research and artistic creation in eight categories: basic sciences (physics, chemistry, mathematics); biomedicine; ecology and conservation biology; information and communication technologies; economics, finance and management; contemporary music; climate change; and development cooperation.

"This award would not have been possible without the contributions of the many students, postdoctoral researchers and colleagues with whom I have collaborated over time," says Reich. "BBVA is impressively forward-thinking in recognizing and publicizing the importance of ecological science and conservation to the future health of our planet."

Related Stories



Regents Professor Peter Reich is a leading researcher in the field of forest and grassland ecology.

Photo: Patrick O'Leary



A roaring tribute

February 24, 2010

Craig Packer's work with African lions is *Smithsonian* magazine cover story

By Deane Morrison

In more than 30 years studying lions up close, [Craig Packer](#) has only been reckless once, when an adult male didn't like him getting too near his tranquilized mate.

For Packer, a University of Minnesota ecology professor, it was an educational moment. He learned how fast he could move.

That's just one of many stories about Packer in "[The Truth About Lions](#)," an article in the January 2010 issue of *Smithsonian* magazine (the one with the lion on the cover).

Recognized as the world's foremost lion expert, Packer has helped solve the puzzle of [what manes do for male lions](#), discovered the extent of [egalitarianism in female lions](#), and researched [strategies to prevent lion attacks](#), among many other contributions.

But just because lions are big and fierce, it doesn't mean they're invulnerable. Packer has spearheaded [Project Life Lion](#) to combat distemper among lions in Africa's Serengeti Plain, and he helped discover a way to [identify lions old enough](#) that sport hunters can shoot them without hurting the species' chances of survival.

Work by Packer and his colleagues has also shown how threats from other lions have led the big cats to adopt a social way of life, the better to protect themselves and especially their cubs.

But now the biggest threat is rural poverty, which leads to habitat loss and also puts villagers at risk of lion attacks. Accordingly, Packer has turned his attention to the people of rural Tanzania, including those who live close to the Serengeti. As director of the [Whole Village Project](#), he is out to discover what types of development assistance work in reducing poverty, improving health, and building stable, sustainable societies, with Tanzanian villagers showing the way.

Related Stories



Lion expert Craig Packer has been a vocal advocate for the wildlife and people of Africa's great Serengeti Plain.



Making a splash

March 1, 2010

Diver Kelci Bryant finds a new home—and makes her mark—at the U

By Rick Moore

A year ago at this time, the University of Minnesota was hardly on Kelci Bryant's radar.

Sure, the Illinois native had competed at the U's Aquatic Center a couple of times, but she was fresh off a semester at the University of Miami, and before that she had dived in the 2008 Summer Olympics in Beijing, placing fourth in the synchronized 3-meter springboard event. "Ski-U-Mah" was not in her vocabulary.

But when her U.S. diving coach, Wenbo Chen, became the diving coach at the University of Minnesota last spring, Bryant decided to bring her considerable talents to Minneapolis to remain under his tutelage.

It wasn't exactly a 3-meter leap of faith, but it was certainly a journey into the unknown.

"I definitely didn't know how to get around when I first got here, but I knew the pool and I knew where the Radisson was, because that's where I always stayed," Bryant laughs. "And I love Jamba Juice, so when I found out they had it [on campus], I was excited."

She has brought another level of excitement to an already strong Minnesota swimming and diving team. The 10th-ranked Gophers recently finished second in the Big Ten Championships. Bryant set a Big Ten Championship meet record with a score of 348.20 in the finals of the 1-meter event, and she was named the Big Ten Diver of the Year and of the Championship.

Her next step is the NCAA Zone Diving competition March 12-14, the competition that qualifies divers for the NCAA Championships the following week.

International waters

While Bryant has both feet planted firmly on the springboard at the Aquatic Center, she also has her eyes on the 2012 Summer Olympics in London.

"Right now, I think the main thing is balancing training for both the college meets and the international-level and national-level meets for diving," she says.

Does she feel less pressure diving in a Big Ten meet, far removed from the Olympic spotlight?

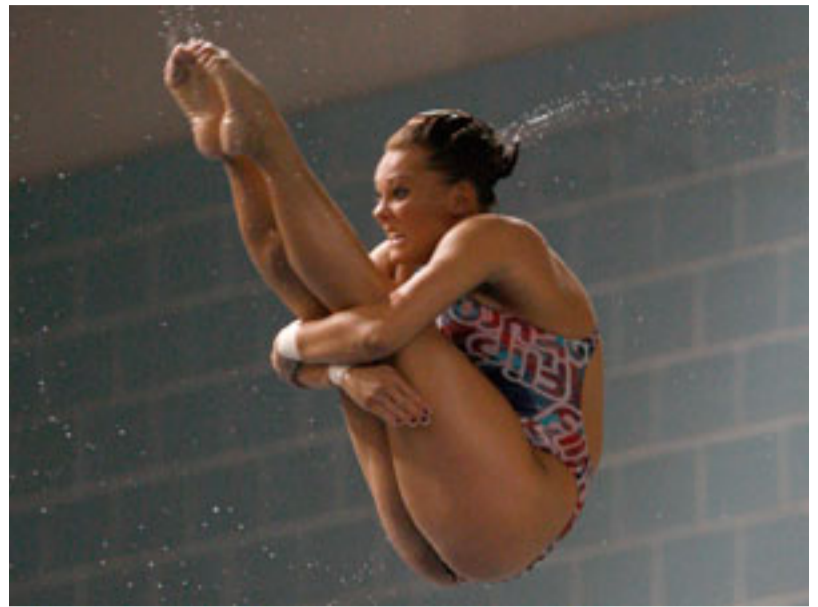
"There's actually more pressure, I feel," she says. "Maybe it's just because it's something new, but at Big Tens I wasn't just competing for me, I was competing for my team."

Despite her international diving resume and Olympic experience, Bryant says she was especially concerned with finding her place among her new Gopher teammates, a task made more daunting with her self-proclaimed initial shyness.

"It was weird because all these girls were my age but they already had their group of friends, and I just felt really intimidated by it. I felt like I missed out on the first two years I should have bonded with them." But, she adds, "They've definitely welcomed me with open arms."

Nowhere was that more apparent than at the recent Big Ten Championships at West Lafayette, Indiana, when Bryant's teammates stuck around well after their swimming events to watch her perform. One particular moment—as she was introduced before the diving finals—stands out.

"I have my [teammates watching] across the pool, and Paige Bradley, one of the swimmers, starts this cheer they call the Hawaii Cheer," Bryant says. "I had the whole swim team and a lot of their parents in the stands and they were doing that cheer. And I've just never felt like I've had that many people behind me, supporting me."



Before coming to the University of Minnesota, Kelci Bryant competed at the 2008 Summer Olympics in Beijing in the springboard synchronized 3-meter with then-partner Ariel Rittenhouse under U diving coach Wenbo Chen. The duo finished fourth at the event. In Bryant's first season at the U, she has been named Big Ten Diver of the Year.

Photo: courtesy University Athletics

By the numbers

According to Bryant's bio, her favorite dive is a 205B—a back two-and-a-half somersault in a pike position (arms around extended legs)—which she says she's been doing since she was 14. (For the industrious, there are some great YouTube videos of her nailing that dive.)

It turns out Bryant's new favorite dive is a front three-and-a-half pike (a 107B for those in the know), in part because it's her highest degree-of-difficulty dive, and also because it's something she's worked hard to master.

"It's a good feeling when you've been working on a dive for so long, and you go under water and you realize, 'Wow, I finally can do it.'"



UNIVERSITY OF MINNESOTA

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Your health

March 10, 2010

Taking Charge blog helps you be your own best health advocate

Q&A with Mary Jo Kreitzer

Why did you create your blog?

Kreitzer: To give consumers easy-to-access information that helps them navigate the health system, explore healing practices and develop a personal plan to improve their health and well-being. The blog is a fun and easy way to highlight news that people can use!

Why should we go beyond conventional health services?

Kreitzer: Conventional health services have focused on diagnosis and treatment of disease. To increase the health of the nation, we need to focus on a broader set of issues: healthy food, green spaces, ways to promote more physical activity, teaching kids as well as adults how to take charge of their health.

What's one idea we should remember?

Kreitzer: Take your health seriously and become an informed consumer. Choice is good, but it is important to make informed choices.



Mary Jo Kreitzer, director of the Center for Spirituality & Healing



Heart-mending technology licensed

March 10, 2010

Doris Taylor's work moves a step closer to the market

By Deane Morrison

In 2008 University of Minnesota professor [Doris Taylor](#) garnered worldwide attention when her team created a beating animal heart in the laboratory.

Now the University has signed an exclusive global agreement with Miromatrix Medical Inc. to license the technology, which holds promise for enabling the replacement of entire human organs with nontransplantable organs. They would be created by harvesting organs from either human or nonhuman donors, stripping them of their cells, and regenerating them with cells from the recipient or a compatible donor.



In 2008 Doris Taylor and her team made headlines by building new rat hearts in the lab.

"This is a major step forward for our technology commercialization efforts," says Tim Mulcahy, the University's vice president for research. Taylor's research, he says, "holds the potential to launch an entirely new industry on the scale of the medical device industry."

Miromatrix CEO Robert Cohen says the company intends to commercialize a series of products based upon her work and expects to complete its initial round of financing in the next few months.

Related Stories



Nudge from a Nobelist

March 15, 2010

A Nobel laureate in chemistry urges students to seek their passion in research

By William Wolf

On March 2, 2010, Robert Grubbs, the 2005 Nobel laureate in chemistry, visited the University of Minnesota's Twin Cities campus.

Generating a big reaction

In a public lecture that morning, Grubbs spoke about how his early interest in science was sparked by the launch of Sputnik in 1958 and how he became involved in research as an undergraduate.

Grubbs earned his prize for researching and developing a chemical reaction called olefin metathesis and the catalyst for the reaction that bears his name. The reaction is used to generate a variety of industrial chemicals from olefins, which are components of crude oil.

He also told how the metathesis reaction started as an industrial afterthought that slowly grew into the practical and useful reaction it is today. He emphasized the applications of his work; for example, the reaction has been used to produce pheromones that help protect crops from insects and to make new lightweight plastics.

Up close and personal

Having studied and performed the Grubbs reaction in my chemistry coursework, I was more than excited about the prospect of meeting the man behind the metathesis. That afternoon I was fortunate enough to be part of a small group of students who met with Grubbs for a question-and-answer session.

Grubbs was in good spirits as he fielded questions about the technical aspects of his research and about winning the Nobel Prize. He also gave advice on conducting research as an undergraduate and finding the right field of study.

Grubbs told how some of his best students suddenly lost interest in chemistry, even after they had earned advanced degrees. He said that undergraduate research is a valuable experience that exposes students to the graduate school environment, which can help avoid problems of uninterested graduate students. Grubbs said his job as a professor is to give undergraduates a really good experience that will allow them to decide if graduate school is right for them.

Apart from that, it is up to undergraduates to take advantage of the experience and to be motivated and excited about research.

"Demonstrate that you're really interested," he said. "That will help other people know that you're excited about research."

Finding the right mentor is another piece of the puzzle. Grubbs spoke of his experience as an undergraduate, where he planned on studying agriculture. He wasn't even thinking about chemistry until he met his undergraduate research adviser, who got him actively involved in research and helped him along the way to graduate school.

Being motivated to research is important, but finding the right direction after school is an entirely different problem. Grubbs emphasized the necessity of finding an area to research. He said that his field was small when he started out, but he found a good opportunity and it eventually paid off.

"Never back off from an opportunity," he said. "Find the best one and follow it, and that leads to the best places in life."



Chemistry Nobelist Robert Grubbs recently visited with University of Minnesota students.

Photo: Honeywell-Nobel Initiative

Grubbs' visit was sponsored by the Honeywell-Nobel Initiative, which connects university students with recipients of the world's most prestigious award. William Wolf is a student in the University of Minnesota's Institute of Technology.



Goldstein collection

March 15, 2010

Designed objects go online

Dresses, shoes, purses, vases, magazines, rugs, tapestries, quilts and more. The Goldstein Museum of Design's 26,200 items of apparel and accessories, decorative art, graphic design and textile will soon be online.

See examples below



Powder Compact

Made around 1920-29
Marbleized plastic
Gift of the Irma Bullard Estate



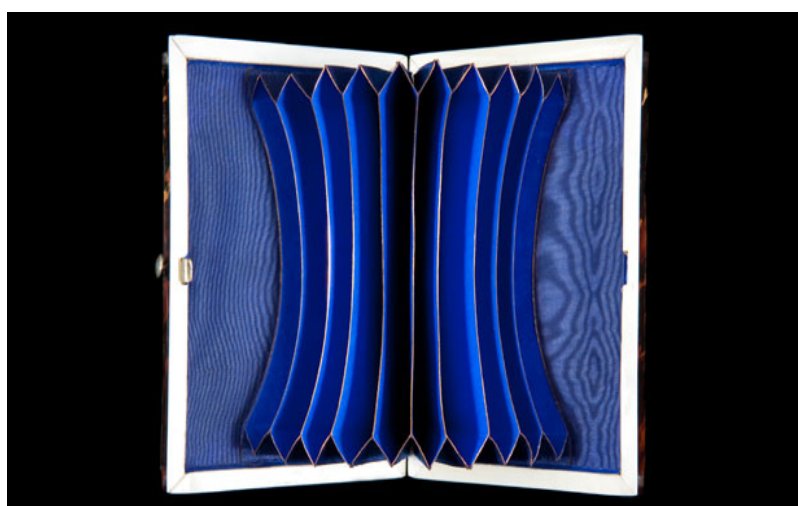
Hat

Designer unknown
Made in 1959
Straw, silk
Gift of Meredith Bloomquist



Interior, Calling Card Case

Designer unknown
1870-79
Tortoise shell, abalone shell, mother-of-pearl, silver, brass, silk moire, paper, ivory
Gift of Rosemarie Beaulieu



Hat

Designer, Leslie James
Made around 1960-69
Felt
Gift of Audrae and Martin Diestler



Hat

Designer, Mr. John
1960-79
Synthetic animal print and leather
Gift of Marjorie Rooks



Dress

Designer, Oscar de la Renta
Made around 1985
Silk
Gift of Elizabeth Weymouth



Bag

Designer unknown
1910-19
Leather and metal
Gift an anonymous donor



Riding Boots

Designer unknown
1980-89
Leather
Gift of Marcia McCabe



Shoes

Designer, Bruno Magli
Made around 1985
Leather
Gift of Amanda Spivey





For seeds, size matters

March 21, 2010

A new explanation for size variation in plant seeds has wide implications

By Deane Morrison

It seems a simple question: Why do some plants make a few big seeds while others make lots of small ones?

The explanation has been a stumbling block for ecologists, but a University of Minnesota researcher may just have found the answer.



U researcher Helene Muller-Landau has found a new explanation for why seeds vary so much in size.

In a paper published in *Proceedings of the National Academy of Sciences*,

[Helene Muller-Landau](#) makes the case for a variable environment as

the key factor. Her work not only addresses a major ecological problem but holds potential for predicting which species will run the highest risk of extinction from future habitat loss or environmental change.

An improbable balance

A current theory holds that big seeds are more likely to successfully establish seedlings and to survive as seedlings, while small seeds counter this advantage by their greater numbers. This leads to a balance that allows many plants to share a habitat. But the theory requires the balance to be perfect—an infinitely improbable situation—or else some species would go extinct. The theory also takes no account of variability in environmental conditions.

In her theory, Muller-Landau posits that big seeds don't always have an advantage over small seeds. Instead, big seeds specifically have the advantage in tolerating a habitat that is too wet, dry, nutrient-poor, or otherwise stressful, as their larger size allows them to persevere despite these hazards. Small seeds, on the other hand, often can't make it in these environments, but tend to win where the environment is not stressful simply by dint of their larger numbers. Thus, variability in the environment gives the advantage first to one seed size then the other, minimizing the head-to-head competition that can drive some species to extinction.

How it works

Consider the coconut, a very large seed. Its tough coat allows it to float hundreds of miles in salt water before being thrown up on a dry sandy beach. Its ample supply of stored food allows its roots to grow deep enough to tap fresh water and allow the seedling to thrive.

If the coconut landed in a cushy habitat with rich soil and surface water, however, it may well find itself losing out to numerous seedlings of small-seeded plants like figs, which need benign conditions to thrive.

A single forest will contain sites that are both more and less stressful; thus, seeds of different sizes will all have a chance to get established. This habitat heterogeneity contributes to the diversity of plant species. And, says Muller-Landau, if human activity or climate change caused either more or less stress, her model provides insight into which species will benefit and which will suffer.

Wider implications

Her work may also aid in understanding similar tradeoffs between the size and number of offspring in animals or even microbes. For example, it may help predict which strains of pathogens can coexist in systems where the host environment is either benign—i.e., immune defenses are weak—or stressful, and where different strains of pathogens may be either "figs" that reproduce fast but have little ability to defeat a host's defenses or "coconuts" that reproduce slowly but can resist those defenses.



An empowering leader

March 25, 2010

John Anderson carries on rich tradition of Minnesota baseball program

By Rick Moore

In his office at the University Athletics complex, John Anderson keeps a tiny snapshot commemorating his pitching debut for the Golden Gophers in 1975. He threw two innings that day—his only stint in a playing career cut short by arm trouble.

“My problem was I hit too many bats,” Anderson jokes. “The idea was to miss ’em, and I wasn’t very good at that.”

What Anderson may have lacked in pitching prowess he’s more than made up for in coaching success at his alma mater. Heading into this season, his record was 1,006-645-3, a winning percentage of .609. He’s 39th all-time in victories and 11th among active Division I coaches. Perhaps more impressive, he’s the winningest coach in Big Ten history, and in 2008 he was inducted into the American Baseball Coaches Association (ABCA) Hall of Fame.

The ace... of his baseball class

Anderson came to the U as a walk-on baseball player—a transfer from Hibbing Community College, where he also played football and hockey. His smartest move may have been taking the baseball course taught by his U coach, the legendary Dick Siebert. The class was so intense even baseball players would flunk it, but Anderson scored the highest grade ever on its test.

Siebert asked him to be a player-coach that year, and Anderson continued to assist the man he calls “Chief” until Siebert’s death in 1978. George Thomas then took over the program, with Anderson remaining as an assistant. When Thomas left after three years he recommended Anderson, at age 26, to replace him.

Anderson earned his position by being an astute student of the game, and he hasn’t stopped learning... or questioning.

In the mid-’90s he was concerned about how his teams were responding to him. At about that time he was introduced to Rick Aberman, a “human performance coach” who forced Anderson to look inward at his coaching style and leadership methods.

“I’m not sure I’d have been able to survive in coaching if I hadn’t met Rick,” Anderson says.

He now focuses his energies on making his student-athletes internally motivated, and sees himself more as a consultant offering help to players who really need it. “It’s been so much more fun, so much more enjoyable, to watch the kids take ownership of their experience and really hold each other accountable,” Anderson says.

He and Aberman wrote a book, *Why Good Coaches Quit: How to Deal with the Other Stuff*. In addition to reaching the 1,000-win plateau last year, he’s also led the Gophers to 16 NCAA Tournament appearances (most in the Big Ten), including 8 in the last 12 years. Year in and year out, the Gophers compete for a Big Ten title, and many of Anderson’s former players have made their mark in the major leagues.

Hail to the Chief

Anderson looks across his office and gives a nod to the Hall of Fame plaque for his own mentor, Siebert, who coached Minnesota for 30 years and led the Gophers to national championships in 1956, 1960, and 1964.

“He’s the legendary coach that really started it all, and to me will always be the godfather of Minnesota baseball, very similar to John Mariucci [in hockey],” Anderson says.

He pauses a moment to reflect on his well-earned inheritance. “It’s a privilege and an honor. For a right-handed, below-average pitcher from northern Minnesota that liked to play hockey, I guess it worked out pretty good.”



About 15 years ago, John Anderson took a hard look at his coaching style and decided to make some changes. Now he sees himself as more of a “consultant,” and encourages his players to motivate themselves.

Photo courtesy University Athletics

First on the field

Anderson’s Golden Gopher baseball team has the honor of playing the first game at Target Field—the new home of the Minnesota Twins—at 1 p.m. Saturday, March 27, against Louisiana Tech. The game will function as a practice run for operations at the stadium. For more information, see the Gopher Sports [story and video](#).



Barcoding butterflies

April 1, 2010

Insect DNA reveals species' hidden histories

By Deane Morrison

What if checkout clerks had to consult an expert halfway around the world to identify the electronics we wanted to buy? And another expert to identify the housewares?

That's how it used to be with tropical insects. Researchers often had to send samples to experts in the far corners of the globe and hope they arrived in good enough condition to name.

But just as clerks now identify items with a single swipe of the barcode, scientists have a new way to tell what species they've dropped in the collection jar. University of Minnesota researcher [George Weiblen](#) and his colleagues report that the technique, called DNA barcoding, is used to quickly identify insects, making it easier to track the distributions and habits of species.

The work is [published online](#) in *Proceedings of the National Academy of Sciences*.

Insect ID card

In DNA barcoding, a species' identity is revealed by a unique sequence in one short stretch of DNA. Weiblen uses these sequences, called DNA barcodes, to identify moths and butterflies in Papua New Guinea, which has 100 times as many Lepidopteran species per square mile as does North America.

But the country is developing rapidly, and researchers are in a race against time to document the biodiversity so it can be effectively managed and protected.

"For instance, we don't know, at this point, how many protected areas would be sufficient to preserve the butterfly diversity of New Guinea or where they should be located," Weiblen explains.

Globetrotting genes

Some species are different but look alike, and others migrate large distances. DNA barcoding reduces the uncertainty in sorting out who's who and how species came to be distributed the way they are (see sidebar).

"You can't put a radio transmitter on a moth, so how do you figure out how far it can travel across the Pacific?" says Weiblen. "We don't have a fossil record for these species, so instead we use a molecular clock to trace their history."

Because DNA barcodes evolve rapidly, they can be used to separate populations of the same species that have been isolated for many generations. Therefore, barcodes may help pinpoint the source of invasive insects like the emerald ash borer, which came from Asia and was recently found in Minnesota.

"We need to understand the history of migration in order to combat the pests that threaten our forests and crops," notes Weiblen.

Little insects, big questions

Weiblen's work is part of a larger push to learn how many species share our planet. One thing is for sure: Insects and the plants they feed on make up a large piece of global biodiversity.

"But," says Weiblen, "we know very little about the geographic distribution of tropical insects."

Published in 2010



The *Asota caricae* moth, an agricultural pest, is found from Taiwan to Australia.

Photo: Lauren Helgen, Smithsonian Institution

The moth went over the mountain

Rapidly evolving DNA barcodes can reveal the history of migration. Weiblen points to a moth found on either side of the New Guinea mountains. Did the mountains, when they appeared millions of years ago, split a population of the moth in two? Or, after the mountains had formed, did moths cross them to colonize the other side?

"If ancient populations were split by the uplift of the mountains, we would expect to find different DNA barcodes on either side of the barrier," says Weiblen. "But when we find the same barcode on both sides, it suggests recent movement of moths across New Guinea."



Prescription for pain?

April 5, 2010

New University research finds that handling cash may alleviate pain

By Rick Moore

“Money can’t buy you happiness, but it does bring you a more pleasant form of misery.”

That quote by Spike Milligan, the late Irish comedian, is one of dozens of lighthearted takes on money and what it brings, or fails to bring, to our lives.

Turns out Milligan may have been on to something. New findings by University researcher [Kathleen Vohs](#) show that cash might indeed reduce people’s pain—both physical and emotional—as well as give them an inner strength.

In her study, Vohs had one group of subjects count cash and another slips of paper. Soon after, she asked all the subjects to dip their hands in very hot water and rate the pain they felt. Those who had just counted cash rated their pain as significantly less than those who counted the paper.

In a related study, cash counters who were later shunned by others while playing a computer game felt less excluded than those who counted the slips of paper.

“In both of those experiments, we found that when people were reminded of money, otherwise painful events were not so painful,” Vohs says. “It’s a robust and very strong finding.”

Getting out of hot water

Vohs’s findings carry numerous implications, especially in the business world. For example, if a flight is delayed for eight hours, an airline might typically give its snarly, malcontent passengers a voucher toward a future flight. Vohs suggests throwing a different bone.

“My research would say that they would feel better—they would feel less pain—if they were handed cold, hard cash as opposed to ... a voucher,” she says.

Could the thought of money even help in a medical setting? Vohs thinks that’s a possibility. “I’ve recently given several talks in front of medical audiences and that is an idea,” she says. “To assuage the pain in a medical circumstance, you may want to give [patients] reminders of cash, because it might psychologically be beneficial and then they wouldn’t feel quite so much pain.

‘Ease his pain’

From a terminal gate to a hospital room to ... a meet market?

Vohs, in the name of creative solutions for all segments of society, thinks the pain-relieving qualities of money might even be of benefit to a single male on the make in the dating world.

“We’ve been toying with the idea of giving men lots of cold, hard cash to handle before going into the nightlife scene, to soften some of the stings of social rejection that will occur when they’re out on the prowl,” Vohs says, smiling. “So, there are lots of different ways you can think about handling money and pain.”

Men, take note: If you can’t handle rejection, handle money.



The study by Kathleen Vohs, an associate professor of marketing at the Carlson School of Management, found that cash and reminders of cash can reduce people's perception of physical and emotional pain.

This article originally appeared in 2010.



The Dead Sea Scrolls come alive

April 14, 2010

In Alex Jassen's class, the Dead Sea Scrolls open a window on a turning point in history

By Deane Morrison

Their discovery more than 60 years ago was hailed as the most important archaeological find of the 20th century.

Known as the Dead Sea Scrolls, these Hebrew, Aramaic, and Greek scrolls represent the library of a sectarian Jewish community that lived from the mid-second century B.C.E. until 68 C.E. near Qumran in modern-day Israel.



This fragment of Psalm 119 is one of the Dead Sea Scrolls on display at the Science Museum of Minnesota.

This year, the Science Museum of Minnesota is exhibiting 15 of the scrolls. In conjunction with the exhibit, University of Minnesota professor [Alex Jassen](#) is giving students in his Dead Sea Scrolls class the chance to view a pivotal era in Judaism and the earliest era of Christianity through the lens of these ancient parchments.

"The scrolls revolutionized the study of the Bible," says Jassen, an assistant professor of early Judaism.

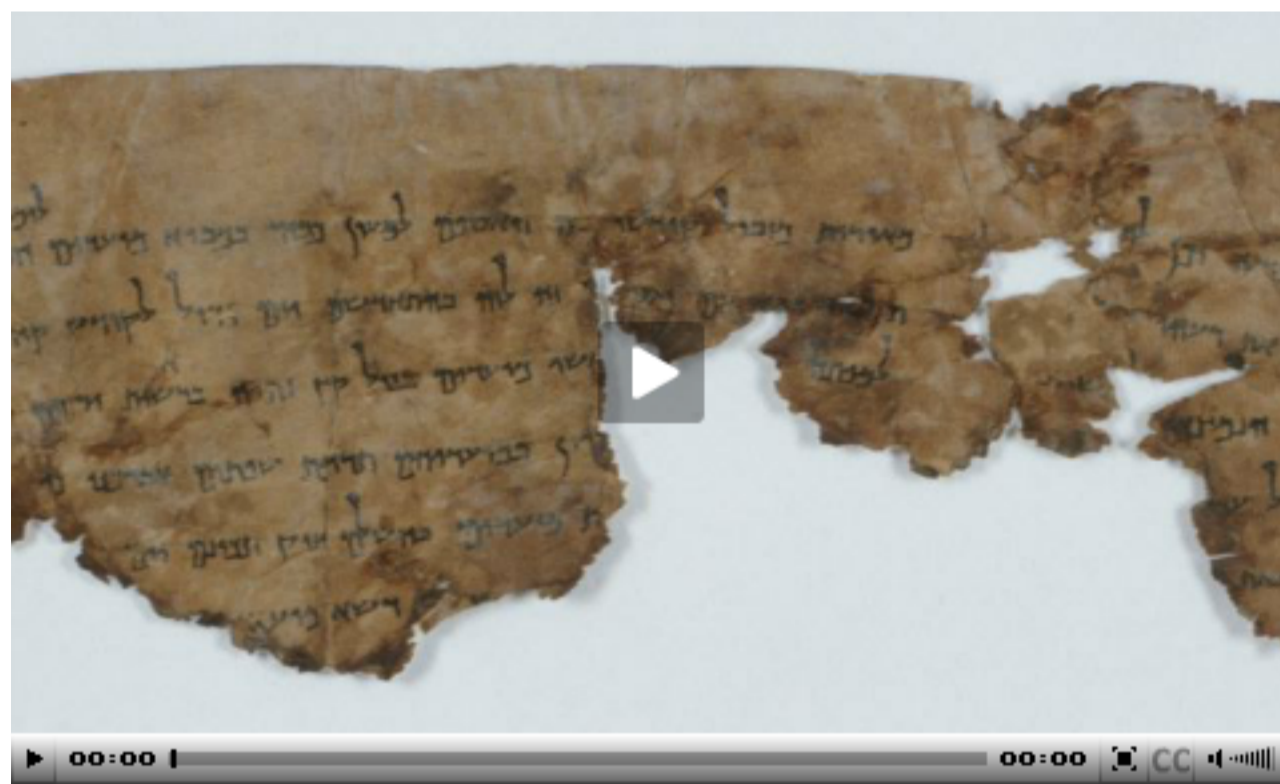
Crossroads of history

The approximately 900 scrolls illuminate Jewish life in the decades before 70 C.E., the year the Romans crushed a revolt and destroyed the temple in Jerusalem.

After the temple's destruction, Jews lost the center of their religious life and began to disperse from their homeland. Discussions of Jewish law, customs, ethics, and other important issues now came from writings of rabbis with many different points of view.

Dating from a crossroads in the development of Judaism, the scrolls also opened up the Jewish context in which Christianity developed. For example, one scroll lists rules for the Sons of Light to follow in the final battle with the Sons of Darkness. Another describes how the Messianic era will unfold.

Shaping the exhibit
Alex Jassen has worked for two years with the Science Museum of Minnesota as an academic adviser, providing the historical and social context for its Dead Sea Scrolls exhibit, which runs through October 24, 2010.



The scrolls also include material from nearly every Old Testament book, rules specifically for members of the Qumran communities, and other texts representing a cross section of ancient Jewish society.

Often, the rules reflect historical shifts in focus.

"In the scrolls, you start to see a transition [in focus] from physical to moral purity," Jassen explains. "For example, before, if you touched a corpse and were rendered ritually impure, the result was that you couldn't enter the temple until you underwent ritual purification.

"But the scrolls attest to a shift whereby if you sinned, you similarly had to undergo ritual purification to purge that sin. This creates a new concept of purity for a society not tied to a physical temple."

In fact, says Jassen, John the Baptist was performing ritual Jewish baths to expiate sin, thus reflecting this very trend.

In another connection between the ancient Jewish and Christian worlds, the scrolls record community debates about the rules for saving a human or a beast that falls into a pit on the Sabbath. The strict Qumran community concluded that a beast must be left until after the Sabbath, but a person could be extricated as long as no tools were used because tool use was prohibited on the Sabbath.

But statements attributed to Jesus had him advocating aid for either a person or a beast on the Sabbath. That account, says Jassen, is essentially an entry into an ongoing debate in ancient Judaism over the application of biblical Sabbath law, a debate that was to continue in the rabbinical writings.



The magic of marimbas

April 21, 2010

The world's top players kick off a festival next Wednesday with a free concert at Ted Mann

By Deane Morrison

When he was 17, a young musician named [Fernando Meza](#) attended a convention for percussionists.

At the time he was a timpanist, a player of kettledrums. But that changed when he heard what the world's foremost player, Keiko Abe, could do with the marimba.

"I was blown away by her artistry," says Meza, who promptly made the marimba the focus of his life.

Now director of percussion studies at the University of Minnesota School of Music, Meza is sharing his love of the instrument through Marimba 2010, an international festival and conference that brings the world's top players to the Twin Cities for three days of music-making.

The festival opens at 7:30 p.m. Wednesday, April 28, with a free concert at the U's Ted Mann Concert Hall, 2128 4th St. S., Minneapolis. Among the artists on the bill are the U of M Marimba Ensemble, whom Meza will conduct as they provide the soundtrack for the silent film "The Invisible Men."

A performance Friday, April 30, in the St. Paul Cathedral will surround the audience with 20 marimbas. Meza will perform in that concert, which features the professional choir VocalEssence and includes pieces by School of Music alumni Libby Larsen and Stephen Paulus.

The festival also brings world-renowned marimba ensembles from Guatemala—where it is the national instrument—Mexico, and Costa Rica, as well as individual artists like Serbia's Nebojsa Zivkovic, who will perform a marimba concerto with the Minnesota Orchestra.

It's a rare chance to hear the best marimbists. "People may never see anything like this here again," Meza notes.

Wood that sings

The marimba consists of keys laid out like a piano keyboard. Beneath each key is a resonator, or tube, that amplifies the sound; the longer the resonator, the lower the pitch. Folk marimbas have wooden resonators, while those of the concert marimba are made of brass or aluminum. The keys are played with mallets, and different kinds of mallets allow players to vary the tone.

A native of Costa Rica, Meza has listened to marimba music his whole life. He says some people attribute its origins to China through a stone instrument called the lithophone many centuries ago, but no one is sure. That doesn't stop anyone from claiming it, though.

"In Guatemala, they would probably say the marimba came from divine intervention," he muses.

Whatever its origins, the name comes from Africa.

"In the Bantu language, it means 'wood that sings,'" Meza explains.

Today, the marimba sings all over the world, thanks to an explosion in its repertoire over the past four decades. Meza has become a well-known performer, having recorded with Abe in Japan and played with the Minnesota Orchestra. He is partial to contemporary music, but as the Bach Courante that accompanies this article shows, he's no slouch at Baroque either.

Most of all, he wants let people know how the marimba has become part of cultures everywhere.

"My dream is to bring the world together through music, this instrument in particular," Meza says.



Fernando Meza plays a concert marimba, an instrument that delights audiences around the world.



A HERC-ulean task

April 26, 2010

U students offer design improvements for Minneapolis garbage burner

By Rick Moore

When a new Twins ballpark was proposed for the west end of downtown Minneapolis, people were quick to point out that the location was marred by one particular (ahem) landmark.

The stadium site was next to the Hennepin Energy Recovery Center (HERC), colloquially known as the garbage burner, where trash from one-third of the county (including every Minneapolis residence) is burned to generate electricity to power an equivalent of 25,000 homes.

How appealing could a ballpark be next to a place like that?

After an opening nine-game homestand for the Twins that has been nothing short of a public and media love fest, the answer is quite appealing. Some University of Minnesota students can take credit for assisting with a host of sustainable design ideas to make the HERC more ecologically sound and visually appealing.

For now, at least, most of the trash talking has stopped.

Designing a makeover for HERC

The University of Minnesota became involved with HERC through the Hennepin-University Partnership, an organization that supports academic/practitioner collaboration between the county and the U.

First, the student group Greenlight held a design charrette in February 2008 to brainstorm ideas. Then four graduate research assistants—Ashley Sommer, Ben Beery, Cassandra Meyer, and Matt Sand—were enlisted to develop a plan under the tutelage of [Virajita Singh](#), a senior research fellow at the College of Design's Center for Sustainable Building Research.

The students, whose expertise spanned architecture, landscape architecture, sustainable design, and civil engineering, worked with staff at Hennepin County Environmental Services and their partners (including representatives from the Twins and neighborhood groups) to envision a makeover for HERC's exterior that would focus on sustainability.

The group submitted its final report, playfully titled "HERC in my Backyard" (a takeoff on the common citizen cry "Not in my Backyard") in August 2008.

The report offered two design proposals to re-envision HERC's exterior, considering architectural, social, economic, and environmental implications on the following topics:

- sustainable landscape (for example, terraced slopes to manage stormwater run-off)
- sustainable messaging using the "architectural skin" (for example, text and images on the side of the building to convey the waste-to-energy process inside)
- green roofs (vegetation atop the facility that addressed stormwater and urban heat island issues)

While only some of the design team's recommendations were ultimately used, they were all well received by the county, Singh says. Following the U's proposal, the county hired the local firm HGA to implement a final design.

In early April, Singh, Sommer, Meyer, and Beery received a tour of HERC from Dave McNary of the Hennepin County Department of Environmental Services. He pointed out some of the sustainable design ideas that were implemented, from stormwater mitigation features to the scores of trees—birch, oak, and red cedar—that were preparing to bloom.

"Even though the final design is not exactly the way you guys had planned, the concepts are there to green it up and to manage the stormwater on site," says McNary. "It was your ideas that ultimately led to what you see now."

A model for future collaborations

Singh says the U students' work for HERC is a good template for generating design ideas in a time of constrained resources.

"This was a real prototype on how to do this kind of work for organizations, counties, nonprofits," she says.

For the U students, it was a chance to contribute to a tangible issue in the community.

"Getting this opportunity as a student is a huge benefit, for any number of reasons," says Beery. "One, just working on a real project is kind of nice. But also, being involved with a county, a large corporation, and a neighborhood is an invaluable experience for a student. We were involved in that process throughout our project."



U graduate research assistants Ben Beery, Ashley Sommer, and Cassandra Meyer stand next to some trees between Target Field and the Hennepin Energy Recovery Center (HERC). The landscaping efforts were part of a broad design proposal by the students to make HERC more sustainable and visually appealing.

Photo: Rick Moore



A new way to swap DNA

April 27, 2010

Fungi surprise scientists with a new trick: swapping chromosomes, which can turn some into pathogens

By Deane Morrison

The news may sound innocuous: The fungus that makes your tomato plants wilt may have picked up that unsavory trait from another fungus by a novel means.

To the researchers, however, the discovery was a rare moment when an organism astounds you with an undreamed-of ability. In this case, fungi turned out to be passing whole chromosomes around like footballs, entirely outside the realm of reproduction.

No one knows how they do it. Chromosomes are bulky, and fungi just weren't supposed to be able to trade them. But the research team caught the fungus that causes tomato wilt harboring four extra chromosomes that seemed to come from a completely unrelated fungus. And they observed such a transfer in the laboratory.

"It was surprising," says [Corby Kistler](#), an adjunct University of Minnesota professor and a research geneticist for the USDA Agricultural Research Service. "This is the first time anyone has detected the transfer of pathogenicity carried on whole chromosomes between fungi."

The four traded chromosomes are "extras" that the fungus can live without. They are packed with genes that allow the fungus to infect plants or even people. Minus the extra chromosomes, the tomato wilt fungus is just a harmless soil variety.

The discovery means scientists can start working on a means to thwart the trading of chromosomes and the diseases that come with them, Kistler says. The work is [published](#) in the journal *Nature*.

Killer chromosomes

Some traded chromosomes may give the same fungus the ability to attack people with weakened immune systems, whom they reach via contaminated catheters.

"These seem to be specific strains specialized toward humans—and they have extra chromosomes," says Kistler. "Whatever causes [harm] to humans may be on these transferable chromosomes."

From friend to foe

The tomato wilt fungus spreads through farm implements and rain runoff, traveling mainly in water. Strains that infect plants get into the xylem tubes—a plant's water transport system—and gum them up.

Ironically, some of the noninfective strains of the fungus are beneficial to tomatoes. They ward off pathogenic fungi by blocking potential infection sites on the plants' roots and may even immunize the plants to infection by pathogens, Kistler says.

But that can change quickly if they pick up extra chromosomes. Then, says Kistler, "It's a friendly fungus gone bad."

Published in 2010



The tomato wilt fungus is able to attack the plants thanks to genes on four extra chromosomes, University researchers have found.

Excess baggage

Why would a fungus pack the genes for infecting plants on a few extra chromosomes? Kistler says that in the normal life of the fungus, when it's feeding on dead matter in the soil and no plants are available, the genes for infecting plants aren't needed. With those genes bundled on a few extra chromosomes, the fungus can easily shed them—and the trouble of maintaining them—without detriment.



Going with the flow

April 27, 2010

New Gopher Ranger program connects U students with the Mississippi River

By Rick Moore

Thousands of students walk, bike, or bus over it each day while shuttling between the East and West Banks of the Twin Cities campus. For most, however, it's more or less abstract eye candy a world below.

In reality, the Mississippi River is so much more than that, a fact that University of Minnesota students are now discovering.

The Gopher Ranger program, begun this spring, is an effort to connect undergraduates to educational and experiential opportunities within the Mississippi National River and Recreation Area (MNRRA)—the National Park Service entity that includes 72 miles of the river flowing through the heart of the Twin Cities, as well as the Twin Cities campus.

“It’s the least-known park that has one million people using it each year,” jokes Pat Nunnally, coordinator of the River Life Program in the U’s Institute on the Environment.

The Gopher Ranger program is working to change that, he says, by helping students to “take stewardship of the park, learn about the park, and explore the park.”

Taking the river to the mainstream

Nunnally says the idea for a more systematic connection to the river, as opposed to a research project or class here and there, arose spontaneously. It landed a name last fall during Welcome Week, when 120-some freshmen learned about the river during a trip on the Minneapolis Queen.

This spring, students have been attending informational sessions on topics like the history and culture of the MNRRA, as well as the natural history of the park.

Future activities may include habitat restoration, internships with the National Park Service, and assisting youth on canoe trips along the river. That last activity may come as soon as this summer, when the park, in conjunction with the Minneapolis School Board and Wilderness Inquiry, plans to showcase the Mississippi to the middle school cohort of summer school students.

“You don’t put 2,000-plus students on the water with just paid staff,” Nunnally says. “We will undoubtedly have some of our folks volunteering with that program.”

Partnering with the National Park Service

“Gopher Ranger is the first step in a much stronger relationship with the University of Minnesota,” says Paul Labovitz, superintendent of the MNRRA. “Going into the 21st century, there’s a lot we need to learn about managing an urban park sustainably, and the University will be a key partner in that effort.”

Ultimately, as the program grows and expands in scope, it will expose that many more students to the river that’s helped define the area they inhabit.

“I would like for every student at the University to know how they can make the Mississippi River a meaningful part of their experience while they’re here,” Nunnally says. “... The goal, for me, is to have all of us know that we can take advantage of one of the great rivers of the world that’s right here on our doorstep.”



University of Minnesota students Julia Hill, Kevin Lang, and Andy Cleven are engaged in a project to visually connect the area between the Mississippi River and the Mill City Museum near St. Anthony Falls.

Photo: Patrick O'Leary

The falls of yesteryear

Some 10,000 years ago, St. Anthony Falls—the only falls on the entire Mississippi River—was located at the junction of the Mississippi and Minnesota Rivers, near Fort Snelling. The falls migrated slowly upstream to its current position in the 1800s. Late in the century, with Minneapolis’s milling operations accelerating the migration of the falls, the U.S. Army Corps of Engineers constructed a dike, apron, and dams to preserve the falls’ current location.



A new face in the academy

April 30, 2010

Bringing economic analysis to ecological problems wins Stephen Polasky a place in the National Academy of Sciences

By Deane Morrison

If Oscar Wilde was right that a cynic is a man who knows the price of everything but the value of nothing, then University of Minnesota professor Stephen Polasky is out to destroy cynicism.



An economist by training, Polasky helps people grasp the value a healthy environment holds for both their well-being and the bottom line.

Stephen Polasky applies his knowledge of economics to solving ecological problems.

Photo by Patrick O'Leary

His work provides tools to factor in the complete set of consequences of decisions, including environmental impacts not currently included in economic analyses. For example, coal is cheap for electric-generating companies, but it imposes additional costs on society, such as carbon, mercury, and sulfur dioxide emissions.

Last Tuesday (April 27, 2010) Polasky's efforts were recognized when he was elected to the National Academy of Sciences, an honor most scientists consider second to the Nobel Prize.

"I am thrilled to be elected," he says. "I think it is a strong vote of confidence about the importance of combining ecology and economics in decision-making."

A new kind of cost-benefit analysis

Polasky was among the first to integrate economic thinking into conservation biology. In one study, he and his coauthors found that two or three times as many species could be conserved with the same amount of money by jointly accounting for economic, as well as biological, factors. For example, one can conserve far more species by buying many tracts of land in places like Nebraska and Nevada for the same cost as buying one tract in the San Francisco Bay Area.

By bringing the value of intact ecosystems—and the costs of degrading them—into the equation, Polasky has inserted a crucial element into debates ranging from energy production to land use and habitat conservation.

In the area of biofuels, he worked with University ecologist David Tilman and other colleagues to calculate the value of alternative forms of renewable energy compared to fossil fuels, including environmental costs as well as direct production costs. The researchers found that while using more biofuel can be good for the environment, clearing land to produce it can create a "carbon debt" that could take decades or centuries to repay.

Beyond this, Polasky considers all the environmental services we get from a landscape, such as ample supplies of clean water, food production, soil retention, and wildlife habitat. One of his big goals is to find ways to give landowners incentives to change their land use or management to yield healthier landscapes that can supply more services.

"For example, suppose there were a 'carbon market' that limited the amount of carbon that could be emitted into the air and rewarded landowners for conserving carbon in either forests or soils," Polasky says.

He cites the Clean Air Act, which cut air pollution in half during a period of strong economic growth, as one example of how a policy can allow economic development while slowing or halting environmental damage.

"It goes to show that good economics and good environmental stewardship can go hand in hand," he notes.



Expertise on tap

May 3, 2010

A case study in how the University's MnTAP program helps local companies

By Deane Morrison

It takes a lot of water to peel, cook, and process potatoes. And in August 2006 a Minneapolis potato processing facility, Northern Star Co., was using a lot more than it wanted to.

Every three years, the Metropolitan Council Environmental Services (MCES)—an arm of the governing board for the Twin Cities metro area—reviews companies' water usage and adjusts consumption and discharge fees.

"We were allowed to discharge 450,000 gallons a day," says Shane Menefee, corporate environmental director for Michael Foods, Northern Star's parent company. That was the volume the company had been paying for. But after an internal assessment, "I saw it was closer to 600,000 gallons."

Following a review in February 2007, MCES told Northern Star it must reduce usage in the next year or face an extra \$416,000 charge. But by that time Menefee had contacted MnTAP, the University's Minnesota Technical Assistance Program, and enlisted food processing specialist John Polanski to help Northern Star cut its water use.

MnTAP provides experts who help companies facing energy use, waste, and other environmental problems. Menefee, who had already had good experiences with MnTAP, wanted to take a team approach that would lead to long-term reductions in water usage.

And Polanski was just the one for the job.

Running start

At Northern Star, Menefee assembled a 12-person water conservation team, provided it with financial resources, and, with facilitator Polanski, made sure it stayed on track.

"John brought a lot of technical expertise, knowledge of technical fixes, and team-building experience," says Menefee. "Without him, we wouldn't have started out as fast nor as successfully. Because we started off fast and found a lot of ways to save water early on, it bred a desire in people to do more because they knew more successes were to come."

Bucket brigade

With at least 600,000 pounds of potatoes to process into refrigerated products every day, Northern Star had its work cut out for it. The key to success was involving all 250 employees in looking for ways to save water.

Each team member received a kit containing a two-gallon bucket, a stopwatch, and blue slips. Employees who found water leaks or overuse noted it on a slip and gave it to a team member.

Members then placed their buckets below leaks. Using the stopwatch to record the fill time for the buckets, they calculated the rates of water loss. The data allowed the team to identify the most pressing problems.

As a result, "We put a lot of engineering controls in, but the biggest reduction was from employees," says Menefee. "For example, they reported leaks, shut things off when not using them, and used shovels and squeegees instead of hoses to clean up potato peels and scraps."

The payoff was substantial. Northern Star reduced its water use to about 425,000 gallons a day and avoided the \$416,000 charge. But the benefits go way beyond that. Michael Foods noted how well a team approach worked and has formed similar teams in other facilities to examine waste issues.

And that's no small potatoes.



The Northern Star potato processing facility is one of many companies to benefit from the University's MnTAP program.

Photo by Nicole Holdorph



The Pill turns 50

May 10, 2010

Elaine Tyler May recounts the lively history of oral contraception in a new book

By Deane Morrison

When approved by the Food and Drug Administration 50 years ago, the birth control pill was hailed as the great liberator of women and the antidote to poverty, overpopulation, unhappy marriages, abortion, unwed motherhood, and the spread of Communism.

Others called it a marriage-killer, a spawner of licentiousness, and a Communist plot.

Today the pill has become a staple of contraception. But it's been a rough ride, as University of Minnesota professor [Elaine Tyler May](#) shows in her new book, "America and the Pill: A history of promise, peril, and liberation."

May takes us along on that ride, ending with the conclusion that the pill neither drove the sexual revolution nor lived up to its billing as a force that would single-handedly transform society for good or ill.

"The pill didn't solve population, poverty, divorce, or unwed pregnancy problems," says May. "And the idea that it would create sexual chaos didn't happen."

Nor did it liberate women. Instead, women liberated themselves and created new career opportunities during the 1960s and later decades.

"It was the feminist movement that opened those doors. The pill allowed women to walk through," notes May.

Challenging authority

The pill also became a linchpin for widespread challenges to religious and secular authority. For example, many Catholic women and couples used the pill in defiance of the church's ban on birth control.

May recounts how availability of the pill and other contraceptives was an issue for doctors and birth control activists who openly flouted state bans on disseminating information on birth control, let alone birth control itself. One such challenge resulted in the Supreme Court's 1965 *Griswold v. Connecticut* decision, which gave married women the right to contraception in all states. In 1972 the court extended the right to unmarried individuals in *Eisenstadt v. Baird*.

A many-faceted issue

May's book contains stories from many women, each offering a different perspective on the pill. Some welcomed the new freedom and control over their reproduction, while others rejected it for reasons such as side effects.

And as for controlling population, the pill fell far short. To take the pill, one needed both a prescription and money to pay for a constant supply, two major factors limiting its spread in the developing world.

But all in all, "the pill was a fabulous innovation," says May. "And today's pill is much safer than the original pill, so most of the early risks have been alleviated. But issues of access, availability, and affordability still need to be addressed so that all those who wish to control their fertility can do so."



Regents Professor Elaine Tyler May has written a new history of the birth control pill.

Photo by Patrick O'Leary

Mothers of invention

The pill has no clear father, says May, but it has two very clear mothers: birth control activists Margaret Sanger and Katharine McCormick. Without the work of these two, the research that led to the pill would not have been possible. Especially key was the monetary support from McCormick, heir to the International Harvester fortune.



One less weight to carry

May 12, 2010

U's Trey Davis decides to leave behind football, focus on track

By Rick Moore

So you think it's easy being a two-sport athlete at the University of Minnesota? Consider Trey Davis's schedule last March and April.

During the five weeks of spring practice, Davis would work out in the morning with the football team and then head off to his classes. After school it was off to track and field practice and weightlifting, then a concerted attempt to do his studying and get to bed at a reasonable hour ... so that he could do it all over again the next day.

Davis smiles at the recollection, and it's one of those smiles that carry a tinge of pain. "I can remember coming to track practice some days last year just exhausted. I could barely do anything," he says. "My body was beat up from football practice. And then trying to stay on top of academics—that's important to me. I don't like to do things haphazardly."

There's nothing haphazard about his attention to schoolwork. He's double majoring in history and political science and has been named Academic All-Big Ten three times.

Even though Davis looks the part of both a center in football and a thrower (shot put, discus, and hammer) in track, he came to see himself as a college student spread too thin. So he recently decided to leave football behind and focus on his track career.

Getting back what he gives

On the surface it might seem like an odd choice: giving up the glory sport of college football—running out of the tunnel to the cheers of 50,000 fans—for the relative anonymity of men's track and field, where, outside of the Summer Olympics, most spectators are close friends and family members.

Yes, he was spread too thin. But track also seems to align better with his personality.

"I'm always the kind of person that likes to do things myself; I'm pretty independent that way," says the soft-spoken Davis. "The appealing thing about track is that it's something where I can go out and I can work on my throw by myself for however long I need to. In football, I can't go and say, 'C'mon guys, let's work on this play for a half hour.' ...

"Track is unique in that it's all about what you put into it. You can't really fake your effort and attitude in track because it's directly correlated to your performances. ... It really is all about what you put into it."

Still, hanging up the shoulder pads wasn't easy for a player who was ranked the 31st best guard in the nation coming out of Farmington High School in 2007. He started in six games for the Gophers over the past two seasons.

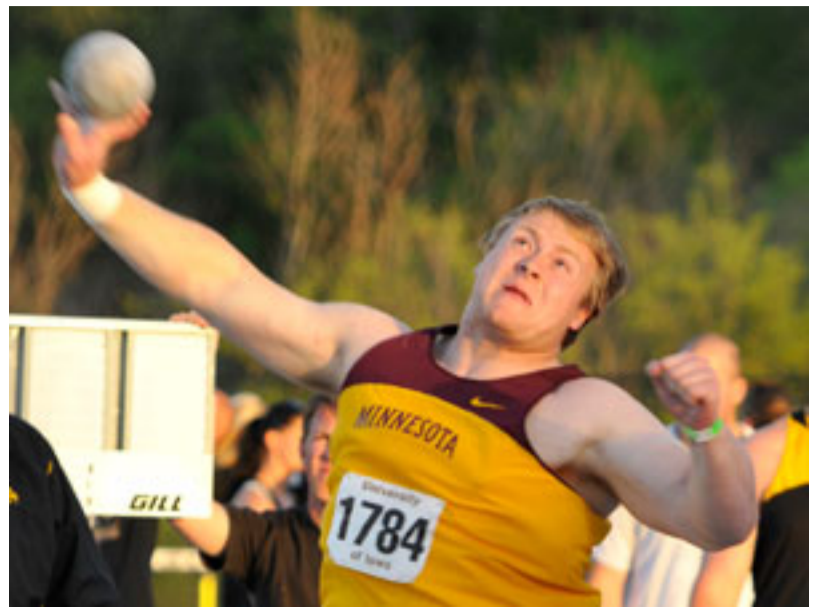
"There's been a lot of special memories from playing football that I'll never forget," he says. "Obviously, going into TCF Bank Stadium that first game is a special memory. At the end, it came down to [knowing] I could keep doing two sports and I could be average at both, or I could choose to do the thing that I really enjoy doing—really love doing—and give myself an opportunity to be pretty good at that."

A good future in track

"Now that he's going to be focusing on track full time, I think he can be a major, major contributor to the program," says Lynden Reder, Davis's throwing coach.

Davis finished fourth in shot put (17.51 meters) at the Big Ten Indoor Championships this year as a sophomore, and Reder points out that underclassmen don't typically excel in throws. But he appreciates Davis for more than just his scoring potential.

"Everybody looks up to Trey and everybody was excited when he would pop by, even during the football season," adds Reder. "He's already been a leader while doing both sports, but especially now that's he's focusing on one, he'll definitely be a leader on the team."



Trey Davis had a big weekend at the Big Ten Outdoor Championships in Bloomington, Indiana, as Minnesota defended its team title. Davis finished third in the discus on Saturday and then second in the shot put on Sunday. The Gophers tallied 145 points, 21 more than runner-up Wisconsin.

Photo: Becky Miller

Gophers defend title

The men's track team made it four titles in a row by capturing the Big Ten Outdoor Track & Field Championships over the weekend. Minnesota scored 145 points, outpacing Wisconsin (124) and Ohio State (115).

Davis had a big weekend for the Gophers. He finished third in the discus with a throw of 172-9, then finished second in the shot put with a career-best heave of 60-0 1/2, eighth best in Minnesota history.



Starwatch - June 2010

May 16, 2010

By Deane Morrison

What can beat watching the stars on a lazy June night?

Our first treat comes early, when Mars makes a close pass over the bright star Regulus in Leo, the lion. Looking to the west around 10 p.m. on the 6th and 7th, you'll see the reddish planet less than half a degree above Regulus, anchor of the Sickle of stars forming Leo's head.

Mars is now traveling eastward against the background of stars, heading toward Saturn, the bright light below Leo's hindquarters. But the stars move eternally westward, thanks to Earth's orbit of the sun. Like fish struggling in vain against a current, Mars and Saturn are being swept with them toward the west, where Venus, now a brilliant "evening star," waits.

Venus is always lovely, but especially so on the 14th. If skies are clear, we'll see a crescent moon hanging below the planet, forming a celestial semicolon. Venus has another fine moment on the 20th, when it glides just north of the Beehive star cluster.

Jupiter is well up at dawn, a bright beacon below the Circlet of Pisces, a round star grouping below the Great Square of Pegasus. The brilliant planet rises earlier every day and will start coming up before midnight by next month.

In mid-June the kite-shaped form of Bootes, the ploughman, sails high in the south after nightfall. At its base is Arcturus, a brilliant star whose orbit slices through the disk of our Milky Way galaxy. Most stars, including our sun, orbit within the disk.

June's full moon arrives on the 26th at 6:30 a.m.—an hour after it sets in the west, so you'll have to get up early to see it at its roundest. Every Algonquin tribe called this the strawberry moon, as this is the season when the small but delicious wild fruit ripens. In Europe, June's full moon was called the rose moon.

Summer arrives officially with the solstice at 6:28 a.m. on the 21st. At that moment the sun will reach a point directly over the Tropic of Cancer.

The University of Minnesota offers public viewings of the night sky at its Morris, Duluth, and Twin Cities campuses. For more information and viewing schedules, see:

Morris, UMN 16-inch telescope schedule: cda.mrs.umn.edu/~kearnsk/Telescope/PubObs.htm

Duluth, Marshall W. Alworth Planetarium: www.d.umn.edu/planet

Twin Cities, Department of Astronomy (during fall and spring semesters):

www.astro.umn.edu/outreach/pubnight

5/20/10 Contact: Deane Morrison, University Relations, (612) 624-2346, morri029@umn.edu

Find U of M astronomers and links to the world of astronomy at <http://www.astro.umn.edu>.



Cream of the crop

May 17, 2010

The varied discoveries of four outstanding doctoral candidates

More than 60 University of Minnesota doctoral candidates recently talked about their discoveries to scores of visitors at an annual showcase of research by recipients of Doctoral Dissertation Fellowships.

Here we present the four candidates in their own words—printed and taped—with links to three scholarly publications they have written or contributed to.

Rachael B. Kulick: Giving Birth at Home in the United States and the Netherlands



Recipients of Doctoral Dissertation Fellowships will soon join the ranks of tomorrow's leaders. Candidate photos by Patrick O'Leary

In the United States, only about one percent of births are home births, and in some states it is illegal for a midwife to attend a woman at home. In the Netherlands, birth at home is part of the mainstream health care system (about 30 percent of all births), midwifery is fully institutionalized, and expectant mothers routinely consider home birth. Here I examine how women, midwives, and societies "achieve" birth at home. I analyze practices surrounding home birth, social institutions that shape it, and cultural assumptions that support and/or undermine it, with the goal of giving U.S. women a strong home birth option.

Mark Hoffman: Rethinking the Politics of Immigration: Colonial Governance in the New World Order

My analysis of contemporary immigration policies and practices reveals that while money and commodities seem to move freely in an apparently "borderless world," immigrant workers from former European colonies face an array of legal and coercive restrictions on their movement that function to exclude them from domains of citizenship. Through a comparative analysis of the United States and France, I examine how contemporary practices of immigration management developed from colonial modes of governance and how these colonial foundations shape a racially exclusionary politics of national citizenship.



Read a [publication](#).

Phebe Veronica Jatau: Complications and Complexities in the Schooling Experiences of Young Northern Nigerian Women Living in Zaria



My work addresses high school dropout rates among northern Nigerian women and the gender gap and inequities that pervade the educational system. Schooling often suffers as a result of the grave impact of social inequity and the disregard of religious, cultural, and ethnic differences. These extracurricular factors, along with the dominance of English language instruction, shape the women's identities and strongly affect their aptitude for school. I recommend replacing the current practice of one-size-fits-all schooling with a humane education that meets these women's needs, interests, views, and values. *Correction to video:*

The figure of 7.3 million school dropouts applies to all of Nigeria, but the situation is worse in northern Nigeria.

Read a [publication](#).

William Ratcliff: Cooperation and Conflict in the Legume-rhizobium Symbiosis

Rhizobia are soil bacteria capable of making nitrogen fertilizer inside the roots of legume plants. While many strains of rhizobia are beneficial to legumes, some rhizobia "cheat," producing less fertilizer and growing more as a result. Legumes are thought to control the spread of cheaters by punishing them, but the global distribution of cheaters suggests that punishment is ineffective. In my thesis I identify key mechanisms that allow cheating rhizobia to succeed despite plant punishment. The successful completion of this research may allow us to sustainably improve agricultural yields, and it helps solve a major theoretical question in evolutionary biology.



Read a [publication](#).



Heineken taps Tilman

May 21, 2010

The Heineken Prize recognizes David Tilman's seminal work in the science of species diversity

University of Minnesota ecologist [David Tilman](#) has won the 2010 Heineken Prize for Environmental Sciences from the Royal Netherlands Academy of Arts and Sciences.

Tilman was selected for his seminal findings, published in *Science* and *Nature* during the 1980s and 1990s, which showed that biodiversity is essential for stable and productive ecosystems and demonstrated the value of protecting endangered species. More recently, Tilman has applied his discoveries to sustainable farming practices for renewable energy, showing that biofuels made from diverse prairie grasses can offer environmental benefits over those made from food crops.

"If there were a Nobel Prize for environmental science, Tilman would be a likely choice," says [Robert Elde](#), dean of the College of Biological Sciences. "He is at the top of his field. Nine previous winners of the Heineken Prize in medicine, chemistry and biophysics have gone on to win the Nobel."

Tilman is director of Cedar Creek Ecosystem Science Reserve, a University of Minnesota field station, where he has conducted resource competition and biodiversity studies since the early 1980s. His grassland experiments, among the longest running in the world, provide a rich resource for ecology research.

The Institute for Scientific Information named him the most cited ecologist from 1990 to 2000 and from 1996 to 2006. In 2008 Tilman received the International Prize for Biology from the emperor of Japan.

The Heineken Prizes are bestowed biannually by the Royal Netherlands Academy of Arts and Sciences. Tilman will receive his prize, which carries a cash award of \$150,000, in September.

Related Stories



David Tilman ranks among the world's most prominent ecologists.

Photo by Tim Rummelhoff



Volcanoes of the deep

May 24, 2010

Journey to a volcanic area at the bottom of the Pacific Ocean with University researcher Julie Bowles

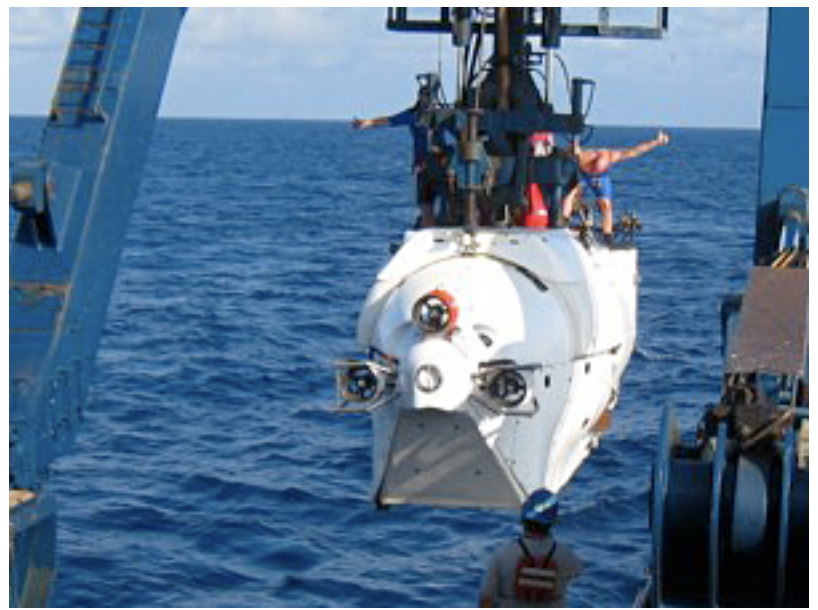
By Julie Bowles, research associate, Department of Geology and Geophysics

The closest land was the fabled Galapagos Islands, 280 miles to the southeast, as we climbed into the tiny three-person sub that would take us to the bottom of the Pacific Ocean.

Far from my University of Minnesota home, I was part of a multiuniversity mission to learn more about how Earth's surface is formed—and most of it forms under the waves.

As we slowly descended, the three of us went over our dive plan, enjoyed the bioluminescent plankton, checked out what was for lunch (peanut butter and jelly), and negotiated leg space.

The latter is often required inside the confines of the six-foot-wide titanium sphere that makes up the human working space of the *Alvin* submersible, which carries two science observers and a pilot to ocean depths of up to 2.5 miles. Today we would reach about 9,185 feet.



The research sub *Alvin* gets ready for a dive in the Pacific Ocean.

Photo by Rod Catanach, Woods Hole Oceanographic Institution



The robotic arm of *Alvin* samples a rock next to a background of old lava flows. Photo by Sean Kelley

Although this was my second time in *Alvin*, it was my first diving on a mid-ocean ridge. This ridge (the Galapagos Spreading Center, or GSC) is essentially a long chain of underwater volcanoes where new ocean crust is generated. Our job as scientists was to plan the dive track, look, take careful notes, and select which rocks to sample.

Seventy percent of Earth's crust is generated at mid-ocean ridges like the GSC, yet compared to our knowledge of how volcanoes work on land, we know little about them. How often do eruptions occur? How big are they? What processes deeper in the Earth

control how magma is generated and delivered to the surface? Why do some sections of the GSC have lots of seamounts (underwater mountains) while others do not? These questions go to the heart of how our Earth works.

To better answer them, we need detailed maps of different lava flows and data on when the flows erupted, as well as something about the chemistry of the rocks. Mapping surface features is easy on land, but try it on a moonless night with only a flashlight. Now add several thousand feet of water. No wonder we know more about what the surface of Mars looks like than we do the bottom of the ocean.

But today, being the first people to visit this particular place on Earth was enough. By the end of our seven-hour dive, we had seen beautiful "pillow-lavas" that form when lava slowly squeezes out through a small opening like toothpaste from a tube. These types of lavas tend to form rough, bumpy seafloor.

Other lava flows were much smoother, and occasionally we saw the remains of channels through which this lava flowed, or the remnants of a lava lake that had drained away. Of course, we also saw colorful sea stars, exotic-looking fish, anemones, squid, and crinoids (an animal that looks like a flower from Dr. Seuss).



Julie Bowles

It may be many years before I make it back to the bottom of the ocean, but the samples and data we collected will keep us busy and keep the good memories alive.



A strong advocate for survivors

May 27, 2010

The Aurora Center aids survivors of sexual assault and relationship violence

By Rick Moore

The U's Aurora Center faces a formidable task—providing crisis intervention and support to victims of sexual assault, relationship violence, stalking, and harassment. And the number served never seems to decline.

But an air of positive energy pervades its bright offices on the fourth floor of Boynton Health Service, and there's a host of people and accomplishments behind that feeling.

The center, which has a staff of six and serves about 300 people a year, is bolstered by the work of more than 60 trained student volunteers, many of whom advocate for victims.

And it boasts strong working relationships with campus organizations like the University of Minnesota Police Department (UMPD), Boynton Health Services, Disability Services, the Parent Program, and the Office of Student Affairs.

A national model

U.S. Assistant Attorney General Laurie Robinson was in town in late March for a panel discussion about violence against women on campus. Robinson heralded the Aurora Center as “not only a significant force here on the U of M campus, but one that we really cite to universities and colleges across the country for the kind of groundbreaking precedent in the work that it has done.”

(The center has received \$1.4 million in grant funding over the past decade from the Department of Justice's Office on Violence Against Women.)

The Aurora Center has a long-standing partnership with the UMPD to arrange for transportation to and from appointments downtown, according to Jamie Tiedemann, the center's director for 21 years.

“We will call and they will send over a squad (and most of the time they try to make it unmarked), and transport them—the advocate and the survivor,” Tiedemann says.

“Most often it will be with regard to a restraining order,” adds associate director Roberta Gibbons. “People feel a lot safer knowing it's a police officer who's dropping them off at the front door of the government center, and picking them up as well.”

And U students are stepping up to help at the Aurora Center in amazing numbers as legal advocates, violence prevention educators, and help line volunteers—all positions that require 20-40 hours of training—as well as volunteers for special projects.

“We both serve students and try to provide leadership opportunities for them, including the experience of doing the really hard work of answering a help line and going to court with people,” Gibbons says. “Students have proven over and over again how competent they are.”

Beyond the numbers

Gibbons and Tiedemann have noticed a couple of trends in the people they see: more complicated, time-consuming cases often involving relationship violence, and a sharp increase in the number of parents coming in for advice about their students. In addition, staff and faculty account for 10 to 15 percent of clients.

Tiedemann points out what she calls the incredible support from the Office of Student Affairs, especially Vice Provost Jerry Rinehart. “Without him,” she says, “we would not be where we're at in terms of unconditional support for our work. ... He gets it; he understands it.”

That can mean understanding the paradox that when the center is serving more victims, it's not necessarily a bad sign.

“It makes me feel really good that more and more people are seeking our services, seeking help, and feeling empowered to do that and feeling safe to do that,” says Tiedemann. “When our numbers go up, it doesn't mean [sexual assault and relationship violence are] happening more,” Tiedemann says. “It's that more people are getting help.”



Roberta Gibbons (left), associate director, and Jamie Tiedemann, director, have served the Aurora Center for 11 and 21 years, respectively.

Photo: Rick Moore



Tracking the economy

June 3, 2010

U alum Rebecca Blank, a key figure in the Department of Commerce, talks about the economic recovery and her time as an undergraduate

By Rick Moore

Rebecca Blank's titles at the U.S. Department of Commerce only begin to speak to the breadth of her responsibilities. The University alumna is the undersecretary for economic affairs in the Obama Administration and the head of the Economics and Statistics Administration.

That means she manages two of the premier data agencies in the United States—the Bureau of Economic Analysis and the Census Bureau. And since this is 2010, she's knee-deep in the once-a-decade U.S. Census.

"We have 650,000 temporary employees on the streets at this very moment knocking on doors," she says.

Signs of recovery

Blank was on campus May 10 to deliver the 4th James P. Houck Lecture on Food and Consumer Policy. Her topic, "Tracking the U.S. Economic Recovery," drew a predictably rapt audience to the St. Paul Student Center Theater.

She ticked off some of the recession's stats that are all too familiar, ranging from a decline in the asset value of household real estate by 22.8 percent to an increase in unemployment from 4.8 to about 10 percent.

The good news is that recession "officially" turned the corner in June 2009, and most economic indicators are on the rebound.

"We look much better in the spring of 2010 than we did in the spring of 2009 or the spring of 2008," Blank says. But, she adds, "We went down long and fast and it's going to take a long time to return to what America assumed was normal over the past two decades."

Blank suggests that if you envision a graph, we're likely to have a U-shaped recovery in economic growth.

"We are not there yet, because the labor market has only begun to show some good trends," she adds. "The labor market and the housing market are [the] two things that are going to unwind very slowly."

Prepared for great things

Blank found her niche as an undergraduate at the University of Minnesota in the 1970s.

"The economics department here is very good now and was very good then," she says. "I became an economics major because Walter Heller, a very famous economist and part of Kennedy's economists of the '60s, was teaching Intro Economics. I took his class, and it was just so interesting that I took another class and I was [hooked]."

"I took a lot of honors courses and met some great faculty. I came out of here fully prepared for graduate school and all the things I've done since."

She returned to campus in December 2008 to give the commencement address for the College of Liberal Arts—and to receive the U's Outstanding Alumni Award.

At about that time, she wrote a piece on her years at the U that included the following reflection:

I don't have a single moment-in-time memory that encapsulates my years in CLA. What I do have is a feeling about the place that comes back to me when I close my eyes and think "college." It's a feeling of finding an intellectual home, of recognizing what I could be and could do with my life.

I felt it during a class on Shakespeare, when I was furiously taking notes in the middle of my first semester and looked up at the teacher, who was enthusiastically explaining a nuance of the text, and I thought, "This guy makes his living by thinking about things like this. This is fun."

I felt it again and again in my economics classes ... when I handed in an assignment or took an exam and thought, "This is interesting. I can do this. And it's fun."



Rebecca Blank took Ph.D.-level economics courses as an undergraduate at the U and graduated summa cum laude in 1976. Her staff in Washington includes 20 Ph.D. economists.



Business in his blood

June 9, 2010

U student rides entrepreneurial spirit to commercial success

By Rick Moore

Every day is like the middle of finals week for Casey Profita.

When school's in session, he devotes the time necessary to stay afloat as a double major in Asian languages and literature and economics. Most of the rest of the day he's dedicated to making his burgeoning business Gophermods a success. So he goes to bed at about midnight and gets up at 5 a.m. to start all over again.

"Lots of coffee, lots of 5-hour Energy," Profita says, smiling. "My brain's always on, it feels like, so there's no down time where I'm procrastinating. I know I have to be doing something. Otherwise, I'll be behind."

As real as it gets

"I've never had a real job; I've always run my own businesses," says Profita. "Not being the boss was never in my plan. I don't want to work for anyone."

The 21-year-old Profita employs five people at Gophermods, a business that fixes video game consoles and iPhones out of a 500-square-foot space in the UTEC building just off campus. Profita has always tinkered with things, and he picked up the technical know-how from an acquaintance back home in Salem, Wisconsin. He launched a website for Gophermods in March 2009 and worked at home in the early days, converting his bedroom into a workshop.

Profita distinguishes Gophermods by offering a 24-hour turnaround for repairs, competitive pricing, and impeccable customer service. To date, there's been only one negative review, and most of his business comes via mail order from states like California, Texas, Florida, and New York.

He projects \$500,000 in revenues for 2010.

Connecting course work with commerce

Profita began buying products from China and reselling them on eBay at an early age, and that spawned the desire to major in Asian languages and literature.

"I realize if I pay attention in class it's going to translate well in business, because I'm working with my suppliers (for Gophermods) and getting great deals that my competitors can't get because they probably don't know how to communicate with [Chinese business contacts]," Profita says. "They really need to get to know you before they want to work with you. It's called *guanxi*. And you need to have good *guanxi* with them. Otherwise, they're going to give you some lousy service and not the greatest prices."

Although Profita admits that it's tough for him to give up the reins on anything, he did take a week of vacation in May. But that's just a dusty tail on his entrepreneurial comet.

He's pondering a new home for Gophermods in the UTEC building that would be triple the size of his current space. He wants to work more with smart phones and computers, and he's also eager to get cracking on a new, separate business venture. Plus, summer classes start in a couple of weeks (he claimed a 3.5 GPA this spring), and he'd still like to pack in a trip to China for networking sometime this summer. So the next figurative midnight is just around the corner.

"I know I don't want to just be focusing on Gophermods," Profita says. "I just don't want to sink down into one area. I want to get multiple things going."

He may need to find a better fix than 5-hour Energy.



Casey Profita, coffee at the ready, says that on a good day Gophermods can repair 30 to 40 video game consoles. "My goal is to always keep everyone happy and have zero complaints," he says.

Photo: Patrick O'Leary



Starwatch - July 2010

June 15, 2010

By Deane Morrison

This July brings us one of the loveliest full moons we're ever likely to see. Rising in the Twin Cities at 8:32 p.m. on the 25th, it becomes full just five minutes later. The sun sets at 8:47 p.m., so from the proper vantage point you may see both a gorgeously round moon and a red sun sitting on opposite horizons.

This full moon was known to Algonquin Indians as the buck moon, for the new antlers pushing up from the heads of male deer. They also called it the thunder moon, since thunderstorms are now most common.

July might be called the month of the scorpion, for this is when the slithery form of Scorpius is highest in the evening sky. Marked by its heart—the gigantic red star Antares—Scorpius comes out low and almost due south, stretching its claws westward toward Libra.

East of Scorpius, the well-named Teapot of Sagittarius dips to pour its contents onto the scorpion's tail. Above the handle of the Teapot hangs the little Teaspoon of stars. Together, these constellations shout "summer" to the experienced star watcher.

In the west, two bright stars and three planets begin the month strung in a rough line. Start by looking just to the west of Scorpius early in the month; you'll see the bright star Spica, in Virgo. Moving westward, you'll next see Saturn, then Mars, then bright star Regulus, in Leo, and finally Venus.

The night of the 9th, Regulus passes Venus and heads into the sunset. But the three planets remain, and they proceed to put on a show of togetherness. At the start of the month they span 38 degrees of sky, but that shrinks to just eight degrees by the 30th, when Saturn glides above Mars. And to add to our viewing pleasure, a waxing crescent moon makes the rounds of the planets between the 13th and 16th.

In the east, Jupiter rises earlier every evening, brightening all the while. It shines near the Circlet of Pisces, a somewhat dim but pretty star group below the Great Square of Pegasus.

On the 6th, Earth reaches aphelion, its farthest point from the sun. At that moment we'll be 94.5 million miles away from our parent star. We don't, of course, feel any less heat because of this because the variation in Earth's distance from the sun is too small. The ancient Romans, however, noted the intense heat of July and put it down to Sirius, the brilliant Dog Star, rising at the same time as the sun and adding its heat. The name stuck, and even today the sweltering days of July and August are known as the Dog Days.

The University of Minnesota offers public viewings of the night sky at its Morris, Duluth, and Twin Cities campuses. For more information and viewing schedules, see:

Morris, UMN 16-inch telescope schedule: cda.mrs.umn.edu/~kearnsk/Telescope/PubObs.htm

Duluth, Marshall W. Alworth Planetarium: www.d.umn.edu/planet

Twin Cities, Department of Astronomy (during fall and spring semesters):

www.astro.umn.edu/outreach/pubnight

6/18/10 Contact: Deane Morrison, University Relations, (612) 624-2346, morri029@umn.edu

Find U of M astronomers and links to the world of astronomy at <http://www.astro.umn.edu>.



Smart clothing

June 22, 2010

Technology expands what clothing can do

Lucy Dunne believes that before long we will see normal clothing that responds to our moods and needs.

Clothing that solves problems

Dunne, assistant professor of apparel design in the U of M's College of Design, says that technology is a way to better solve problems we deal with in regular clothing design.



Today's winter coat, for instance, is designed to simply trap body heat.

"By using technology," she says, "you can actually be generating heat ... maybe only when the person is actually cold. So then we'd have a garment that's a little more dynamic or responsive."

Dunne is focusing on embedding sensors to get information about movement or position or physiological states. "You can imagine embedding [a sensor] into a knee brace that might be able to tell you: 'This is too far.' Or it could just detect what's going on with your knee all day long and then feed that information back to your doctor."

Clothing that expresses moods

Smart clothing has a fun side. "If fashion is a spectacle," Dunne says, "then we want to use technology to get attention or to make a statement. ... Your outfit could change in some way to reflect your mood."

A skirt she designed had fiber optics that twinkled when the wearer laughed.

"We are only in the exploration stages of the expression realm," she says. "The potential for the future is great."



Triumph on the water

June 30, 2010

U continues summer theater tradition on Minnesota Centennial Showboat

By Rick Moore

It's less than 10 miles as the crow flies from the West Bank theaters to Showboat Landing on Harriet Island in St. Paul. But taking in a performance on the U's Centennial Showboat—the hallmark floating theater in the Twin Cities—is like stepping into another world.

This summer the Showboat presents “Triumph of Love,” which runs through August 28. The 18th-century play by Pierre Marivaux follows a princess on her quest to return her crown to its rightful owner—the young scholar Agis (pronounced “Ah-zhee”). But Agis has been taught to loathe and distrust women since birth, so the princess disguises herself as a man in the hopes of winning his trust and restoring his crown.

Along the way, love blossoms ... to say the least. What starts out for the princess as a simple quest to gain time with Agis turns into a somewhat tricky love triangle that speaks to the inherent power of love.

Director Peter Rothstein chose musical numbers from the Showboat era—including songs by George Gershwin, Irving Berlin, and Noel Coward—that serve to illuminate the characters in Marivaux's play, written many years earlier. The tunes also help showcase the talent of the Showboat cast members, who rate a rave review from Rothstein.

“It's an incredibly talented group of young students who work really hard and who will do this play dozens of times throughout the summer,” says Rothstein. “They get extraordinary training, and this play challenges them. ... It's a character-driven play; it's a text-driven play; and these students are incredible—really stepping up to the plate.”

A unique experience

Rothstein chose this production in part to work with young actors, but also because of the Minnesota Centennial Showboat itself—a tradition at the U since 1958.

“It's so charming, this old space with the footlights and the roll drop scenery. ... The last show I did was at the Guthrie, so it's kind of apples and oranges, technically. But [the Showboat has] its own set of aesthetics.”

While the Showboat isn't the Guthrie, it's a decidedly unique arts experience in the Twin Cities. Where else can you step outside at intermission and gaze upstream at the sun descending into the downtown St. Paul skyline while Ol' Man River lazes by? Therein lies the tug of “Triumph” for Rothstein.

It's amazing, he says, “to be able to go to the theater and then step outside and realize you've just experienced this whole magical world of the play, but you've been living on water the last couple of hours. I think that is truly unique.”

For more information on dates and times, visit [Triumph of Love](#).



Triumph of Love is a royal comedy featuring Showboat-era musical numbers and a look into the primal power of love. It runs on the Minnesota Centennial Showboat through August 28.



Science opened artist's eyes

July 7, 2010

Miles Mendenhall claims that, left on his own, he "would never take a science course." He was forced ("encouraged") to take science courses as an art student at the U of M.

Broadening his thinking

At the U, Mendenhall first focused on painting and sculpture and later, after the science courses, on printmaking.

"It's important," he says, "not to just concentrate on art but to also bring a bunch of areas of study into your conceptual thinking about the stuff that you're making. ... That breadth of knowledge really ... open[ed] up what I was interested in artistically."



Winner of a Jerome Foundation grant and a Minnesota State Arts Board fellowship, Mendenhall has shown his art in the Gallery at Fox Tax in Minneapolis and in a group exhibit at the Weisman Art Museum. He recently finished a residency at High Point Center for Printmaking.

Becoming a reality TV star

Mendenhall can currently be seen on Bravo's reality show "Work of Art." He and 13 other artists are competing to win \$100,000 and an exhibit at the Brooklyn Museum.

The entire show has been taped, but Mendenhall is keeping his vow of secrecy as to just how far he got. He does say the show helped him appreciate "simple, perception-based imagery in a time period where stimulation ... is so entrenched in our society."

"[It's] so beautiful," he says, "to make something that people can appreciate without all that excess stimulation."

Future is bright gray

Mendenhall is planning to travel down to Arizona "to keep going" with work he began at High Point Center. Which means, he says, "simple, really gray imagery and translating that into a carbon printing process." Then he hopes "to bring it back here to create some large-scale works on paper."



Milestone in mind control

July 15, 2010

New technology lets people's thoughts steer virtual objects in 3-D

By Deane Morrison

Seated before a computer screen, Elissa Gutterman does what once seemed impossible: She guides a helicopter through virtual 3-D space by the force of her thoughts.

Watching her move the helicopter is fun, but biomedical engineering professor [Bin He](#) has a serious purpose in mind. He hopes that someday his work on brain-computer interfaces will give some control over their environment to people who have only their minds with which to communicate. Stroke and paralysis survivors are among the potential beneficiaries.

This is the first time, to He's knowledge, anyone has demonstrated a system that allows a person to continuously move objects on a screen at will through 3-D space using noninvasive technology. And the system's noninvasive character means it could have implications far beyond the hospital. It could possibly help people drive or navigate, or it may find a use in entertainment software.

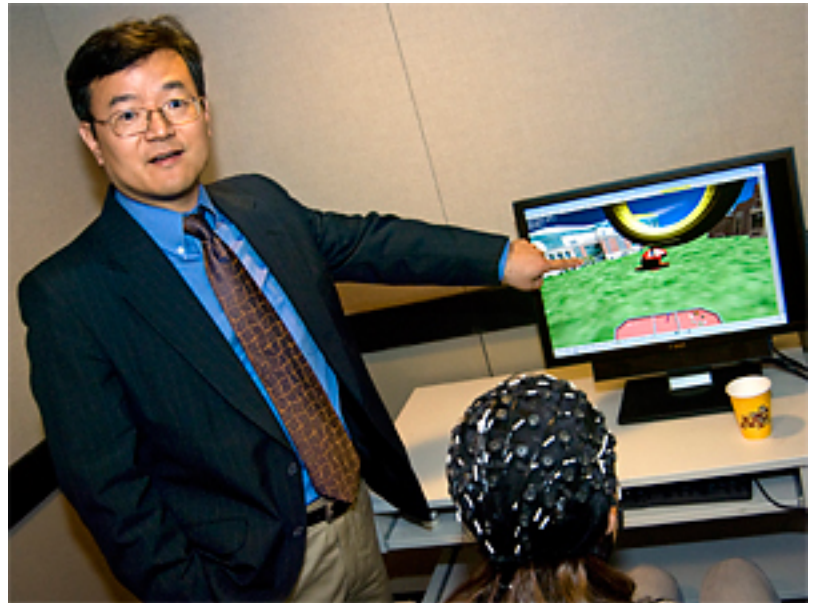
"Our dream is to develop a way to integrate brain and machine to help patients and give everyone a better life," says He.

The concept is simple. Embedded in the cap Gutterman wears are 64 electrodes picking up EEG signals from her cerebral cortex. To move the helicopter, she will, for example, think about moving one side of her body. This generates neural activity that is translated to a command to move the helicopter in the same direction.

In the video accompanying this article, you'll see Gutterman steer the helicopter over a virtual landscape representing the Northrop Mall area of the University of Minnesota Twin Cities campus. The goal is to guide the chopper through the big gold ring hovering over the greensward.

The new system demonstrates new capabilities that "nobody ever thought about before," says He.

Read about some of [Bin He's previous work](#).



Bin He has moved the technology of "mind control" into the realm of 3-D.

Photo by Nicole Holdorph



Spotlighting the spill

July 21, 2010

U course takes in-depth look at the issues surrounding the Gulf oil spill

By Rick Moore

The Deepwater Horizon Oil Spill has become a fixture of the daily news, enough so that 99 percent of Americans are at least aware of the spill, if not its daunting ramifications for the communities and landscapes in the Gulf region. Now, students at the University of Minnesota are getting an opportunity to drill deeper into a defining disaster in U.S. history.

The U is offering a class this fall titled “Oil and Water: The Gulf Oil Spill of 2010” (CFAN 3480, Section 4), that takes a systematic view of the spill, from the history of oil in the Gulf to containing the spill to the future of energy production. It’s the latest in a run of “rapid-response” offerings (including courses on the 35W bridge collapse, the Asian tsunami, and the credit crisis) sponsored by the [Institute for Advanced Study](#).

A broad, liberal arts approach to a complex issue

The three-credit, interdisciplinary course will view the spill through a host of lenses, according to Robert Gilmer, a history Ph.D. candidate and former resident of Louisiana who has a keen interest in environmental history.

Gilmer is especially intrigued by some of the paradoxes at play in the region; for instance, the strangely symbiotic relationship (at times) between the fishing and oil industries, and how many families involved with the former also work in the latter, often leading to mixed emotions on moratoriums on the off-shore drilling industry.

“You can’t really understand this topic without approaching it from a variety of different angles,” says Gilmer. “We’re going to be looking at the oil spill from historical perspectives, from legal perspectives, from the ecological science behind it, and also the engineering itself—the science involved in making offshore drilling possible (and what exactly went wrong in that technology), and the technologies involved in helping the recovery effort.”

Each week of the course will focus on a different topic, and several guest speakers will lecture. A research assignment will add depth to the student experience.

“By giving students the freedom to explore some aspect of this topic that’s really interesting to them and that maybe comes out of their disciplinary background, it gives them a chance to become an expert on that specific topic,” Gilmer says.

Only at the U

The “Oil and Water” class is more than a timely look at a hot topic; it’s a critical examination of an event that will be studied for decades, if not lifetimes.

“Having a class like this now is important because the issues coming out of this spill are things that we—both in Minnesota and throughout the country—are going to be dealing with for years to come,” he adds. “Everything from the kinds of food we eat to the way energy is produced in this country to the environmental regulations that we have in place to protect us from things like this. All of this is likely to be changing over the next few years.

“The University of Minnesota is, I think, ideally situated to deal with this because of the resources we have here and also the past experiences of the Institute for Advanced Study in offering rapid-response courses like this.”

Oil and Water: The Gulf Oil Spill of 2010 has been approved for the “Technology and Society” theme for the Liberal Education requirements. For registration information, visit [Oil and Water](#).



Over millions of years, organic matter carried and broken down by the Mississippi River helped create the oil deposits off the coast of Louisiana. Now, the oil spill has triggered widespread destruction to plant and animal life in the region.



Starwatch - August 2010

July 21, 2010

August opens with Lammás, or the festival of loaves, an ancient Celtic celebration of the season's first harvest. The August 1 holiday was one of four cross-quarter days falling midway between a solstice and an equinox.

The Celts divided the year into light and dark halves, with the switchovers happening on the dates we call Halloween and May Day. By this reckoning, Lammás marks the halfway point in the light half of the year, an occasion to rejoice in its bounty. Its opposite is Imbolc, or lamb's milk, on February 2, which we now know as Groundhog Day.

This year August holds two aces up its sleeve: very favorable conditions for the Perseid meteor shower and a close gathering of planets in the west. Look for the Perseids after 10 p.m. the nights of the 11th, 12th and 13th; this year, no moon will be around to interfere. Perseids tend to be fast and bright, with many leaving persistent trails. They radiate from a point in the northern constellation Perseus, which rises about 90 minutes after sunset.

These meteors represent the paths of dust left behind by Comet Swift-Tuttle, most notably during its 1862 appearance. As Earth hurtles through the dust cloud, numerous specks burn up in Earth's atmosphere, producing the fireballs we all love to watch.

All month long, Venus, the brightest of planets, puts on a show—with a little help from its friends. On the 9th, look to the west as the sky darkens to see Venus pass Saturn. Moving eastward, Venus catches up with Mars on the 19th; these two planets then close in on the bright star Spica in Virgo. The three objects will form the tightest grouping on the 30th and 31st.

In the east, Jupiter begins the month by rising as the western planets are setting, but it appears earlier every night. Its large bright orb traces a low trajectory across the night sky, just below the Circlet of Pisces, which itself is below the Great Square of Pegasus. With no bright stars in this area of the sky, Jupiter's presence lends a welcome touch of brilliance.

August's full moon arrives on the 24th. Algonquin Indians called this the full sturgeon moon, for the large Great Lakes fish that is easily caught this time of year. It was also known as the green corn moon.

The late summer stars are matchless in their variety. In the west, the kite-shaped form of Bootes hangs over the horizon, anchored by the bright star Arcturus. East of Bootes, find Corona Borealis, the Northern Crown; Hercules; and the Summer Triangle of Vega, Deneb and Altair. Further east, the autumn constellations of Pegasus, Pisces, Aquarius and Capricornus are wheeling into view. And in the south, take advantage of the last good time to see Scorpius and its bright red heart, the supergiant star Antares, before they disappear into the sun's afterglow.

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7/21/10 Contact: Deane Morrison, University Relations, (612) 624-2346, morri029@umn.edu

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A passion for pain relief

July 27, 2010

Horace Loh's studies of opiate addiction and pain relief earn him a Regents Professorship

By Deane Morrison

A friendly man with a wide smile, [Horace Loh](#) is exactly the kind of person you would want to see win a big award.

As a major contributor to the understanding of how opiate drugs such as morphine work on the molecular level, Loh, a professor of pharmacology, has awards to burn.

Now, his work has earned him the title of Regents Professor, the University of Minnesota's highest faculty rank. And he is out to turn his research findings into better treatments for both opiate addiction and pain.



New Regents Professor Horace Loh has made major contributions to understanding the mechanisms of pain relief and drug addiction.

Photo by Patrick O'Leary

Anatomy of addiction

Loh's research group was the first to study the neurochemical mechanism of opiate addiction. It rests on the presence of structures called opiate receptors, which sit on the outer surfaces of nerve cells and respond to molecules of morphine or other opiate drugs as a lock responds to a key. As they interact, the drug changes the receptor's shape. This "activates" the receptor, setting off biochemical changes in the cell.

Figures 1 and 2 show how morphine works in the human brain.

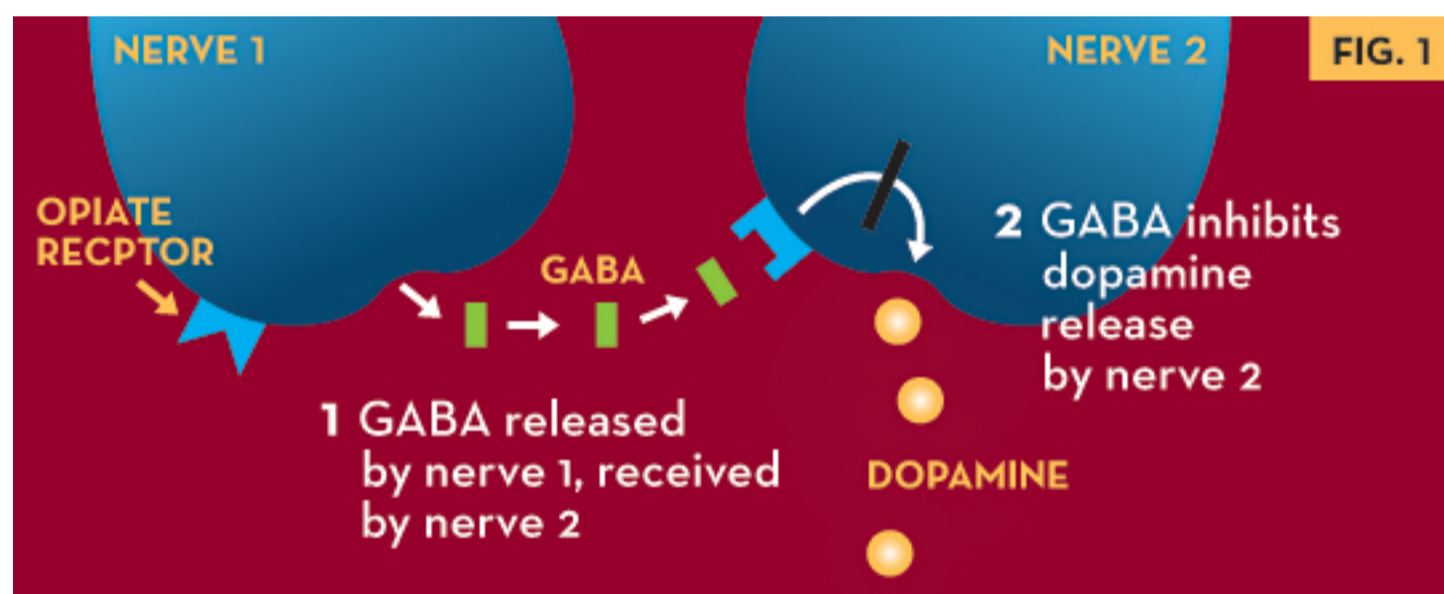


Fig. 1: Nerve 1 "talks" to nerve 2 by releasing a chemical called GABA. GABA activates a receptor on nerve 2 (the thick blue bracket); this causes nerve 2 to release less dopamine, a chemical that causes a person to feel good.

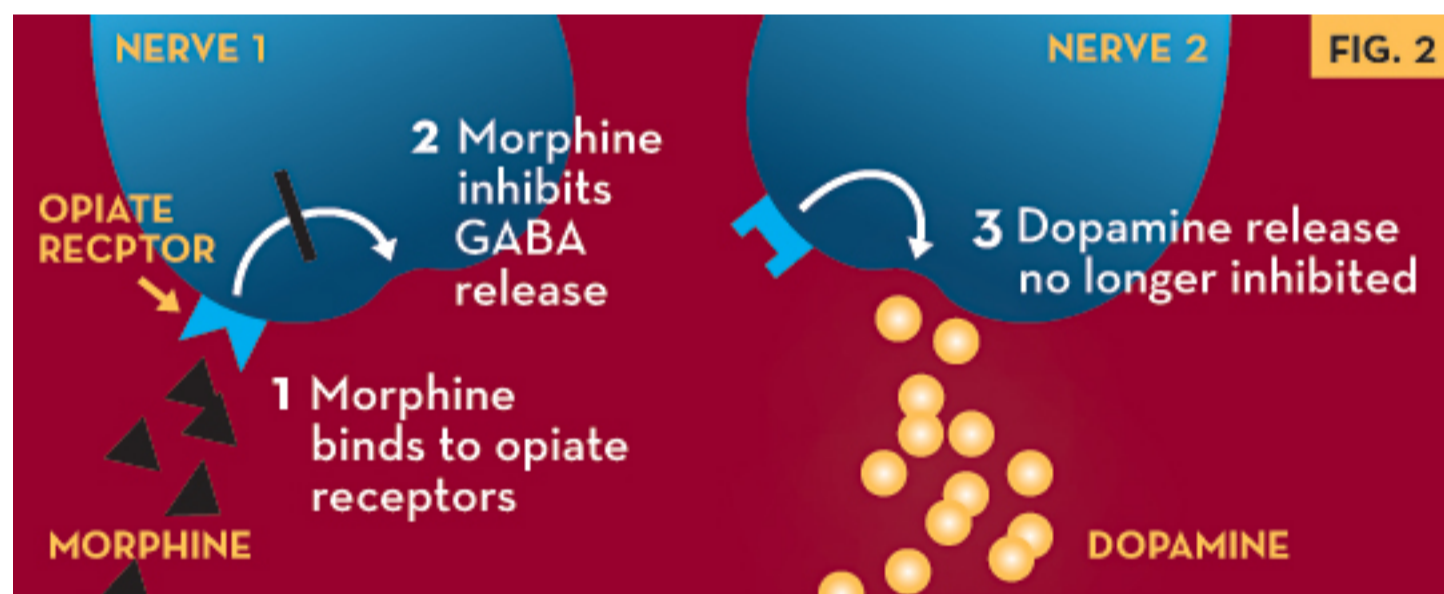


Fig. 2: Morphine activates an opiate receptor on nerve 1. The effect is to shut off GABA release. Now, nerve 2 is free to release more dopamine, allowing the person to feel better.

But the discovery of receptors for morphine in the human brain raised a big question: Since morphine was unknown to humans for most of our evolutionary history, why would we be wired to respond to it? The answer came with the discovery by others that our brains make pleasure-causing morphine-like substances called endorphins, which Loh calls "the brain's own morphine."

It was Loh and his colleagues who found the most potent endorphin—beta-endorphin—and that it was not only 200 times as potent as morphine, but addictive as well. And no wonder.

"The opiate receptor [for endorphins] also is involved in other functions, such as sexual behavior and food intake," explains Loh.

'A better morphine'

Loh's driving passion is to understand how morphine produces addiction in order to find a chemical treatment for addiction and to design a painkiller without the side effect of addiction—in other words, a "better morphine."

With longtime colleague [Ping-Yee Law](#), he has developed a gene therapy that works in animal models as a nonaddictive treatment for pain. Their approach is to modify the opiate receptor rather than modifying the morphine molecule, which is the traditional approach.

How it works: The researchers injected rat spinal cords with a gene for a mutated form of opiate receptor. Then they injected a chemical similar to morphine that activates the mutated receptor but not the normal one. The result: By activating the mutated receptor, they killed pain but produced no addiction.

Loh and Law are now searching for a small molecule that can cause the normal receptor to behave like a mutated one. This would bypass the need for gene therapy and allow doctors to treat pain with chemicals similar to morphine, without fear of causing addiction.

"That is the Holy Grail of our research," Loh says.

Published in 2010



Flights of Fancy collection

August 1, 2010

A colorful exhibit at the Goldstein Museum of Design explores the history of feathers in western fashion, the feather trade and activism against it, and the psychological appeal of wearing feathers.

See examples below



Formal dress

USA
de la Renta, Oscar
1975-83
Donor: Kremen, Virginia



Boxy hat

USA
Durand, Norman
1960-69
Donor: Stein, Mrs. Marion



Straw hat

USA
1910-19
Donor: Lindquist, Joan



Short jacket

Mackie, Bob
Donor: Willard, Emily



Folding fan

1890-99



Feathered coat

France
Sonia Rykiel
1970-75
Donor: Sylvia Markus Mohn



Straw hat with velvet roses

1890-99
Donor: Wheeler, Lola Edna Schuelter



Illustration, Gazette du Bon Ton

Pavane, Robe du soir, de Worth
Barbier, George
1921





Change agent

August 3, 2010

Karen Seashore is a leading scholar in school improvement and school leadership

By Rick Moore

When Karen Seashore began college, she was planning on becoming a historian. Then she discovered she was allergic to dust.

“Literally, I changed fields when I found out as an undergraduate that I couldn’t spend a long time in the stacks,” Seashore says, flashing a trademark easy smile.

History’s loss has been an epic gain for the field of organizational sociology—and for the University of Minnesota. Seashore, a professor in the Department of Organizational Leadership, Policy, and Development in the College of Education and Human Development (CEHD), has become “the most important methodologist in the field of school improvement that we have seen in the last quarter century,” according to one colleague.

Her work has also earned her the title of Regents Professor, the highest faculty rank at the University.

Change as a good thing

A lion’s share of what Seashore does is focused around one overarching question: “How do people who are working in whatever settings they’re working in generate ideas, use information, and get information to improve or change what they’re doing?”

Specifically, she studies the K-12 and higher education learning environments, and is interested in discovering the conditions under which teachers and faculty members “become highly productive.”

“I was one of the first people who started writing about and talking about teachers’ work as something other than a set of skills and a set of knowledge about the curriculum,” she says. The concept that teachers work in a professional community in their schools—and that its effectiveness leads to teacher dedication and student achievement—has become a staple in the vocabulary of schools, regardless of whether they know who’s responsible for it.

“There’s not a school in Minnesota that is not busy working on developing professional learning communities,” Seashore says. “It’s part of the common language now.”

Before the dust settles

Seashore came to Minnesota in the late 1980s “kicking and screaming” because she loved her life, at the time, in Massachusetts. Two-plus decades later, she’s a happy Midwesterner, grateful for all the opportunities the U affords her.

“The University of Minnesota is the only organization I’ve worked for where I actually can say I *really* love the institution,” she says.

In particular, she appreciates that the U has catered to her self-proclaimed short attention span. “I like to redefine what my job is every couple of years, and I’ve been able to do that here ... without actually changing my position,” she notes. “How many places can you go where you get to do that?”

She’s finishing up her first year as the director of undergraduate studies for CEHD, a role she never would have imagined for herself 35 years ago.

“The idea of being able to create something really wonderful for students within this huge institution is just ... It’s giving me goose bumps,” she says. “And it’s a lot of fun.” She also relishes her work with doctoral students; she’s advised 54 of them to date.

Then there’s the notion that she’s working for a public university “with that strong sense of engagement with [the] public interest,” she says. “It appeals to the piece of me that cares about whether or not my research is out there, at least being thought about by people in the real world.”

This article originally appeared in 2010.



Karen Seashore was one of the first people who began looking at teachers' work as something beyond just a set of teaching skills and knowledge about the curriculum. "Professional learning communities" are now part of the education vocabulary.

Photo: Patrick O'Leary



Starwatch - September 2010

August 11, 2010

The darker, clearer skies of September mean good viewing conditions for Pisces, Aquarius and other watery autumn constellations as they flow into the evening sky from the east. In addition, Jupiter, the sun and the moon all lay claim to special attention this year.

First up is a close call with Jupiter. On the 21st, Earth passes the giant planet in the race around the sun, an event we call opposition because it places a planet directly opposite the sun in the sky.

On that day Earth swings within 367.5 million miles of Jupiter. Although that's one of the closest approaches our two planets ever make, it's still nearly four times the distance from Earth to the sun. At opposition Jupiter will shine brilliantly in the southern sky, an unmistakable beacon just beneath the circle of stars called the Circlet of Pisces, which itself lies below the Great Square of Pegasus. A bright moon will compete with Jupiter's glory for several days around opposition, but the planet will be at near-maximum brightness most of the month.

This September we also get an excellent chance to find Uranus, thanks to its proximity to Jupiter. When no moon is up, use good, steady binoculars or a small telescope to search for a tiny spot within a degree above Jupiter. If your eyes are sharp, you may be able to make out the planet's bluish tinge.

The seventh planet from the sun, Uranus follows an orbit that takes it as far as 1.8 billion miles from its parent star—20 times as far as Earth's distance from the sun. Nothing strange about that, but Uranus has one bizarre distinction: Its axis of rotation is tilted nearly to the plane of its orbit, leaving the planet to rotate on its side like a gigantic rolling ball. A leading theory for how this came about holds that early in its history, Uranus collided with a planet-sized body that knocked it over. It's a good thing Earth's tilt is nowhere near so extreme; if it were, the seasonal changes we experience would be drastic indeed.

Next in the spotlight comes the sun, via the autumnal equinox. It happens at 10:09 p.m. on the 22nd, when the sun crosses the equator on its way into the southern sky. At that moment an observer in space would see Earth lighted from pole to pole, and day and night are equal.

The shift in daylight at the equinoxes may have implications for travelers. Since the March equinox, travelers going north have encountered progressively longer periods of daylight. After the September equinox, however, the farther north you go, the shorter the days. In the Southern Hemisphere, the pattern is reversed.

Rounding out our triad of special events, the harvest moon arrives officially at 4:17 a.m. on the 23rd. The harvest moon is traditionally the full moon closest to the fall equinox, and this year the two events miss each other by a whisker—barely six hours. If you want to see this iconic moon at its best, get out early that morning, since the moon will set shortly after 7 a.m. (exact times vary with location).

Venus, now a downwardly mobile planet, spends the month sinking into the sunset. But don't write it off just yet; on the 11th Venus and a young moon make a pretty pair, the last such spectacle before the planet disappears on its next sweep between Earth and the sun.

As darkness falls, the first three stars to come out will be the Summer Triangle, consisting of Deneb at the northeast point, Vega at the northwest and Altair at the south. All are the brightest stars in their constellations: Deneb in Cygnus, the swan, which contains the Northern Cross; Vega in Lyra, the lyre; and Altair in Aquila, the eagle.

You can find a somewhat dim but very pleasing pattern of stars by sighting with binoculars along an imaginary line from Altair to Vega. About a third of the way to Vega you'll see 10 stars in the shape of an upside-down coathanger. The Coathanger is an asterism, a group of stars that aren't a constellation. The Summer Triangle is itself an asterism; other famous ones include the Big Dipper in Ursa Major, the Little Dipper in Ursa Minor and the Great Square of Pegasus.

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Contact: Deane Morrison, University Relations, (612) 624-2346, morri029@umn.edu



An epic investigator

August 19, 2010

New Regents Professor William Iacono makes his mark with the help of twins

By Rick Moore

William Iacono is the first to admit that his research doesn't yield daily "Aha!" discoveries. But that's to be expected when you examine your research subjects over the course of decades as opposed to days. Still, Iacono's body of work has made a lasting impression within and beyond the University community; he was named a Regents Professor, the highest faculty rank at the U.

Much of Iacono's renown comes from his work with the Minnesota Twin Family Study (MTFS), a benchmark longitudinal investigation of about 1,900 sibling pairs and their parents begun in 1987.

The study traces the development of twins from adolescence through adulthood to understand the underpinnings of substance use and mental health problems; specifically, how genes and the environment interact along the way.

Study participants spend significant time in Iacono's psychophysiology laboratory. All told, the twins are screened across more than 100 different measures of characteristics like personality, family interactions, and religious behavior, and the data collection is repeated over time and updated for age appropriateness.

"If you measure enough things and do a good job of it, the idea is you should be able to see how those things work together to influence the [mental health] outcomes you see," Iacono says.

Among his findings are that a person who has one "externalizing disorder" or antisocial behavior is likely to have another one, and this co-occurrence of disorders is more heritable than a single disorder. The goal is to find and understand the underlying biological mechanisms.

"Hopefully, all that will come together in a way that will improve the mental health of people in this country," he says.

Detection of deception

Iacono smiles when asked about his litany of titles—professor of psychology, of psychiatry, of neuroscience, and of law—and how he came to piece together so many disciplines.

"I think it's kind of atypical, because most people are far more focused and it's easier to explain how they get from one point to another," he laughs.

Early in his career, Iacono became involved with a lie detector study as a way of attracting students to his lab. Soon he found himself in demand to help with legal casework involving polygraph testing.

"In the process of doing that I found out there are very few psychologists who are willing to venture into this field," he says. "It ends up being very important because it has huge implications for the individual lives of the people who take these tests, and also public policy implications in terms of whether or not employees should have to undergo polygraph tests to keep their jobs. It also has implications for national security."

At home in Minnesota

Iacono spent a few years early in his career at the University of British Columbia in Vancouver, and took part in some groundbreaking research there involving schizophrenia.

But he jumped at the chance to return to the University of Minnesota—a place he considers his intellectual home in a state that he cherishes for its outdoor splendor.

"There probably is no other place where I would fit in better or feel more at home," he says. "There isn't really any other clinical psychology program in the country that has a focus like that [on the etiology and biological basis of psychopathology]. And we're ranked in the top few and have been for decades."

Perhaps more so than any of his research findings, he's proud of the more than 40 doctoral and post-doctoral students he's advised over the years, many of whom are now collaborators who have carved out their own distinguished academic careers.

As for the research, "We don't have 'Oh, we found a cure for cancer' days in psychology," he grins. "But I think we've made great strides toward understanding the development of abnormal behavior."



William Iacono is well known for his work with the Minnesota Twin Family Study, a benchmark investigation of about 1,900 sibling pairs and their parents that began more than two decades ago.

Photo: Patrick O'Leary



Freeing the innocent

August 26, 2010

How law students at the U's Innocence Clinic helped right an injustice

By Deane Morrison

A career as a lawyer had never appealed to Hans Anderson—until the day he was watching TV and saw a newly exonerated man being released from prison.

“I thought that must be the greatest feeling in the world,” says Anderson.

After enrolling in the University of Minnesota Law School, he secured a highly prized spot in the school's Innocence Clinic, where students work closely with the Innocence Project of Minnesota to try to free inmates who can make a strong case for having been wrongly convicted.

This year—Anderson's last in law school—the case of a lifetime came along when a lawyer representing Koua Fong Lee asked the Innocence Project of Minnesota to help exonerate his client.

Lee was driving his Toyota Camry on a freeway exit ramp when it suddenly sped up and crashed into other cars. Ultimately, three people were killed and two injured. Lee, who had been coming from church with his pregnant wife, father and brother, was convicted in 2007 of criminal vehicular homicide and given an eight-year sentence.

But his luck turned with the recent publicity about sudden acceleration in Toyotas. Working for Lee pro bono, attorney Brent Schafer filed an appeal in Ramsey County District Court for a new trial and asked the Innocence Project for help. Much of the work fell to the U's Innocence Clinic, in particular to Anderson and Julie Jonas, an adjunct Law School professor and managing attorney for the Minnesota Innocence Project, who oversees the clinic.

“We were excited when Julie told us we were getting the case because we'd heard about it in the media,” says Anderson.

“My initial assessment was that this had to be an accident. To me, it was a huge miscarriage of justice that a jury could find this wasn't an accident. In fact, many of the jurors have since commented that they would have voted differently had they known about the Toyota recalls.”

Turning the tables

It wasn't long before potential witnesses came pouring in. Dozens of people who had had similar problems with Toyotas contacted Schafer through a website he had set up and recounted their experiences.

“About 50 people gave affidavits,” Anderson recalls. “I helped write about 40 of them.”

One in particular stood out from the pack, says Jonas.

“I talked to a witness who was a pilot for Sun Country,” she says. “He was also in the National Guard Reserve and flew for them. He was absolutely credible, as somebody who understands [mechanical systems]. He said, ‘My Toyota was accelerating out of control, and the brakes couldn't stop it.’”

Besides the new evidence, the clinic team and Schafer claimed that Lee had had incompetent counsel at his trial.

“His trial attorney [not Schafer] messed up by saying in court that Lee had his foot on the gas, when Lee consistently and unwaveringly protested [on the stand] to the contrary,” notes Anderson.

In the end, the court ordered Lee a new trial. But before the ink on the order could dry, the Ramsey County attorney announced that prosecutors would not retry him nor appeal the decision. On August 5, 2010, Lee was released after serving two and a half years in prison and reunited with his wife and four young children.

Lee was so grateful to his defense team that he invited them, including Anderson and Jonas, to a Hmong dinner.

“It was wonderful, almost like a dream,” says Anderson of his experience. “It was the highlight of my career.” And it came barely two months after his graduation from law school.



Thanks in large part to the efforts of Julie Jonas, Hans Anderson, and others at the University of Minnesota's Innocence Clinic, Koua Fong Lee was freed from prison after serving two and a half years of an eight-year sentence.

Photo by Patrick O'Leary

Justice denied

Through the Innocence Clinic, U law students screen and investigate inmates' claims of innocence and get an invaluable look at how cases proceed through the criminal justice system.

“Common causes of wrongful convictions include bad lawyering, bad forensic science, mistaken eyewitness identifications, and, in about 25 percent of cases, a defendant being coerced into confessing to police,” says Julie Jonas.

But “it's rare that a case has any potential for exoneration,” Hans Anderson says. “The Lee case was only the second exoneration I know of in Minnesota, and there have been only 250 to 260 in the whole country.”



A map of a different color

August 30, 2010

U professor's interactive map of joy and pain elicits strong emotions

By Rick Moore

On the surface (both literally and figuratively) Rebecca Krinke's latest public art piece is simply a giant laser-cut map of Minneapolis and St. Paul. But once she added in two types of colored pencils—gold and gray—and let local citizens color in their personal places of joy and pain, it became something much more.



The map has turned into a sociology experiment of sorts and a sounding board for people's emotions: hope and despair, contentment and anger, love and hate.

Kathy Kapsner, left, adds some color to the U hospital where she had open-heart surgery as a 7-year-old. Kapsner says she marked the spot as a place of both pain and joy. Rebecca Krinke looks on.

Photo: Rick Moore

Krinke, an associate professor in landscape architecture at the U, created the map this summer with the help of students, including three funded by the Undergraduate Research Opportunities Program. Etched into maple veneer over a thick hunk of plywood, it rests atop a "table" filled with gold and gray sculpture pieces.

Beginning in late July, Krinke started taking the map to public spaces in Minneapolis and St. Paul and inviting passersby to use the colored pencil of their choice—gold for joy and gray for pain (or both)—to express their memories of places.

"We're surprised; we didn't know what would happen," says Krinke. "That's the beauty of this being a public art project and not a scientific investigation."

Shades of gray ... and golden memories

Even though the map abounds with gold lines, arrows, splotches, and blocks, one can't help but notice the patches of gray—a stark reminder of the pain that surfaces in all of our lives.

The Minneapolis impound lot, by no stretch of the imagination a place of good cheer, is gray going on black. Ditto for large sections of the freeway system in the Twin Cities and for the Hennepin County Medical Center. One person even drew gray lines depicting flight patterns across south Minneapolis.

Many of those painful places have sparked heartfelt stories shared with Krinke. Like that of the boy who lost his father at Regions Hospital in downtown St. Paul. Or from the man who was ready to leave St. Paul behind and wanted to color the whole city gray.

One man was sharing his tale of overdosing on heroin in Minneapolis when another chimed in and said, "Yeah, that happened to me, too," Krinke says. "And they looked at each other like, 'Well, we made it.'"

Fortunately, the map still radiates more than its share of good times and golden memories. Of fish caught in Minneapolis lakes. Of trails hiked and biked over and over again. Of sports venues old and new. (The Metrodome, in case you were wondering, registers more gold than gray.) And of new connections to person and place.

One man mapped his whole block in St. Paul gold "because he adores his neighbors," Krinke says. "He said that when [one neighbor] first met him she said to him, 'You are complete now,' because he bought this house after a divorce. And he said, 'When she said that, I just felt like I had found the perfect place. It was such a moment of completion.'"

"I said, 'That's beautiful. It's interesting you didn't pick up the gray pencil to map pain at the old place. He said, 'I thought about it, but then I felt I've moved past that.'"

A need to be heard

Krinke figures the physical map may be at the end of its life, but she's looking at a way to put it online and make it more broadly interactive, possibly with "a national or international day of mapping joy and pain."

"I guess I'm really surprised at what kind of chord this is striking," she says, pausing for a moment. "I don't know, is there some kind of deep hunger in our society for a place to share beauty and fear, joy and pain? Do we never think about it, acknowledge it?"

As artists and designers, "there's a lot of potential here," she adds. "Maybe we're the witnesses. Maybe that's why they like talking. It's like testifying in a way. I guess [it's] a deep fundamental human need to be heard."

Read more about "Unseen/Seen: The Mapping Joy and Pain" at [Rebecca Krinke's blog](#), which has many comments and photos related to each of the places the artwork has traveled.



Memories of pain permeate this part of the map, from places including the Minneapolis impound lot (upper left), Hennepin County Medical Center (bottom center, next to the Metrodome) and the interstate freeway system, presumably at rush hour. At least the river runs through it.



Giving back in a big way

September 2, 2010

U student-athletes find the time to donate thousands of hours to the community

By Rick Moore

Minnesota football fans may know defensive tackle Brandon Kirksey best for forcing a critical fumble against Air Force last year in the opening game at TCF Bank Stadium. Nate Triplett's ensuing fumble return for a touchdown gave the Gophers a lead they never relinquished in that memorable 20-13 victory.

Kirksey still smiles at the recollection of that play. But he positively beams when he talks about his experiences volunteering with children when he has a spare moment away from field, the weight room, and the classroom. The junior captain from St. Louis is one of the most prolific volunteers on the football team.

And he's in great company among student-athletes.

A good year for giving

Over the past year, University of Minnesota athletes have dedicated upwards of 8,700 hours to volunteer activities. More than 610 athletes have volunteered at least once, and on average they've offered 8.5 hours of community service apiece. Some, of course, have given much more.

"In the last two years we've jumped tremendously in the amount of participation," says Anissa Lightner, assistant director of student-athlete welfare and the person responsible for setting up many of the community service activities for athletes.

For Kirksey, it's a chance to pay it forward to the next generation, a group that includes a lot of children who idolize athletes.

"Back home, I never did as much community service, so I try to do as much giving back as possible," he says. "One of my favorite memories of being a Gopher is just how the kids look up to us and how they aspire to be like us."

Dannie Skrove is a junior outfielder on the softball team who began volunteering during the fall of her freshman year. Skrove, like Kirksey, loves working with children, and along with gymnast Janell Campbell she's the co-chair of the upcoming HopeDay Festival—an event where some 400 athletes will give smiles to kids with cancer and other life-threatening illnesses.

"Growing up, I looked up to athletes. We're definitely role models for the kids who we do volunteering for," Skrove says. "It's good to see their smiles and know that they look up to you, and that you're their hero that day."

Finding time in a tight schedule

Lightner says she's amazed at how some student-athletes find the time to volunteer. She teaches a course for first-year athletes and knows firsthand their schedules. Swimmers may be in the pool at 5 or 5:30 a.m., in classes the rest of the morning, and back in the pool in the afternoon. Then they "grab something to eat on their way to the library or wherever they're going to study, and then they get up and do it again the next morning," she says. "And that's how it is for a majority of our teams."

Despite that grinding schedule, she'll have athletes contact her to try to squeeze in a community service opportunity, perhaps on a Friday morning when they could be catching up on sleep.

"We'll even have athletes that will be in competition over the weekend, and some of them will volunteer in the morning before they play that night. How do you do this?" Lightner says with a tone of disbelief. "I'm just very impressed with their dedication."

Some of the main beneficiaries of the M.A.G.I.C. (Maroon and Gold Impacting the Community) program are Special Olympics, Big Brothers Big Sisters, the Boys and Girls Clubs, and the HopeKids organization. Often, the U athletes travel to their service venue in the M.A.G.I.C. Bus, sponsored by the St. Jude Medical Foundation.

Lightner says that her office sees volunteering as an important experience for athletes, but there is no requirement.

"If you don't have a requirement yet you still achieve over 8,000 hours, that's a great culture to be a part of," she says.



The annual HopeDay Festival held at the U benefits children with cancer and other life-threatening illnesses and their families. Cassy Opitz and Missa Varpness, both from women's track and cross country, hang out with some of the attendees.

Photo: courtesy University Athletics



Getting beyond 'bowl eligible'

September 8, 2010

Tim Brewster talks about Big Ten expansion, the stout schedule, and the season at hand

By Rick Moore

Another college football season has begun, and there are changes in the air in the Big Ten. Nebraska has joined the conference, and next year there will be two six-team divisions.

But first things first. On the eve of the 2010 season, Gopher head coach Tim Brewster chatted about TCF Bank Stadium, the Big Ten expansion, his scheduling philosophy, and what he's learned about coaching in the Gopher State.

Q: How did playing at TCF Bank Stadium align with your expectations?

"I really feel that in all facets, TCF Bank Stadium exceeded my expectations. It's a dream come true for the state of Minnesota and for our fans to be back on campus. To me, there are some bigger but there are none better or finer than TCF Bank Stadium.

Q: Is having the new stadium an important recruiting tool?

"It's imperative that we continue to improve facilities if we want to compete for championships in the Big Ten. We can't now think that because we have a new stadium that we're done. ... This is a term I like to use: It's the 'Wow' factor. The wow factor is what recruiting is all about. We've got a wow factor with TCF Bank Stadium; we just have to continue to upgrade and improve our facilities each and every year."

Q: The Big Ten just added a big-time team in Nebraska. How should Minnesota fans view that?

"It's a tremendous addition to the conference—obviously a very storied, traditional football program that's had great success through the years. ... It helps us with adding a prestige team to the conference, but most importantly, it adds a 12th member so that we can split the divisions and play a Big Ten championship game on national television. And that's something we've sorely been lacking in our conference."

Q: It seems like a double-edged sword with scheduling. In the past, Gopher coaches have been criticized for scheduling easy non-conference games. Now that you've beefed up the schedule, some people think it's going to be too tough to win games.

"We've proven through history that we can win 6 games and we can win 7 games. What we have to do is prove that we can win 10 games, that we can compete for a championship. ... This year [we opened] up on national TV on a Thursday night ... and if we want to elevate the status of our program, that's the arena we need to be in. I'm not bashful about being in that arena. I want kids that want to be in that arena. I want kids that come to Minnesota to play against the best and challenge themselves to be the best. Because in life I think you shortchange yourself if you do otherwise.

"Going to a bowl game is not our goal. We've done that, two years in a row. ... Now it's time to take the next step. I think that we'll certainly have the opportunity to do that with the type of schedule that we're playing."

Q: Who's one player to watch this year?

"I fully anticipate [senior quarterback Adam] Weber to go out and play extremely well, extremely well, and lead our team to victory. That's what the quarterback's job is—to lead your team to victory, find a way to win. And I certainly believe that Adam's got the capability to do that. There's not a more experienced quarterback in college football than Adam Weber. It's his time. I fully anticipate him to go out and have an outstanding year."

Q: What has been the biggest surprise in being the head coach of the University of Minnesota football team, in this environment?

"There aren't a lot of surprises. I think this is my 24th year, so I've seen everything from a football standpoint.

"I think the things that you become more comfortable with as you move forward are handling all the demands on your time that are non-football related. Understanding the media. Learning, particularly in this market, the media's agenda, shall I say. Obviously, I feel very comfortable now going into my fourth year with all facets of what this job entails.

"More than anything here in Minnesota, there's such a deep-seated, deep-rooted skepticism about Gopher football. I came in here with a belief that we can win football games, we can win a championship, and unfortunately we got off to a really hard start—a one-win first year. But my belief is as strong today, if not stronger, that you can succeed here and that you can win a championship here. We are doing the things on a daily basis that are going to allow us to do that."

Q: What excites you most about the upcoming season?

"Just the challenge that it presents, playing such a difficult schedule right out of the gate. And accepting the challenge and going out and winning football games. ... I'm excited to see our guys go out and compete. To me, what gets my juices flowing is playing great opponents and challenging yourself to see whether or not you're up to the task."



Tim Brewster, now in his fourth season as head coach of the Golden Gophers, has an overall record of 15-24 counting the season-opening victory over Middle Tennessee State.

Photo: courtesy Eric Miller, University Athletics



Hovering higher

September 16, 2010

Parents still highly connected to their college-aged children, but they're trying to shed the 'helicopter' label

By Rick Moore

The anecdotes about over-involved or self-absorbed parents tend to be startling. Like the one about the parent who writes the essay for her child's scholarship application. Or the parent who, when told the dates of the University's Parents Weekend, says that doesn't mesh with his schedule, so how about picking another weekend?

Yes, today's parents are much more involved with their college students' lives than 20 or 30 years ago. But according to Marjorie Savage, director of the University's Parent Program, most parents are doing the right things—letting their sons and daughters make their own tough decisions, while still being there for them in times of true need.

A history of involvement

Parents certainly have reason to be involved. Those footing a good share of tuition see success in college as a return on investment. Plus, they're used to paying attention.

"Parents today have at least eight years of No Child Left Behind in their pockets [whereby] K-12 schools are *telling* parents how to be involved with their student—sending them emails, giving them access to their grade books, all of those very close connections," Savage says.

Naturally, that can breed an expectation that college will be similar.

"I had an email from a dad today saying, 'During high school we were able to look at our student's grade book. Can we do that the college level, or do we just have to trust them?' Savage says. "And the answer is, you do just have to trust them and get the information directly from your student, not from the University. Students have all their own information and can give it to their parents."

While some parents feel the need to stay involved with their child's academic and personal lives, others are aware of the reputation their generation has gained.

"I'm seeing a lot of parents who are hesitating to contact their student or the University because they're afraid of that 'helicopter' label," says Savage. "So when they should be involved (as in the case of a student who was hospitalized), they're stepping back and thinking, 'I don't want anybody to call me that.'"

So, Savage says, "trying to delineate between what's appropriate and what's not is a real test for parents today."

The wireless umbilical cord

Technology has aided and abetted the bonds between parents and their college students. A generation ago, students kept in touch via the occasional long-distance phone call and the even more occasional hand-written letter.

That's no longer the case.

"Parents today are much more likely to be texting," Savage says. "They are texting more than they're emailing. It's approaching the level of cell phone calls."

And Savage says that's okay. "It's easy to check in with a text," she says. "You can just say, 'Hi, how are you doing? Things going okay?' 'Yep, everything's fine.' And you don't have that long phone conversation or the awkward 'How do I hang up on my mom' kind of thoughts."

Keeping the proper distance

So, at what point should parents insert themselves in their students' issues, academic or otherwise?

Savage says that if parents are tempted to get involved, they should ask themselves three things: Is their student asking for help? Could most students take care of the situation at hand? And is their student physically and mentally capable of making this decision right now?

"You need to trust your student and to trust the institution. As long as you know that the resources are there for students, let them deal with the issues *and* deal with the consequences. The hard part for parents is knowing their student has to deal with consequences. But that's how they really learn some of the important lessons."

For news updates and more information for parents, visit the [University's Parent Program](#).



Today's college students often turn to their parents first for advice and support. The U's Parent Program offers resources for parents and tips on helping their children navigate collegiate life.

This story originally appeared in 2010.



Starwatch - October 2010

September 16, 2010

Just as the mythological winged horse Pegasus flew over the Mediterranean, so its starry namesake sails above a sea of watery fall constellations.

Pegasus puts its unmistakable stamp on the sky with the Great Square, now high in the south after nightfall. Right below the Great Square is a subdued but pretty ring of stars called the Circlet of Pisces, the fish.

Just southwest of the Circlet you'll find the Y-shaped Water Jar, the apex of the spidery-shaped constellation Aquarius, the water bearer. Moving southwest again, a chevron of stars outlines Capricornus, the sea goat.

The lone bright star in the neighborhood is Fomalhaut, a lantern low in the south. This intriguing star, beloved of science fiction writers, marks the mouth of Piscis Austrinus, the southern fish.

Only 25 light-years from Earth, Fomalhaut delighted astronomers five years ago when they discovered a gigantic ring of dust circling the star. The ring is made of debris from collisions of countless small objects in orbit around the star, yet the ring is not centered on the star. It owes its off-center position to the gravitational influence of a large planet, found in 2008, orbiting Fomalhaut at a distance of about 10 billion miles; that's 115 times the distance between Earth and the sun.

Speaking of planets, the water constellations host a prominent guest this year. Jupiter, a gorgeous beacon, lights up the sky below the Circlet of Pisces. The king of planets is almost as bright as it can get and remains visible most of the night.

Morning star watchers will see Saturn rising earlier every day. The ringed planet ends October by popping into the eastern sky a good two and a half hours before the sun.

October's full moon, known to Algonquin Indians as the hunter's moon, rises round and beautiful the evening of the 22nd. The month closes out with Halloween, an ancient Celtic holiday known as Samhain.

One of four cross-quarter days falling midway between an equinox and a solstice, Samhain began at sundown and ushered in the dark half of the year. On that night, evil spirits cooped up for six months came bursting out of confinement to wreak havoc on mankind and had to be placated with bribes of food. Thus began our tradition of trick-or-treating. The unfriendly spirits hung around until May Day, when the light half of the year began and they were once again banished from the world of the living.

The University of Minnesota offers public viewings of the night sky at its Morris, Duluth and Twin Cities campuses. For more information and viewing schedules see:

Morris, UMN 16-inch telescope schedule: cda.mrs.umn.edu/~kearnsk/Telescope/PubObs.htm

Duluth, Marshall W. Alworth Planetarium: www.d.umn.edu/planet

Twin Cities, Department of Astronomy (during fall and spring semesters):
www.astro.umn.edu/outreach/pubnight

Find U of M astronomers and links to the world of astronomy at <http://www.astro.umn.edu>

Contact: Deane Morrison, University Relations, (612) 624-2346, morri029@umn.edu



Helping students reach higher

September 21, 2010

Reach for the Sky program offers White Earth students a closer look at STEM disciplines

By Rick Moore

Keeping middle school kids enthralled with the idea of a career in math, science, or engineering is never an easy task, and it can be even more of a challenge in Native communities. That's where the Reach for the Sky (RFTS) program comes in.



One of the highlights of this year's Reach for the Sky program was the launching of weather balloons equipped with sensors, cameras, and GPS units.

Reach for the Sky has been a three-year partnership—funded by the National Science Foundation—between the University of Minnesota, the White Earth 21st Century After School Program, and three schools on the White Earth Reservation.

The program brings innovative curricula and activities in STEM disciplines (science, technology, engineering, and mathematics) to the White Earth students over a five-week span. It's targeted at fourth- through eighth-graders, the age "when students start to lose an interest in science and mathematics," says RFTS co-director and associate professor Gillian Roehrig.

"What we wanted to do is provide opportunities for students to have hands-on, culturally relevant, place-based opportunities with science and engineering and mathematics that they could relate to—things they could see in their own communities," Roehrig says. "The goal is to keep students engaged in science and to see that science is a possibility as a career."

Up, up, and away

Part of the focus of this summer's program was to study the earth's atmosphere, and the White Earth students (with the help of aerospace engineering and mechanics professor James Flaten and the U's Minnesota Space Grant High Altitude Ballooning Team) created experimental packages. They included sensors, cameras, and GPS units and were attached to two large helium weather balloons.



The balloon

experiments were designed to give students a basic understanding of what the earth's atmosphere is like, Roehrig says, "so that you can start to talk about how things we do as humans—like pollution—upset the atmosphere."

The students discovered how temperature, pressure, and radiation are affected by the atmosphere, and also how remote NASA satellites work.

There were surprises along the way. Students discovered that the temperature gets lower and lower at higher altitudes, up to a certain point where an inversion kicks in.

"The temperature actually does something the students would never predict," Roehrig says.

Because science doesn't have to be separate from culture

While their career choices have yet to be determined, it's apparent that the White Earth students are embracing the RFTS program, which recently received a grant extension for a fourth year. Each year student interest exceeds the space available in the program, and many students have been in the program all three years.

"We've got kids who could be doing something else, but they're choosing to come here," Roehrig notes. "You can imagine the squealing and the excitement with the balloon going up and the different things they're doing."

The fact that the programming is intended to be culturally relevant to Anishinaabe youth makes it that much more beneficial.

"You don't want science to be something that's *done* to a community," says Roehrig. "You want the students to see science as something that's part of them and part of their culture and part of their community. ... It's not 'I can be Native or I can be a scientist.'"

Reach for the Sky involves faculty from the College of Education and Human Development, the College of Food, Agricultural and Natural Resource Sciences (CFANS), the College of Science and Engineering, and University of Minnesota Extension. In addition to Roehrig, the co-PIs of the program are Tamara Moore, assistant professor in the Department of Curriculum and Instruction, and Stephan Carlson, CFANS professor and Extension educator.



Stalking a cereal killer

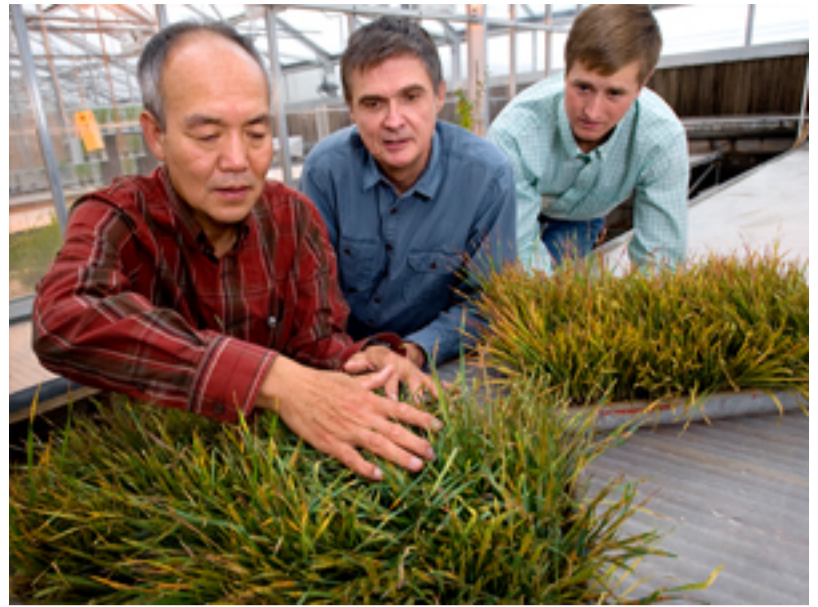
September 24, 2010

On the front lines of the fight to save the world's wheat crop

By Deane Morrison

Riding the wind out of the wheat-growing areas of eastern Africa, a killer fungus has already reached Asia and now threatens up to 80 percent of the world's wheat crop.

Discovered in Uganda in 1999, Ug99 is a strain of "stem rust" fungus that burrows into the tissues of wheat and barley and damages or kills the plants, even some of the most rust-resistant lines. It's a formidable foe for University of Minnesota cereal grain researchers, who are on the forefront of efforts to contain its spread.



Researchers Yue Jin, Martin Carson, and Matt Rouse are out to control the spread of the deadly Ug99 stem rust fungus.

Photo by Patrick O'Leary

A global reach

Today Ug99 is spreading into Iran, and variants of Ug99 have been found in southern Africa. It now threatens wheat in India and China, where a billion people depend on the grain. If it finds its way to the Americas, it will pose a threat to most of the U.S. wheat crop.

Stem rust has afflicted wheat crops since time immemorial. During World War I, legendary U of M plant pathologist Elvin Stakman and his colleagues began breeding wheat for rust resistance.

"It was because of fear that stem rust would wipe out enough of the wheat crop that the United States couldn't feed soldiers in World War I," says Les Szabo.

Szabo is one of about a dozen rust researchers at the Cereal Disease Laboratory (CDL) on the St. Paul campus. The lab is part of the USDA's Agricultural Research Service, and Szabo and his colleagues also hold appointments with the U's Department of Plant Pathology. Together they are part of a global Gates Foundation-funded project to fight the plague of stem rust.

A wily opponent

The CDL researchers are out to learn all they can about Ug99, especially the mechanism that allows it to mutate into new, virulent variants.

The name Ug99 is applied to several closely related variants within one lineage of the stem rust fungus. All Ug99 variants have the ability to infect wheat carrying the "gold standard" gene for resistance to stem rust. That gene, called Sr31, was the mainstay of crop protection for several decades.

Unfortunately, "Ug99 has mutated at least twice since its discovery," says Martin Carson, research leader at the CDL. Each time it produced a variant with added virulence.



Stem rust on young wheat leaves. Photo by Patrick O'Leary

Two of the variants were discovered by CDL researcher Yue Jin and colleagues. First, they observed two wheat lines growing in Kenya, each carrying a gene for resistance to Ug99. But soon, those lines became susceptible to stem rust in Kenyan fields. Laboratory studies revealed that the rust strains attacking plants with the resistant genes were new variants of Ug99.

"[Ug99] has the potential to undo the Green Revolution led by Norman Borlaug in East Asia, because it's capable of attacking the high-yielding wheats that he worked so assiduously

to breed for resistance," says University rust researcher Brian Steffenson. He, Jin, and other University researchers are screening wheat in heavily affected areas like Ethiopia and Kenya in a race to find long-lasting resistance to the fungus and incorporate it into wheat and barley.

More genes, please

"The way to slow down the evolution of virulence is to have multiple genes for resistance to Ug99," says Matt Rouse, who recently completed his doctoral research on resistance to Ug99 in the Department of Plant Pathology and will soon join the CDL as a research scientist.

Rouse has already found two new resistance genes and identified molecular markers that can be easily detected and serve as flags for the presence of these genes. The markers help scientists track which plants carry the resistance genes so that only they will be used for breeding.

In another tack, Szabo is looking for the precise agents—called effector proteins—that Ug99 uses to infect plants. If these can be identified, Szabo, along with University scientists Jane Glazebrook and Fumiaki Katagiri, can test other plants, such as rice, to see if they have genes that can protect against effector proteins. These genes could possibly provide new sources of resistance to help protect wheat and barley.

"If we understand enough, we may be able to design 'de novo' genes that block key points essential for this fungus to infect its host," Szabo says.

More than anything else, Carson wants to avoid repeating the complacency that set in after the "golden" resistance gene Sr31 was bred into crops.

Because of Sr31's success, "the effort to find new genes for resistance to stem rust was put on the back burner," Carson says. "If we had had a fairly modest program to identify resistance [and had kept resistance genes in reserve] we could have responded much faster."

The blessing of cold

The Cereal Disease Laboratory is one of just two labs in North America (the other is in Winnipeg) allowed to study samples of this rust fungus from overseas. But only from December to February, because our cold winters will kill any spores that might escape. Yue Jin uses the different strains of the wheat stem rust fungus to screen wheat plants for resistance.



A smarter way of looking at power

October 1, 2010

U professor advocates for "smart self-healing grid" to boost U.S. energy security

By Rick Moore

Editor's note: In the aftermath of Hurricane Sandy, millions of people are without power along the east coast, an area that has one of the older infrastructures in the country. The University of Minnesota's Massoud Amin is an expert on power-grid issues, and his work to develop a "smart, self-healing grid" is now more pertinent than ever.



The nation's \$14 trillion economy is critically dependent on electricity. Massoud Amin and his team at the U are working to make the delivery of that electricity smarter and more efficient.

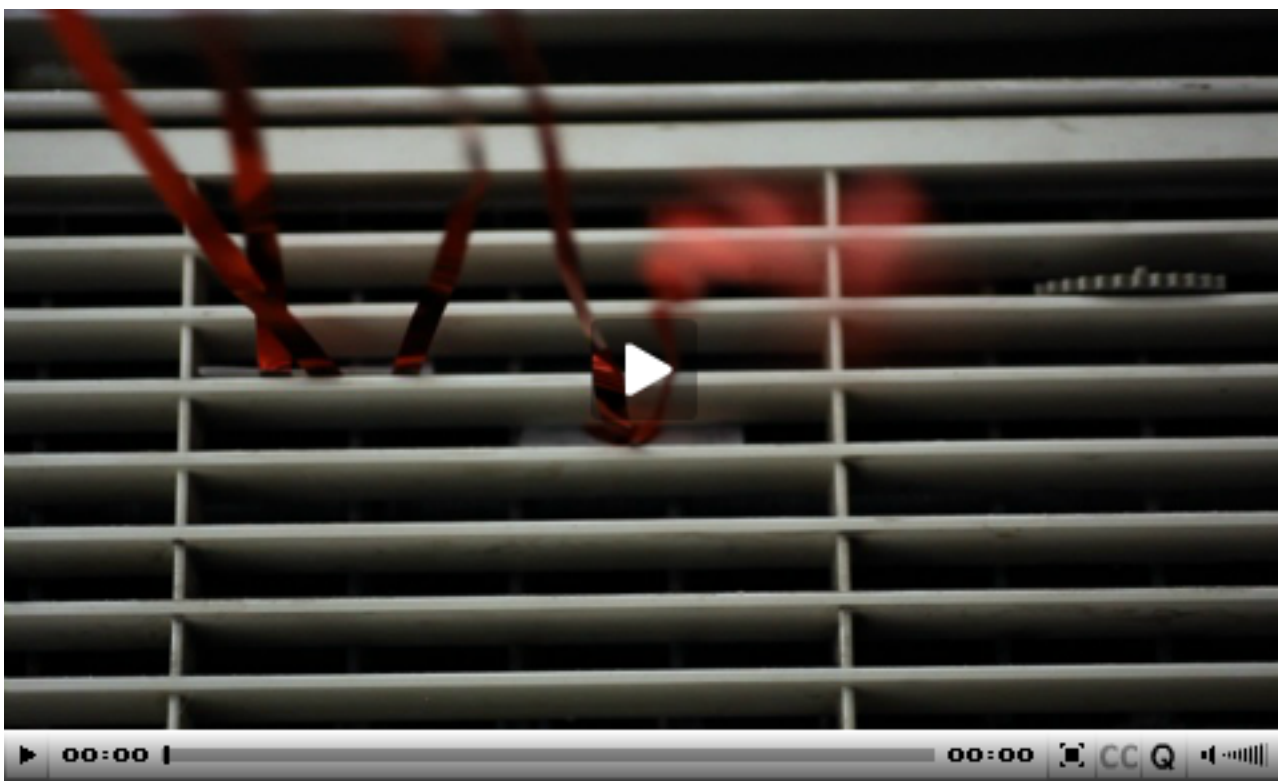
Massoud Amin has been all too close to some major disasters. On 9/11 he was in Washington, DC, presenting at a workshop (on, of all things, disaster risk-management), when the plane attacks effectively ended the proceedings. And on August 1, 2007, he witnessed the collapse of the I-35W bridge from his office window.

Coincidentally and perhaps fittingly, Amin, director of the U's Technological Leadership Institute, has devoted much of his time and energy to averting disasters. Most of his work focuses on developing a "smart, self-healing grid" for delivering electric power in the United States, which he says would save money and offer increased security to the nation's infrastructure.

First off, it's helpful to define just what a "smart grid" is. According to Amin, the term, which he began using 12 years ago, refers to the use of computer, communications, sensing, and control technology—operating in conjunction with an electric power grid—to enhance the reliability of electric power delivery. A smart grid minimizes the cost of electric energy to consumers; improves security, quality, and resilience; and meshes easily with new generating sources like wind and solar.

It also uses the sensing and control technologies to deal with unforeseen events, minimizing their impact.

And, as Amin points out, "unforeseen events" are leading to an ever-increasing rate of power outages. The number of non-disaster-related U.S. power outages affecting 50,000 or more consumers increased from 186 during 2001-2005 to 297 from 2006 to May 2010. These outages and quality disturbances cost the U.S. economy from \$80 billion to \$188 billion per year.



Some of the most reliable utilities are in the

midwestern states of Minnesota, Iowa, the Dakotas, Missouri, Nebraska and Kansas, where the power is out an average of only 92 minutes per year—compared to 214 minutes in New York, Pennsylvania, and New Jersey. But compare that to Japan, which averages only four minutes of total interrupted service each year.

"I cannot imagine how anyone could believe that in the United States we should learn to 'cope' with these increasing blackouts—and that we don't have the technical know-how, the political will, or the money to bring our power grid up to 21st-century standards," Amin says. "And it is not just a matter of 'can.' We must, if the United States is to continue to be an economic power."

Investing in our future

Amin acknowledges that developing a smart grid in America will be costly; integrating the technology within the existing grid will cost from \$150 billion to \$170 billion over a 10- to 20-year period. He also suggests that an overhaul of the entire electricity infrastructure is in order, which would cost \$1.5 to \$1.7 trillion over 20 years.

But once in place, a smart grid would pay for itself by increasing efficiency by 5 percent (\$20.4 billion in savings annually) and reducing the costs of outages by about \$49 billion per year, he says. It would also reduce emissions by 12-18 percent, increase overall energy security, and spur economic growth.

Because our nation's economy depends on a smarter solution

At the University, Amin and his team of doctoral students in electrical and computer engineering continue to work on smart grid concepts, including the integration of plug-in hybrid electric vehicles to the grid, power grid simulation, and risk assessment for large-scale networks. He also hopes to someday transform the U's Twin Cities campus into a "SmartGridU."

At stake, Amin says, is what century Americans see themselves in.

"A key challenge before us is whether the electricity infrastructure which underpins our economy, society, and quality of life will evolve to become the primary support for the 21st century's digital society—a smart grid with self-healing capabilities that powers our innovation," he says. Or will it be "left behind as a 20th-century industrial relic? And what are the costs of not implementing change?"

Adds Amin: "Our \$14 trillion economy—all aspects of it—depends on reliable, disturbance-free access to electricity."



Benefits of Bt

October 7, 2010

Growers of non-Bt corn reap savings from Bt cornfields, study shows

By Deane Morrison

Fields of corn engineered to resist insect pests has allowed non-engineered cornfields to save farmers in Minnesota and four other Corn Belt states more than \$4 billion over 14 years, a new U of M study shows.

The work is published in the October 8, 2010, issue of *Science*.

For the past 14 years, Corn Belt farmers have been planting "Bt" corn engineered to produce insect-killing proteins isolated from the bacterium *Bacillus thuringiensis*. The main target is the European corn borer, which causes an estimated \$1 billion in damage every year.

Because Bt corn effectively kills the larvae of corn borers, it reduces the population of adult moths available to infest the next crop of either Bt or non-Bt corn.

In the current study, University of Minnesota entomology professor [William Hutchison](#), with colleagues at the U of M and several other institutions, examined data from Iowa, Illinois, Nebraska, and Minnesota—the top four corn-growing states, with 2009 yields valued at \$27.1 billion—and Wisconsin. The researchers used data on corn borer numbers and annual USDA data on yield, price, and planted area to estimate benefits for both Bt and non-Bt corn growers for the last 14 years.

They estimated that together, non-Bt corn growers in Illinois, Minnesota, and Wisconsin realized more than \$2.4 billion in savings from suppression of corn borer populations in Bt cornfields over that time period. For Iowa and Nebraska, the savings were \$1.9 billion. Total non-Bt corn savings: nearly \$4.3 billion.

Looking at Minnesota, Illinois and Wisconsin, the study also found that the higher the percentage of fields that were planted with Bt corn, the lower the density of corn borer larvae on the plants in that state.

"Although many factors are known to affect [corn borer] population dynamics, including weather and natural enemies, these results indicate that reductions in [corn borers] were associated with commercialization of Bt maize," says Hutchison.

Fields planted only with Bt corn would exert strong pressure on the corn borer to evolve resistance to the Bt insecticides. Therefore, the EPA has mandated that a certain percentage of corn be non-Bt, to provide a refuge where corn borers can reproduce and provide a steady supply of individuals susceptible to Bt circulating in the population.

So the benefits are actually mutual: Bt corn kills corn borers, which helps non-Bt growers in a region, and non-Bt cornfields help slow down the evolution of resistance to Bt, extending its lifetime as a useful means of controlling the pest.

Also, say the researchers, because the corn borer eats many other crops, the results suggest that farmers growing other non-Bt crops might also benefit from Bt corn plantings in their region.

But sustaining the economic and environmental benefits of planting Bt corn depends on "continued stewardship by producers to maintain non-Bt [corn] to minimize the risk of evolution of Bt resistance in crop pest species," among other factors, the researchers note.



Controlling the European corn borer with Bt corn reduces pest damage in non-Bt corn too, a U of M study indicates.



Cultivating the creative

October 10, 2010

The U is a fertile training ground for the next generation of idea makers

By Rick Moore

We live in a state and world where creativity and innovative thinking are prized commodities.

That's no surprise to anyone who has followed the writings of Richard Florida, whose 2002 book *The Rise of the Creative Class* defined a growing culture in which creativity is a key component of job descriptions. By Florida's account, the "creative class" numbers some 38 million Americans, or 30 percent of the nation's workforce.



The "creative class" encompasses occupations in which creativity is often put to use, and members of this group number some 38 million in the United States.

And there's great news close to home. Minneapolis-St. Paul ranks in the top 10 in most creative places in the United States; people are flocking to creative hubs; and the University of Minnesota is a fertile training ground for the next generation of idea makers and shakers.

Innovation equals success

"The American economy is increasingly ideas- and software-driven, and most manufacturing, for better or worse, has been shipped overseas," says Tom Fisher, dean of the U's College of Design—an obvious hot spot for creative minds. "We are even more dependent on creativity. A lot of corporations in our area realize that unless they continue to be innovative, they will fall behind in terms of global competition."

Indeed, Fisher points to a recent survey in which CEOs around the world were asked to name the most important quality they look for in new employees. "Contrary to what they expected, creativity was by far number one," he says.

And the U is poised to be the pipeline for innovation, according to Steven Rosenstone, the U's vice president for scholarly and cultural affairs.

"If one is thinking about long-term strategy for Minnesota, the University plays an absolutely critical role in not only recruiting remarkably creative students and faculty, but in turning out creative and innovative graduates. We also need to work collaboratively with our community partners to make this the kind of place that creative people want to be."

And they do want to be here. Fisher points to new faculty member Lucy Dunne, whose work falls at the crossroads of clothing design, medicine, and computer science.

"We were the only university that had all of those three disciplines on the same campus," he says. "We are attracting creative people here because we have so much in one location."

"When it comes to creativity, we can put Minnesota on steroids," Rosenstone says. "And we ought to play that role. That's what will make our graduates hot commodities in every sector, no matter what they want to do, whether it's write screenplays or run banks."

Beyond that, the U continues to foster collaborations—across colleges and disciplines—aimed at viewing problems through different lenses. For example, the Center for Design in Health has focused on projects that include redesigning patient forms to be more efficient; adapting information-exchange protocols from the airline industry to the nursing industry; and developing a system of color coding surgical instruments to ensure that none are left inside patients during surgeries.

"These are pretty simple things that come from intersecting design expertise and knowledge with the healthcare industry," Fisher says.

John Finnegan, Jr., dean of the School of Public Health, can point to a number of collaborations his school is involved with. They include a food initiative involving faculty from at least a half dozen colleges, who are looking at "everything from the production/agronomy side of the equation all the way over to such things as obesity and diabetes and public policy," Finnegan says. "What's evolving right now in this food initiative is probably one of the most comprehensive continuums of dealing with the issue of food and its impact on human life."

Great minds think differently

"When it comes to creativity, we can put Minnesota on steroids," Rosenstone says. "And we ought to play that role. That's what will make our graduates hot commodities in every sector, no matter what they want to do, whether it's write screenplays or run banks. It's people with innovative ideas who make the biggest contributions."

"At the end of the day, the people who invent the new products, who invent the new solutions, who solve the big hairy problems in ways that nobody else figured out—they are the change-makers," he adds. "They are the people who transform the world."

View ads from the "Because" campaign at the [Driven to Discover](#) site.



Di-Vine providence

October 11, 2010

Cold-hardy U of M-bred grapes support a burgeoning industry

By Deane Morrison

On a crisp September morning, [James Luby](#) ushers visitors into a vineyard hung with plump, ripe grapes and takes a cluster of mouth-watering dark fruit into his hand.

"We have about eleven acres of grapes here at the HRC," he says, referring to the University of Minnesota's Horticultural Research Center.

For more than 30 years, the HRC and its rustic vineyards have been home to research on producing cold-hardy grapes and making the best wines from them. Luby, a professor of horticultural science who has been with the University since 1982, is in charge of the breeding program along with Peter Hemstad, who joined in 1985.

Grapes bred at the HRC have helped vineyards and wineries flourish across the state and the northern tier of the country.

"Four varieties of grapes form the backbone of winemaking in this region," says Luby. "Frontenac and Marquette for red wines, La Crescent and Frontenac gris for white wines. There has been an explosion of wineries throughout the Midwest, and we've been adding three to five wineries a year over the past decade."

All this was estimated to contribute about \$36 million annually to the state's economy, he adds.

"The U of M has done a great job developing grapes that can withstand extreme heat and cold and our springs," says Michael Dickerman, co-owner of Woodland Hill Winery in Delano, Minn. "In spring we can have high temperatures followed by a cold snap as late as May. [The vines] don't start to break buds till about May 1, and are done by the first frost."

Luby and his HRC colleagues are now testing a third variety of Frontenac, Frontenac blanc, to see how the vines grow, when to harvest, and how best to make wine from the grapes.

The HRC also includes an Enology Laboratory, where researchers test grapes, make wines from new selections (varieties not yet introduced to growers) and evaluate the wine quality.

Pioneers all pulling together

But the HRC goes beyond breeding and testing to help local growers and winemakers. Some examples:

- Staff work closely with the Minnesota Grape Growers Association, staging an annual, mid-February Cold Climate Grape and Wine Conference that usually draws people from 15 to 20 states to the Twin Cities.
- Every September the HRC hosts a fall Open House that draws 100 to 150 people interested in the latest research.
- Enologists from the HRC hold an annual Winemaker Roundtable.

"We have open discussions about what works and what doesn't," says Dickerman, a regular roundtable attendee. "Our passion is to make the best wine we can. Everybody in the Minnesota wine industry is in the same boat. We're all pioneers. We share. We look to the U of M to be the catalyst for that."

Also, he says, "HRC people usually come out once a year to assess our vineyard and viticultural practices and critique our wines."

For Luby, this is the most exciting part of the year.

"Each fall we harvest new breeding lines that are yielding their first fruit," he says. "It's like a kid's first music recital. As the grapes grow over three to four year years, we're like parents wondering how they'll turn out."

At this year's annual conference, a man from a wine-related industrial firm opined to Dickerman about how he thinks the local grape and wine businesses will turn out.

"He said, 'I feel what's going on here is what happened in Napa Valley in the 1970s,'" Dickerman recalls.

Published in 2010



Grapes from the University's Horticultural Research Center are the mainstay of vineyards and wineries across Minnesota and several other northern states.

Photo by David Hansen

How it's done

To breed cold-hardy grapes, James Luby and his colleagues cross a native Minnesota grape—*Vitis riparia*, the "river grape"—with chardonnay, cabernet sauvignon, or other varieties. Besides cold hardiness, the native grape carries "a lot of disease resistance" and makes the clusters grow little side clusters, a characteristic trait.

Taste of success

Here are profiles of wines from the four U of M-bred grapes.

Frontenac: Red table wine, rosé, and a port with notes of blackberry, cherry, and chocolate.

Frontenac gris: White table, dessert, and ice wines with aromas of peach and apricot.

La Crescent: Off-dry and sweet, Riesling-style white wines with an intense nose of apricot, peach, and citrus.

Marquette: Complex red wines with notes of cherry, berry, black pepper, and spice.



Strong start

October 14, 2010

Skills in goal-directed behavior determine children's early school success

"Executive function" may sound like the stuff of the boardroom, but it is critically important in the elementary classroom. Its absence is obvious when a child can't sit still during story time or can't refrain blurting out comments when others are speaking.

Executive function is an umbrella term for skills in goal-directed behavior and self-control. Preschool children who lack these skills face an uphill battle in school readiness and achievement.



Assessing executive function

Creating new ways to assess executive function in children and to identify lagging development has long been the focus of [Stephanie Carlson](#) and [Philip Zelazo](#) at the University of Minnesota's [Institute of Child Development](#).

Carlson is creating a standardized set of assessment tools for executive function skills, which can be difficult to identify. Early childhood educators, schools and other specialists could use the tools to screen for school readiness. Zelazo has developed a foundational approach for assessing goal-directed behavior in children, connecting neuroscience with cognitive development.

The importance of early assessment

"Children make the most striking advances in the preschool period. It really improves drastically," Carlson says. "If we can help three- to four-year-olds get up to speed in executive function, they will be on a more level playing field with their peers when they start school."

The study of executive function and its effect on school readiness is critically important. Zelazo says, "[It's] an important predictor of many real-world developmental outcomes, like school achievement or behavioral problems. In many cases it's a more important predictor than intelligence. For early school performance, being able to sit still and pay attention to the teacher are more important determinates of success than being smart."



The sun in close-up

October 14, 2010

A U of M instrument will fly on a NASA spacecraft right into the sun's corona

By Deane Morrison

Swooping closer to the sun than any previous mission, a new NASA spacecraft will probe the star's corona—and its two biggest secrets—with help from University of Minnesota physicists.

The physicists, along with colleagues at other institutions, comprise one of four teams chosen to design experiments for the Solar Probe Plus (SPP) mission.

The size of a small car, the SPP spacecraft will perform seven flybys of Venus, tapping the planet's gravity to steer itself ever nearer to the sun. At its closest, the vehicle will sail through the corona (the sun's plasma "atmosphere") just four million miles from the sun's core. That's one-eighth the average distance of piping-hot Mercury, the sun's nearest planetary neighbor.

With a front row seat like that, SPP is sure to discover a wealth of new and unexpected behaviors from our parent star.

"It's a dream mission," says physicist Keith Goetz, principal investigator for the University's SPP team. "It's the most interesting thing in space physics."

Besides answering scientific questions, the mission, scheduled for launch in 2018, will help researchers characterize and predict how shock waves in the corona energize particles that could pose a danger to future space explorers.

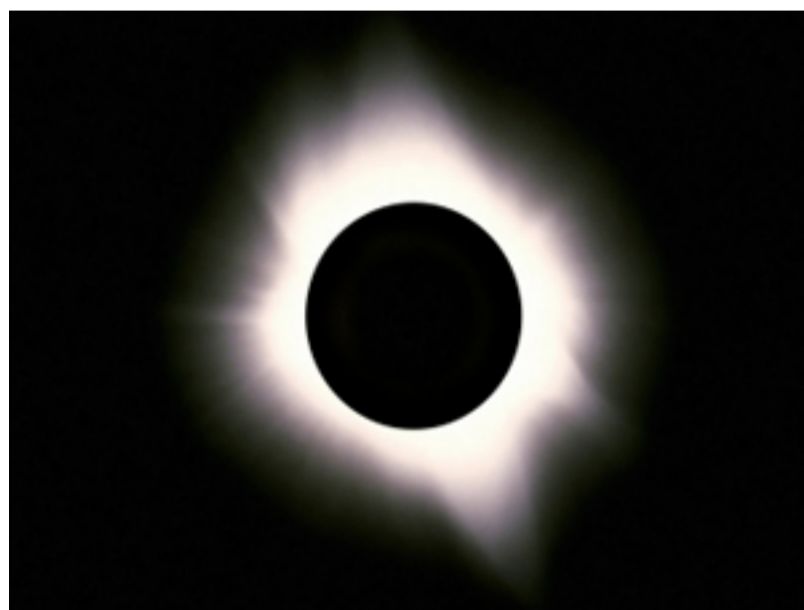
Fields and streams

The experiments aboard the SPP spacecraft will address two mysteries that have fascinated physicists for decades.

First, it seems logical that the temperature would drop as one moves away from the sun; instead, it rises sharply. The sun's surface registers a relatively cool 6,000 degrees C, but at a blistering one million C, the inner corona is hundreds of times hotter. Thus, some mechanism must exist to transfer energy to the corona, where it is dissipated as heat.

"Whatever heats the corona has to be electric and magnetic fields. That's all there is," notes Goetz. "There are competing ideas about the details, but no measurements or observations." Data from SPP should, finally, settle the debate.

The second enigma centers on the solar wind, a 3-D stream of charged particles flowing out from the sun at speeds in excess of 400 kilometers per second—a whopping million miles per hour. A dynamo in the corona must accelerate the particles, but its identity is unknown. Again, researchers believe electric and magnetic fields are involved.



The sun's corona becomes spectacularly visible during a total solar eclipse. See second sidebar.

device that measures electric and magnetic fields, radio waves, and the abundances and sizes of interplanetary dust particles. It's also smart enough to periodically sift through its stored data, then select and save only what promises to be useful or intriguing.

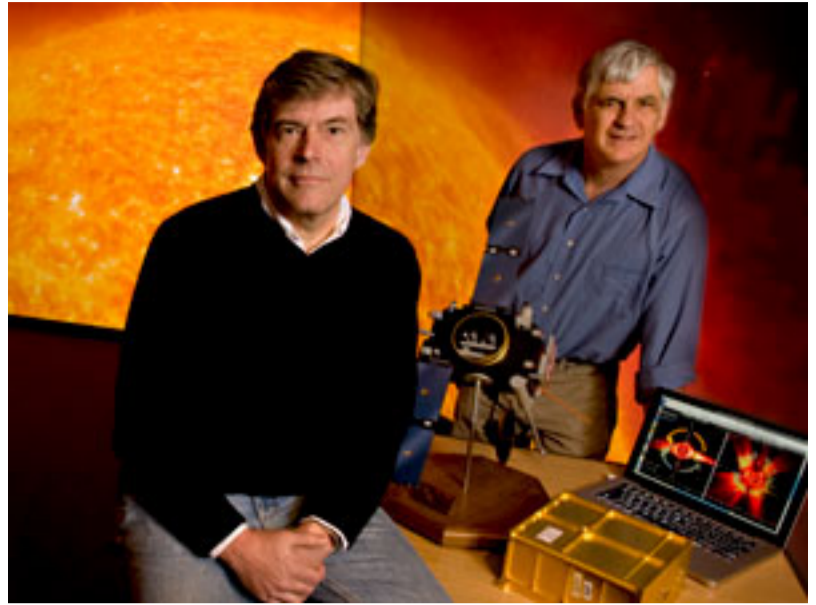
The TDS experiment is part of Fields, one of the four sets of projects chosen by NASA for SPP. Also on the U of M Fields team are physics professors Cynthia Cattell and John Wygant, who will analyze the data, and retired physics professor Paul Kellogg. The principal investigator for Fields is Stuart Bale, who received bachelor's and doctoral degrees in physics from the University of Minnesota and now heads the Space Sciences Laboratory at the University of California, Berkeley.

All are excited by the prospect of discovering more about how electric and magnetic fields interact with particles to produce large-scale effects.

"This work has implications for space weather, other stars, black holes, and so on," says Goetz. "They're all affected by the same physical laws."

Published in 2010

Related Stories



Physicists Keith Goetz (left) and John Wygant are part of NASA's Solar Probe Plus mission, which will send a spacecraft closer to the sun than any has gone before.

Photo by Patrick O'Leary

A sizzling slice of space

At the distance of SPP's closest approach, 4 million miles (9.5 solar radii), the sun would appear 23 times wider, cover more than 500 times as much sky, and shine 500 times brighter than it does as seen from Earth. And unlike mythical Icarus's wings, SPP's carbon-ceramic heat shield will withstand temperatures of 1,400 C (2,550 F).

"Your car would turn into a molten puddle at that temperature," says Keith Goetz.

"SPP lets us finally make the measurements we need to understand why the solar wind blows the way it does," Goetz says.

One smart instrument

The U of M's share of those measurements will come from an instrument called the time domain sampler, or TDS, which Goetz designed.

"It takes snapshots of interesting short-term things," he says.

He likens it to "a souped-up car radio," a somewhat understated term for a

Crowning glory

The corona (from the Latin word for "crown") is the upper, ionized atmosphere of the sun. But the part we see during an eclipse is just the tip of the iceberg; the corona actually extends much farther out into space.



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Presidential visits

October 18, 2010

Before Obama, three U.S. presidents visited the University of Minnesota Twin Cities

The University of Minnesota will welcome President Barack Obama when he visits on October 23. He is the fourth sitting U.S. president to visit the Twin Cities campus, beginning with Theodore Roosevelt in 1903.

Theodore Roosevelt

The first president to visit the University of Minnesota Twin Cities campus was Theodore Roosevelt. He delivered a speech there on Saturday, April 4, 1903. The 4,000 people who filled the University's armory that evening were only one-third of those who had sought tickets to see the president.

William Howard Taft

President William Howard Taft spoke at the University on Tuesday, Oct. 24, 1911. An article the next day in the *Minneapolis Morning Tribune* said that in his address Taft "spoke fondly" of the work of Cyrus Northrop who had retired earlier that year as the University's president. Taft's references to Northrop were "cheered by the students."

George W. Bush

President George W. Bush visited the University of Minnesota Academic Health Center July 11, 2002. He and University president Mark Yudof took part in a roundtable discussion on advances in research, new drug therapies and ways to improve care.



Starwatch - November 2010

October 21, 2010

By Deane Morrison

Let's hope this November is as clear and beautiful as last year's, especially when the annual Leonid meteor shower comes around. Whether it turns out to be spectacular or not, this year we'll have to rise early to get the best view of it.

The Leonids radiate from the head of Leo, the lion, peaking this year the night of the 17th-18th. A waxing moon will interfere until it sets around 4 a.m.; still, that leaves a couple of hours before sunrise to watch for meteors as they shoot out of the eastern sky. The Leonids are typically very fast and bright, and more than half can be expected to leave persistent trails.



If you have clear skies overhead early Thursday morning (Nov. 18), take a step outside for a peek at the Leonid meteor shower, which should be raining as many 20 meteors per hour down upon the Earth.

Also in the morning, watch Venus pop up over the eastern horizon, rising steadily farther ahead of the sun. The queen of planets will be invisible during the first few days of November, since it's just emerging from a swing between Earth and the sun. But by month's end the brilliant "morning star" will be rising more than three hours before the sun.

Above Venus, look for the bright star Spica, in Virgo, and then above Spica to see Saturn. The best mornings will be the 3rd and 4th, when a waning sliver of moon joins the planet and star.

Algonquin tribes called November's full moon the beaver moon because late fall is when the busy beavers went into overdrive, preparing their lodges for winter, and it was also time to lay in a supply of pelts. To see the beaver moon at its roundest before it sets, look to the west by about 7 a.m. the morning of the 21st.

Jupiter rules the evening sky, a bright beacon in the south below the Circlet of Pisces and the high, dominant Great Square of Pegasus. Between the Great Square and W-shaped Cassiopeia, you may spot the oval smudge of light that marks the Andromeda Galaxy, the nearest big galaxy to our Milky Way. Best viewing will come in the first week of the month, when the evening sky will be moonless.

Late in the evening, look high in the east to find Perseus, nearly overhead and just southeast of Cassiopeia. Pointing toward Cassiopeia is the hero's helmet, and just beyond its tip lies a beautiful double star cluster. To find it, wait for a moonless night and use binoculars or a small telescope.

Also in Perseus is a star that fascinated ancient astronomers, who named it Algol, or "the demon star." It represents the eye of Medusa, the snake-haired Gorgon, whose head Perseus carries. Algol earned its sinister reputation by dimming its brightness for a 10-hour period every two days, 20 hours and 49 minutes. Today, astronomers know that Algol is a three-star system, with a big, bright main star and two dimmer ones. Algol "winks"—that is, its brightness dips—when one of the dimmer stars eclipses the main star.

Standard time resumes at 2 a.m. on the 7th. Set your clocks back one hour.

The University of Minnesota offers public viewings of the night sky at its Morris, Duluth and Twin Cities campuses. For more information and viewing schedules, see: Morris, UMN 16-inch telescope schedule: cda.mrs.umn.edu/~kearnsk/Telescope/PubObs.htm

Duluth, Marshall W. Alworth Planetarium: www.d.umn.edu/planet

Twin Cities, Department of Astronomy (during fall and spring semesters):
www.astro.umn.edu/outreach/pubnight

10/21/10 Contact: Deane Morrison, University Relations, (612) 624-2346, morri029@umn.edu

Find U of M astronomers and links to the world of astronomy at <http://www.astro.umn.edu>.



A stimulating mind

October 25, 2010

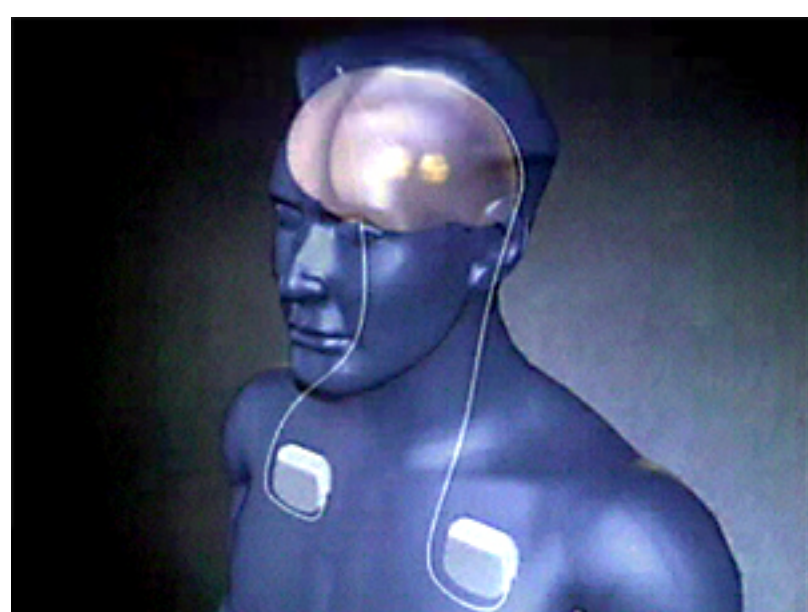
Neurologist Jerrold Vitek is out to mobilize his department—and patients

By Deane Morrison

For people with Parkinson's disease and other movement disorders, the trouble starts deep in the brain, out of sight and out of reach for conventional therapies. But not for Jerrold Vitek.

The new professor and chair of the University of Minnesota Department of Neurology has extensive experience in a surgical technique that has already improved the lives of many patients.

Called deep brain stimulation, or DBS, it delivers electrical impulses directly to specific areas of the brain. There, the impulses counteract the pathological activity that causes symptoms. Besides Parkinson's disease, it has helped patients with such conditions as dystonia—characterized by sustained, uncontrollable muscle contractions—tremors, obsessive compulsive disorder, and depression.



In deep brain stimulation, electrical pulses are generated by a pacemaker-like device implanted under the skin of the chest and delivered to the brain by electrodes implanted through the skull.

Illustration: Medtronic

medical practices as quickly as possible.

"We wanted to add further strength and expertise in treating movement disorders and in the department," says Frank Cerra, the University's Medical School dean and senior vice president for health sciences. "And Jerrold Vitek was far and away the best person to do it."

Vitek also wants to grow the University's DBS program.

In DBS, an internal impulse generator—similar to a pacemaker—is implanted under the skin of the chest. It's connected by a wire to an electrode positioned in the brain, most commonly in an area called the sub-thalamic nucleus (STN).

But another brain site, called the GPI (internal segment of the globus pallidus) may be as good a target as the STN, and easier to find. Vitek and colleagues designed a clinical trial to test this, and preliminary results indicate that stimulating the GPI produces outcomes as good as those from stimulating the STN.

Vitek is now working with Aviva Abosch, a University of Minnesota neurosurgeon who has performed DBS implants, and her team. Having received a doctorate in neurophysiology as well as an M.D., Vitek, who now pursues research in the pathophysiology of Parkinson's disease and dystonia, bolsters the team's strength in the basic science and treatment of movement disorders.

Using animal models, "We're exploring the brain circuits involved in the disease," Vitek explains. "If we can understand what goes wrong in those circuits, we'll be in a better condition to fix the problem."

Although not considered a cure, DBS has been shown to reduce symptoms of Parkinson's disease and allows doctors to lower a patient's medications, drastically improving their quality of life, Vitek says.

"Long-term use of anti-Parkinsonian medication, plus progression of the illness, often leads to, for example, hallucinations or a sudden return of symptoms, including a temporary inability to move," he says. "DBS can vastly improve patient symptoms."



Jerrold Vitek is an expert at deep brain stimulation, a promising treatment for Parkinson's disease and other movement disorders.

Photo by Richard Anderson

"I think its applications will be expanded in neurology and maybe outside the neurological realm," says Vitek. "For example, one researcher has explored using DBS in the hypothalamus of the brain to treat obesity."

Room to grow

Vitek, a native of Meadowlands in northern Minnesota, received M.D. and Ph.D. degrees from the University of Minnesota. After faculty positions at Johns Hopkins University, Emory University, and, most recently, the Cleveland Clinic, he joined the University in July. From his new post, he wants to see his department grow, expand its clinical services, and develop translational research, which is geared to turning its findings into new



A big commitment for a cell

November 2, 2010

How cells destined to become sperm make a critical decision

By Deane Morrison

The stereotype of a commitment-shy male may not play out very often in men, but their sperm are a different story.

Cells that give rise to eggs and sperm—germ cells—must undergo a special form of cell division that commits them to their fates. But future sperm put it off much longer than future eggs do.

That much was well known. Now, University of Minnesota researchers have discovered how they manage it.

In adult males, a gene blocks the signal to switch to the radically different mode of division. This allows precursors of sperm cells to vastly increase their numbers and, thus, the numbers of sperm, which cannot divide and multiply.

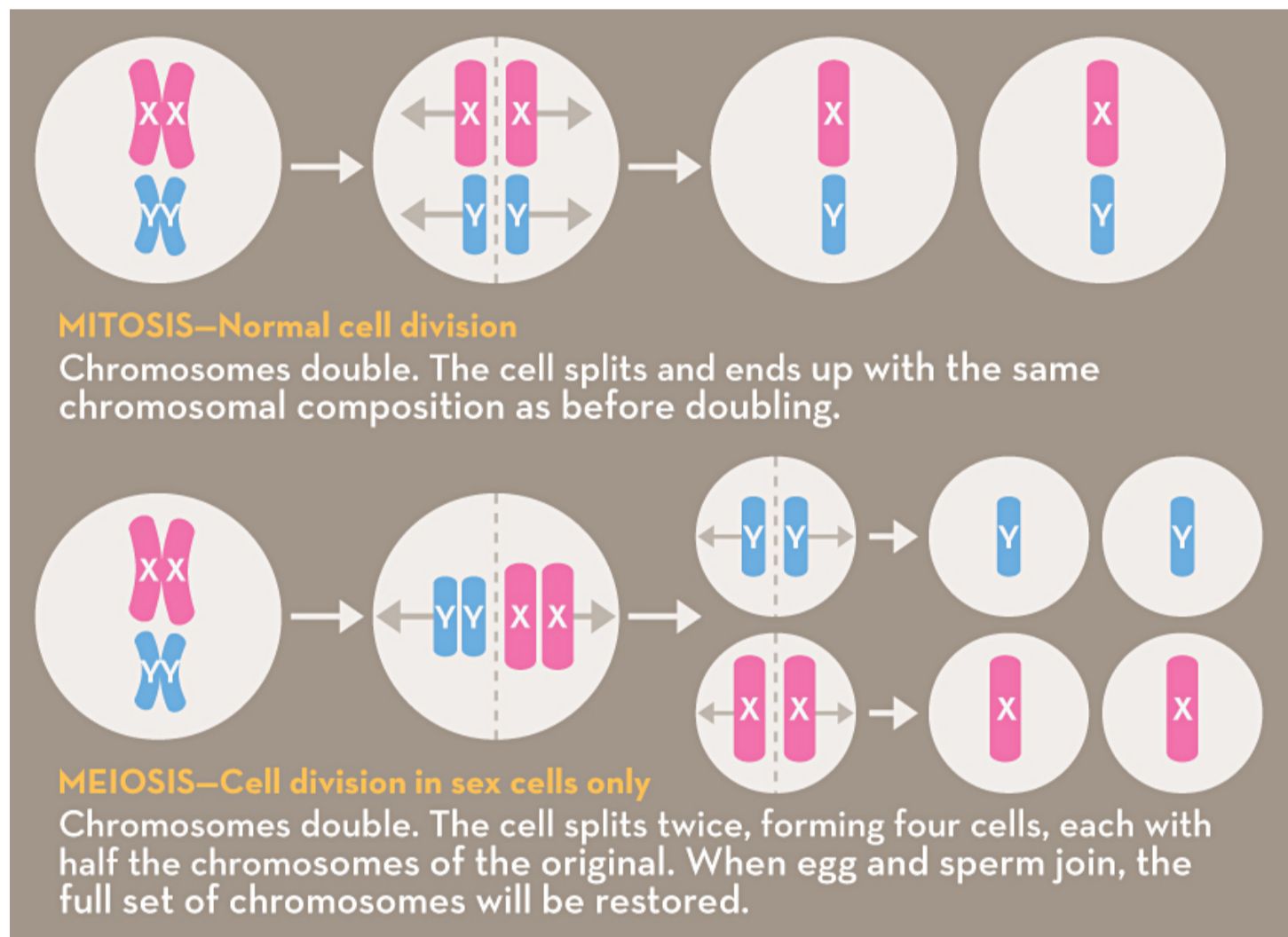
"It belongs to the only gene family found to control sex determination in a wide variety of animal species," says David Zarkower, professor of genetics, cell biology, and development, who led the study.

The work may someday help boost male fertility or reduce it—i.e., in a male Pill. It is published in *Developmental Cell*.

The great divide

Normal humans have 23 pairs of chromosomes, each pair consisting of one chromosome inherited from the mother and the other from the father. In normal cell division (mitosis), a cell splits into two daughter cells, each of which gets a pair of each chromosome, including the sex chromosomes: X-X in females and X-Y in males.

But germ cells in a late stage of development must divide so that daughter cells get only one member of each chromosomal pair. In the case of the X-Y chromosomal pair in males, it means that the X (from a man's mother) and Y (from his father) end up in different sperm cells (see diagram). This form of cell division, called meiosis, ensures that sperm and egg each have half the usual number of chromosomes, which is restored upon fertilization.



In this greatly simplified chart, the X and Y chromosomes of the male illustrate how the two forms of cell division distribute the members of a chromosomal pair in radically different fashion. In both rows, the first figure shows a cell after its chromosomes have duplicated themselves, a necessary condition for either form of cell division. Graphic by Ranja Sem

In adult males, germ cells go through multiple rounds of mitosis, generating large numbers of new cells. With every round, the cells mature, until they are ready to undergo meiosis and turn into sperm. At any given time, a testis contains germ cells performing meiosis while neighboring cells are performing mitosis, a fundamentally different process.

"It's been an open question how males control which cells perform mitosis and which perform meiosis when they are side by side," Zarkower notes.

A master switch

A clue came when Zarkower and his U of M colleagues—postdoctoral fellow Clinton Matson, research associate Mark Murphy, and Associate Professor Vivian Bardwell—noticed that a gene they had studied for a long time, called DMRT1, was active in mouse germ cells dividing by mitosis but was "silenced" in cells after they had entered meiosis.

So they did the logical thing: Using pinpoint genetic manipulation, they disabled the DMRT1 gene in just those germ cells that were still dividing by mitosis, not even close to entering meiosis yet.

Zarkower credits Matson with figuring out what happened when DMRT1 was disabled. It turned out that by switching off DMRT1, they made the germ cells enter meiosis precociously.

Killing the messenger

Further experiments showed that among DMRT1's many effects, it kept the male germ cells from responding to retinoic acid, a form of vitamin A that acts as a messenger by signaling the cells to begin meiosis. Retinoic acid exerts its effect by activating another gene, and DMRT1 blocked both the functioning of the other gene and its activation by retinoic acid.

So what silences DMRT1 in male germ cells that are ready to enter meiosis?

"We're working on that," answers Zarkower.

He muses that someday, the ability to turn DMRT1 on and off may help, for example, a man facing chemotherapy, which often destroys male germ cells. Before treatment, doctors could remove and culture a sample of germ cells, keeping the gene turned on until they have generated lots of sperm cell precursors that could be transplanted back after chemotherapy.

And a pill that interfered specifically with the functioning of DMRT1 in germ cells could greatly reduce male fertility.

Studying the molecular basis of sexual development never loses its appeal, Zarkower says.

"It's fascinating because the two sexes look the same as embryos, yet they grow up as adults having many differences that are essential to maintaining the species," he says.

Published in 2010



David Zarkower and his colleagues have made fundamental discoveries in sex determination.



More than just kicks

November 4, 2010

U center uses soccer to engage underrepresented communities

By Rick Moore

For more than a century, baseball has been considered “America’s pastime,” and Americans have inflated its relative importance by staging an annual event—the World Series—in which only North American teams compete.

In reality, soccer is far and away the leading pastime for much of the world, and it’s becoming more and more prevalent in many pockets of the Twin Cities and beyond.

The Minnesota Center for Neighborhood Organizing (MCNO) recognizes that, and it’s using soccer as a means to connect with communities in North Minneapolis and help them address issues of concern.

The center, a part of the U’s Center for Urban and Regional Affairs (CURA), was founded nearly two decades ago. It provides training and support for organizations doing grassroots, issue-based organizing with a focus on “place-based” organizing, according to operations director Margaret Kaplan.

“A lot of our work—and I think this is consistent with the philosophy of CURA as a whole—is driven by community identified needs and issues and concerns,” she says.

Connecting with the Hmong on the North Side

MCNO program director Jay Clark knew that a lot of Hmong and Latino youth in North Minneapolis loved soccer, so he helped organize five youth teams at Farview Park in the Minneapolis Parks and Recreation fall soccer league.

Clark was aware that some Hmong students had concerns about their schools, but knew that their families weren’t likely to come to traditional community meetings in which language might be a barrier.

“We started a soccer program to listen to what was going on in their schools, and we ended up taking on a whole series of school issues that they identified,” Clark says. “And it was at soccer that they identified them.”

Another concern—which has led to an ongoing project—grew out of a chance encounter, when Clark noticed a group of young adults loitering in front of one of his soccer player’s homes; they turned out to be a gang setting up shop in the neighborhood. The family wanted to speak with a Hmong police officer, but as the days passed, no one arrived. So Clark and MCNO decided to find out where the Hmong police in town worked.

“We found out that most of the Hmong police officers are where the Hmong don’t live, and the two Hmong police officers who are up here (in North Minneapolis) are both on the midnight shift, so they can’t talk to people when they’re actually awake,” Clark says. “So we’ve been mounting a campaign to get a Hmong police officer assigned to the day shift.”

One day after soccer, three teams of kids—still in uniform—and a few dozen parents met to convince two Minneapolis city council members of the need for a Hmong police officer on the day shift. They then garnered 1,000 signed postcards to make the pitch to Mayor R.T. Rybak.

Along the way, U students have provided research into the issue, and one helped produce a map showing the demographics of Hmong citizens and police officers across Minneapolis.

And the dialogue all began because the U sought to find common ground in the community—in this case, the grass-challenged soccer fields of Minneapolis.

“They love to play soccer,” says MCNO community organizer Yia Yang. “Soccer allows us to connect with families and to hear them out, and to really build a relationship with these kids.”

“This is a way that people in communities can identify their own issues and work with MCNO and other programs within CURA to be part of that process of solving the big issues and concerns,” adds Kaplan. “This is a way where the University is relevant for a large number of people who might not otherwise think the University is a really relevant place in their lives.”



Hmong youth showed up en masse—and in uniform—for a meeting that included Minneapolis City Council member Don Samuels.

Photo: Jay Clark



Finding her place

November 9, 2010

Emily Johnson and friends weigh in on place and displacement in *The Thank-you Bar*

By Rick Moore

Describing exactly what audiences are likely to see and experience in Emily Johnson and Catalyst's upcoming show at Northrop Auditorium (November 18-20) is about like trying to catch a fish with your bare hands. It's a slippery proposition, at best.

Johnson, a University of Minnesota alumna, is a dancer turned choreographer whose work is designed to stimulate the senses on many levels. Her current piece, *The Thank-you Bar*, is part of the Northrop Dance Series, but the "dance" descriptor only begins to tell the story.

Each show will have 50 audience members seated on the Northrop stage. They'll experience dance, visual imagery, storytelling, and live music, among other sensory treats.

"I literally try to make the Northrop stage our home for an hour, including the audience," Johnson says. In addition, there is an accompanying [art exhibit](#) at Northrop and a special Friday evening concert by BLACKFISH.

A home away from home

Johnson, who is of Yup'ik Eskimo descent, grew up in Alaska and often spent Sundays socializing at her grandmother's tavern—the Que-Ana Bar. *Quyana* is the Yup'ik word for "thank you," hence, the name of Johnson's piece.

At 18, she left her rural life to attend the University of Minnesota on a scholarship to study physical therapy. During her first year at the U, she replaced a lecture class with a modern dance class, and "by the end of the year I had changed my major to dance," she says.

She's now spent 16 years living amidst the buzz and flurry and energy of the big city, which is great given the Twin Cities' esteem in the arts community. But it means she's miles and miles away, literally and figuratively, from her homeland and her family rituals of hunting and fishing, then smoking, canning, and freezing food.

That sense of displacement is the driving theme in *The Thank-you Bar*. She says the piece started with a short story she wrote about blackfish, which have the ability to survive in harsh and seemingly unbearable conditions.

"This story exists in *The Thank-you Bar*," she says. "It makes me think of how we all find the way to adapt."

Other points of view

"Everything I've made has come, in general, from a personal place," Johnson says. "I [create] from the thing I'm obsessing about."

Now she has an eye toward conveying other stories and points of view. "I don't want to present only *my* images and ideas and thoughts about displacement," she says. "I wanted to present the audience a much broader and larger scope of what displacement can be."

So, along with her friend Carolyn Lee Anderson, she's curating the special exhibit, "This is Displacement: Native Artists Consider the Relationship Between Land & Identity," that accompanies *The Thank-you Bar*. It chronicles the views of more than a dozen different artists spanning Native nations from across the country.

Music is also an important part of the mix, much as it was at the Que-Ana Bar with its country-flavored jukebox. Her Catalyst collaborators James Everest (Johnson's husband) and Joel Pickard helped develop *The Thank-you Bar*, and their music on stage enhances the imagery.

"It's more of a sensory experience," says Johnson. "I'm trying to get at memories. And I'm trying to create memories for the audience."



Emily Johnson's collaborators on *The Thank-you Bar* include musicians Joel Pickard and James Everest of BLACKFISH.

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'Elmer Gantry' takes the stage at Ted Mann

November 10, 2010

U of M Opera Theatre brings Sinclair Lewis's charismatic preacher to life

By Deane Morrison

If there's one thing Elmer Gantry loves more than drinking, brawling, and seducing women, it's preaching—and the riches it brings him.

By any measure, Gantry qualifies as a first-class jerk. But he sure makes compelling opera.



Will Bryan and Bergen Baker (pictured) and Joel Mathias and Anna DeGraff sing the lead roles in University Opera Theatre's production of "Elmer Gantry." Each pair is featured in two of the four performances.

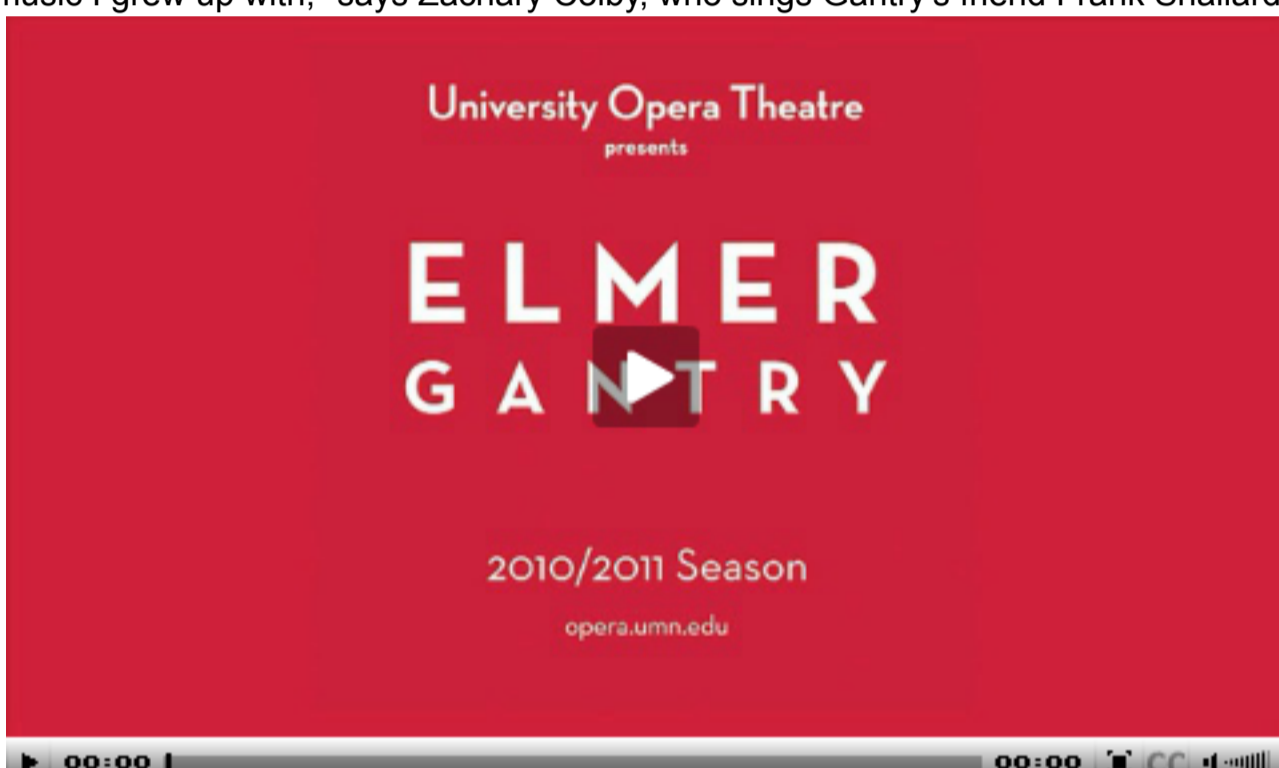
Photo by Patrick O'Leary

That will become clear Nov. 18–21, when University of Minnesota Opera Theatre presents "Elmer Gantry," a three-year-old opera based on the 1927 Sinclair Lewis novel. Performances will be in [Ted Mann Concert Hall](#), 2128 4th St. S., Minneapolis.

With a virtuosic score by Robert Aldridge and libretto by Herschel Garfein, the work would test the limits of any professional company. But University voice students have risen to the challenge. And in singing all the roles—except the revival singer, sung by the legendary J.D. Steele—they are getting an educational tour de force.

"This is a training program for life," says Opera Theatre Director [David Walsh](#). "If the students can do this, they can do Puccini or anything else."

The students also see how adaptable opera can be. "I didn't think there would be an opera using the church music I grew up with," says Zachary Colby, who sings Gantry's friend Frank Shallard.



This video

combines rehearsal photos with a duet between Elmer Gantry (Will Bryan) and Sharon Falconer (Bergen Baker), with pianist Joseph Welch.

The production also features a chorus of talented high school students, the result of relationships Walsh has built with area choral directors. The University of Minnesota Symphony Orchestra, with conductor [Mark Russell Smith](#), will be in the pit.

A thoroughly American mix

Walsh had wanted to do an American opera, but none grabbed him until he saw parts of the original production of "Elmer Gantry" on YouTube.

"The high level of literacy and musicality struck me," he explains. "It's both sophisticated and accessible, like Mozart. As a stage director, it's a real privilege to work on an opera of this caliber."

The opera follows the fortunes of Gantry, an equal-opportunity crusher of lives in his quest for fame and riches. He becomes a renowned preacher who denounces vices such as adultery, whose evils he is well, and personally, acquainted with. Key to his rise is his relationship with a fiery evangelist named Sharon Falconer.

"I wanted to write something about religion in America," says composer Aldridge. "It seemed this would be a great subject because there's this character who's like [Mozart's operatic rake] Don Giovanni, but using religion to become successful."

The opera plays out themes of how religious revivalism, evangelism, and the "self-made man" are woven into the fabric of American culture, and of the dark side of Gantry.

"There's also a story element in which he's typical of a type in this country that triumphs not despite lack of education, but because of it," Walsh notes. "It's the instinctive American distrust of intellectualism. The story depicts how that type of character can thrive and survive in this culture, where he wouldn't in Europe."

Musically, the opera incorporates jazz, gospel, college rah-rah, and, of course, classical traditions, but in a very sophisticated musical structure, Walsh says.

Besides its quality, Walsh chose "Elmer Gantry" because he sees it as a launch pad for placing University Opera Theatre at the forefront of creating new American operatic works.

"Ninety percent of opera is European," he says. "It's difficult for American composers and librettists to get new operas produced. But if we make a success of this, we might be able to work with the composer and librettist to workshop more of their operas and, later, expand to works by other teams."

In spring 2012, Walsh will bring Aldridge and Garfein to campus for a two-week residency, where they will mentor students on their operas and the students' works for opera or musical theater.

Performers all the way

Asked what makes a good opera singer, Walsh replies that it's not just about singing; it's really about being a good performer.

"An opera performance requires great technical facility and stamina as a singer and as an actor," he explains. "Frankly, in my productions at least, enormous demands are put on [student performers] in terms of physicality and choreography, especially when they're also trying to sing difficult music."

Several scenes feature ensembles of four to six people, who must sing together through complicated rhythms and note passages while also handling choreography.

Aldridge acknowledges that his score is not for the weak.

"I wouldn't have imagined it would be done at the college or conservatory level because it's so challenging," he says. "But many, including [the U of M], are so good, they can handle it."

Get your tickets

Shows are at 7:30 p.m. Nov. 18, 19, and 20, and 1:30 p.m. Nov. 21. Composer Robert Aldridge and librettist Herschel Garfein will hold pre-show discussions in the Ted Mann lobby at 6:45 p.m. before the first three shows. Tickets: \$22/\$12 students and children. Two-for-one tickets for U of M students, faculty, staff, alumni, and retirees. (612) 624-2345 or [Northrop Ticket Office](#).

Bonus feature: A Q&A with [librettist Herschel Garfein](#) discussing "Elmer Gantry" and the creative process. *Spoiler alert:* The first answer reveals the ending of the opera.



In search of food for all

November 15, 2010

The U is teaming up with the UN Food and Agricultural Organization to combat global hunger

By Rick Moore

The task is formidable—finding a way to sustainably feed a world whose population is expected to grow from 6.8 billion to 9 billion over the next 40 years. And the shoes to fill are those of [Norman Borlaug](#), the late U alum and Nobel Peace Prize winner whose “Green Revolution”—the development of high-yield wheat—saved hundreds of millions from starvation in India and Pakistan.



The University of Minnesota and the UN Food and Agricultural Organization have outlined a shared commitment to fighting global hunger.

But the University of Minnesota is poised for the task.

The U recently launched a new partnership with the United Nations Food and Agricultural Organization (FAO) designed to increase food security and fight global hunger.

The partnership [between the FAO and the U] will capitalize on the dozens of programs already established at the U in food and agriculture, according to [Will Hueston](#), a professor in the College of Veterinary Medicine and School of Public Health and the executive director of the [Global Initiative for Food Systems Leadership](#).

“It also allows the FAO to benefit from our collective expertise in Extension, in education, in information management, and in distance education,” Hueston says.

Hueston’s myriad titles and range of expertise are symbolic of the interdisciplinary strength the U brings to the initiative.

“We are one of very few universities in the world that have a School of Public Health, a college of agriculture (CFANS), a College of Veterinary Medicine, and a school of business (Carlson School) all on the same campus,” he notes. “We have a breadth of expertise at the University, and it’s a breadth that’s not found at many other universities.”

A multipronged approach

In addition to sustainably increasing food production, the initiative will focus on a number of areas. One is controlling the cereal rust Ug99, which is threatening wheat crops around the world. (You can read more about the U’s efforts here in [“Stalking a cereal killer”](#)).

Another effort is aimed at enhancing distance education to the more than 170 FAO member countries. The U is looking to “share knowledge across borders and boundaries through cyberspace,” says former U provost Tom Sullivan. “We are exploring a variety of e-Learning possibilities and open source tools to build capacity and exchange knowledge freely—going in both directions—between the University of Minnesota and the rest of the world.”

Another focal point is the protection of our food supply. The U is already a leader in this realm with its National Center for Food Protection and Defense, funded by the Department of Homeland Security. “Much of what they do has applications for food safety and security concerns around the world,” Hueston says.

The U will also be looking at ways to assure environmental stewardship while increasing food production around the world, which would make the next “green revolution” truly green. This entails farming more efficiently with less water, ensuring the safety of nearby watersheds, and better utilizing agricultural byproducts.

And when it comes to production, the U is uniquely positioned to address the challenges of ... well, challenging climates. “We have an interest and reputation in developing types of crops to meet different weather situations,” Hueston says.

The land grant of the 21st century

In an average day, Hueston notes, many of us eat food coming from 30 or more different countries, each of which is dealing with their own issues in safety and production. “If those countries are better able to ensure the safety of their food, then our food supply here in Minnesota is safer and the world is more stable.”

By extension, the partnership with the FAO is a chance for the U to take the outreach aspect of its land-grant mission well beyond the borders of Minnesota. Minnesota agriculture products are marketed around the world and we touch every corner of the globe with our food purchases. Hence, the world has become the U campus as it relates to food.

“Global food security is a defining challenge of our time,” says [Al Levine](#), dean of CFANS and a key player in the partnership. “Through this collaboration, the University of Minnesota can put our world-class research to work, and, together with the FAO, create revolutionary strategies to provide food that is healthy, accessible, and sustainable—locally and around the world.”

“It’s an opportunity for us to promote a global model of the land-grant university of the 21st century,” Hueston says.

Editor’s note: This article originally appeared in 2010.



A world-class repertoire

November 16, 2010

The Paul Taylor Dance Company comes to Northrop on November 30

Paul Taylor is known as the greatest living force in modern dance, and he's bringing his world-renowned company back to Minnesota for a specially selected program on Tuesday, November 30. It will be the last dance performance this season at Northrop Auditorium.

Taylor continues to win acclaim for the vibrancy, relevance, and power of his recent dances. More than a half-century ago, he became the youngest member of the pantheon that created American modern dance. As his success continued, Taylor was a recipient of the Kennedy Center Honors, and he received an Emmy Award for *Speaking in Tongues* in 1992.

He also was awarded the National Medal of Arts in 1993, received the Algur H. Meadows Award for Excellence in the Arts in 1995, and was named one of 50 Americans honored for outstanding achievement by the Library of Congress's Office of Scholarly Programs.

From the 'naughty boy' to the standard-bearer

Taylor, who was born in 1930 and discovered dance in the late 1940s, studied at Juilliard and by 1954 he had assembled a small company of dancers and was creating his own works.

At the time, his work was so cutting-edge that it could send confused audience members flocking to the exits, and Martha Graham even dubbed Taylor the "naughty boy" of dance. By contrast, Taylor's works are now known to appeal to the largest possible audience.

His show on November 30 will include three pieces:

Cloven Kingdom (1976) reveals the primal beast lurking just below mankind's sophisticated veneer, while *Brief Encounters* (2010) is a dance about people more concerned with momentary connections than ongoing relationships. *Esplanade's* (1975) pedestrian, "found" movement displays the exuberance of youth, the sadness of a dysfunctional family, and the romantic interplay of lovers.

For more information and for tickets, visit the [Northrop website](#).



At one point, Taylor's work was so cutting-edge it chased some patrons toward the exits. Now, his pieces have broad audience appeal.

Covering the arts

"Arts journalism isn't dying, it's morphing into new forms using new media to reach new audiences," says Camille LeFevre, an arts journalist and adjunct professor in the School of Journalism and Mass Communication. That's the rationale behind a new course (JOUR 4990) she developed that merges professional journalism students with strategic communications students. In addition to reviewing music and dance, the students are currently working with Northrop on promoting the Paul Taylor Dance Company. Their projects include contributing to the Northrop blog and developing guerilla-marketing tactics for the upcoming show.



Starwatch December 2010

November 18, 2010

Deane Morrison

This full moon was called, for good reason, the cold moon by some Algonquin tribes, the long nights moon by others. It shines at a time when northern dwellers are beset by both freezing weather and the longest, darkest nights of the year.

The lunar eclipse begins at 12:32 a.m. CST on the 21st, when a high and bright moon encounters the Earth's umbra, or dark inner shadow. Totality lasts from 1:41 to 3:53 a.m., with the moon in deepest shadow at 2:17 a.m. The show ends at 4:02 a.m. as the last sliver of moon emerges from the umbra.

The eclipse unfolds among the wonderfully bright stars of Taurus, Gemini, Orion, and other winter constellations. As the lunar disc darkens, you may notice that dimmer stars, as well as the Pleiades and Hyades star clusters in Taurus, appear to brighten.

Both the Pleiades and the Hyades are known as "open clusters" because their stars are only loosely bound to each other by gravity. This leads to stars being pulled away by passing stars or gas clouds and lost to the cluster; eventually, most open clusters dissipate. At about 100 million years of age, the Pleiades are quite young as open clusters go, while the Hyades are an elderly 625 million years old.

Winter arrives just as the day of the eclipse is fading. The solstice occurs about an hour after sundown, at 5:38 p.m. on the 21st. At that moment the sun reaches a point directly over the Tropic of Capricorn and we experience the shortest day of the year.

December also brings the annual Geminid meteor shower, predicted to peak at 1 a.m. on the 14th. This should be a good year for the shower, despite a pesky waxing moon that sets shortly before 1 a.m. The Geminids radiate from near the star Castor, in Gemini, just northeast of Orion. The meteors represent the fiery deaths of dust from a bizarre object called Phaethon, which is built like an asteroid—that is, has a similar mineral composition—but acts like a comet by shedding dust.

All month long, Jupiter glows like a beacon in the southwest below the Great Square of Pegasus. Meanwhile, in the southeast, Sirius, the brightest of stars, rises earlier each evening. Try comparing these two objects in the first or last week of the month, when the moon won't interfere. Can you see the color difference? Also see if you can make out the ruddy hue of Betelgeuse, the star at Orion's northeast shoulder, and the orange beauty of Aldebaran, the "eye of the bull" in Taurus.

On the morning side, brilliant Venus rules the predawn sky, rising more than three hours before the sun. The bright star above Venus is Spica, the jewel of Virgo, and above Spica is Saturn. If you have a telescope, this is a good month to see Saturn's rings. They open to 10 degrees from horizontal late in December, and you may spot a dark "break" where the planet's shadow falls across its glittering girdle.

The University of Minnesota offers public viewings of the night sky at its Morris, Duluth and Twin Cities campuses. For more information and viewing schedules, see: Morris, UMN 16-inch telescope schedule: cda.mrs.umn.edu/~kearnsk/Telescope/PubObs.htm

Duluth, Marshall W. Alworth Planetarium: www.d.umn.edu/planet

Twin Cities, Department of Astronomy (during fall and spring semesters):
www.astro.umn.edu/outreach/pubnight

11/18/10 Contact: Deane Morrison, University Relations, (612) 624-2346, morri029@umn.edu

Find U of M astronomers and links to the world of astronomy at <http://www.astro.umn.edu>.



A fine line

November 22, 2010

U student Chris Hui has gained fame hand-painting custom sneakers

By Rick Moore

There's a picture of Chris Hui on his "C2 Customs" website carrying one of his hand-painted sneakers like a football in the classic Heisman Trophy pose. It's not clear to whom or what he might be giving a figurative stiff-arm, because Hui seems more likely to embrace a new friend than keep someone at arm's length.



Still, the picture seems appropriate. If a Heisman were to be awarded for creating amazing sneakers, Hui would be a top contender, and Goldy Gopher might be his biggest booster (see video). For the time being, Hui is content as a U student with a major in marketing and a minor in design. But his sneaker-painting resume is eye-catching, to say the least.

Chris Hui has hand-painted more than 300 pairs of custom sneakers since he first took up the craft as a young teen.

Photo: Nicole Holdorph

A moniker is born

Hui created his first pair of "hand-crafted" sneakers at the age of 13, when he and a neighbor each spray-painted their shoes a solid color. When the paint peeled off a short time later, Hui decided to do some research into the art of custom sneakers, and discovered "there was a cool underground scene to it all."

Soon he was buying sneakers on the cheap from Goodwill, creating his own designs, and making a profit reselling them.



As for his artistic alias, "C2," the name is more

accidental than intentional. When Hui began posting on a sneaker website forum, he was randomly assigned the user name "C2Hui." Then when people began commenting, "C2, nice shoes!" the name stuck.

"It has a nice ring to it," he says. "It's short; it's easy to paint. It actually ended up working quite well."

As the years have passed, C2 has gained a good share of fame, if not fortune. His clientele includes NBA superstar LeBron James, baseball stars Prince Fielder and Ryan Braun, rapper Lupe Fiasco, and late-night TV host Carson Daly. His pieces have traveled the world in exhibitions, and he's been featured in TIME and on Carson Daly.

A labor of love

Hui spends an average of about 10 hours per pair of sneakers, not counting design time, but some pairs have taken him considerably longer—up to 100 hours. Often, the time invested correlates with the celebrity involved.

"There are different situations that create a lot of stress," Hui says, referring specifically to the pair of shoes he made for James, the Miami Heat megastar. "How do you create something unique for someone who has been given everything in life?"

Hui has yet to meet James, but he has fond memories of Fiasco. He made the performer's sneakers before he had released a record, then asked to meet up with Fiasco before a show in Hui's hometown of Milwaukee. Just as it seemed the two weren't going to connect, Fiasco brought Hui backstage for a confab that lasted beyond when the show was supposed to start.

"It was a really humbling experience, because he was actually famous at this point," Hui says. "And for him to remember the little guy was really cool and rewarding."

'C2' ... or just Chris

Let's see ... a backstage chat with Fiasco while thousands of fans stood waiting, features in TIME and on Carson Daly, and magazine photos of supermodels covering up with C2's kicks. Heady stuff for a college student.

"It's weird. Back home I originally was Chris Hui, and now they all call me C2 because I'm more known for my shoes," he says. "Then I come to Minnesota and I'm Chris Hui again because I don't really talk about it."

For that matter, he's had to scale down his creative output. "During school I'm lucky if I make a pair a month," he says. "It's not that I don't have the time, it's that I dedicate my time to just being a college student."

He says he loves the U, and he appreciates the opportunities afforded him through the Carlson School. "They've been really supportive and almost overbearing in how much they prepare you for life after college," Hui smiles.

His dream job would be to work for Nike. "That's always been the dream, to work within a creative aspect of a business," he says. "Not pure design, not a pure business position, but kind of a fusion of the two."

And if a few more 15-minute hunks of fame come his way, so be it. C2 will still be Chris Hui at heart.

"It sounds kind of cliché, but it's true—I really just go about my life, and this just happens to be part of it," Hui says. "I try not to let it get to my head."



Catching the wind

November 30, 2010

U professor Ned Mohan is dedicated to tapping renewable energy sources

By Rick Moore

When it comes to the potential of renewable energy sources in America, the possibilities are more than a little intriguing.

Consider the wind howling in our neighbor states to the west (and no, this isn't the start of a joke). According to [Ned Mohan](#), a U professor in electrical and computer engineering, there is enough wind power in North and South Dakota to supply half the electricity needs of the entire country.

"But where are the transmission lines?" Mohan asks.

Therein lies the rub, and in this case it's one of the questions that drive Mohan's efforts in developing the next generation of wind generators and storage. It's what he calls the "next-generation grid"—the infrastructure to power our nation with renewable energy.

"We are preparing undergraduate students and graduate student to tackle that problem," he says. "And we are doing it on a national scale."

Using resources to develop resources

The University of Minnesota is the recipient of nearly \$4.2 million in grant funding (\$2.5 million from the U.S. Department of Energy) to carry out this work, some of which is dispersed across 82 member institutions.

"The main objective is to spread the curriculum we have developed over the last 10 years" to close to 100 other schools, Mohan says.

Here at home, the University of Minnesota offers an undergraduate degree in electric engineering that includes an electric-energy curriculum with an emphasis on renewables. One course offering, Wind Energy Essentials (EE 5940), has as its objective "to familiarize students with various essential aspects in harnessing wind energy and its conversion and delivery as electricity."

A global view of things

"How we produce electricity, how we transmit electricity, and how we efficiently use it—these are all very important," Mohan says. He uses the example of compact fluorescent bulbs, which are considerably more efficient and have a longer life than the standard incandescent light bulbs. The public is generally aware of the benefits of the former.

Other technologies have been slower to take hold, such as variable-speed compressors that operate continuously to help air conditioners and heat pumps operate more efficiently. So part of the challenge, Mohan says, is developing political will and incentives for the American public.

"Ultimately, you have the reward of using less electricity and improving the environment in terms of global warming," he says.

Speaking of that controversial topic, count Mohan in the camp that believes that global warming and climate change are scientific realities, not conspiracy theories.

"There's room for debate whether human activity is causing the climate to change," he says, but most scientists believe that our use of energy and the resulting greenhouse gases are contributing factors. "I really feel that this is a very serious problem."

"This climate change could affect billions of people," Mohan adds. "A lot of it is in the developing world, but no one is immune from it."

So Mohan is working to ensure that the current generation does everything in its power to put the next-generation grid in place. For that to happen, he says, "you have to have a well-educated workforce. So that's what we're promoting here."



According to Ned Mohan, 2007 Morse-Alumni Distinguished Teaching Award recipient, there is enough wind power in the Dakotas to supply half the nation's electricity needs.



Written in stone

December 7, 2010

Lawrence Edwards, the U's 'cave man,' discovered a way to read 500,000 years of history in the rock record

By Deane Morrison

In 2007 a jawbone and two molars with some modern human features turned up in a cave about 100 miles from the Gulf of Tonkin, in southeastern China.

Modern humans, it was thought, had moved out of Africa and spread into eastern Asia by 40,000 years BCE.

It could have happened tens of thousands of years earlier than that date; the fossil record was too sparse to tell. But when a team led by University of Minnesota researcher

Lawrence Edwards, using methods he devised, dated the 2007 remains, they turned out to be an astounding 100,000 years old.



In dating the rock found with this 100,000-year-old jawbone in a Chinese cave, University professor Lawrence Edwards and his colleagues raised profound questions about the migration of modern humans across Asia.

In that one fell swoop, Edwards and his colleagues raised the question of whether modern humans could have made it across the vast expanse of Asia far earlier than suspected. Because the remains also bore characteristics of more primitive humans who were already in the area, it is possible that the two groups could have coexisted for some time the way moderns and Neanderthals did in Europe.

But the discovery, [published](#) in the *Proceedings of the National Academy of Sciences*, is only the tip of the iceberg. Edwards has used his dating methods to uncover a whole library of information about the last 500,000 years, a period in which the dearth of data has been especially frustrating.

"A series of ice ages, the most recent stages of evolution, and human history all happened during this time, as well as many episodes of abrupt climate change," says Edwards, a professor of geology and geophysics. "When applied to certain types of rocks, [our methods] are better than the best carbon-14 dating, which is limited to dating materials from the last 50,000 years."

No more stony silence

In dating the human remains, Edwards and his team examined not the remains themselves but the rock laid down on top of them as minerals grew from flowing water in the cave. Information stored in such rock, called flowstone, and in stalagmites—both born of minerals precipitating out of water—makes caves one of Edwards's favorite sources of material.

To measure the ages of rock, he uses the "uranium-thorium" (also called the "thorium-230") dating method, in which he must detect incredibly small amounts of the elements uranium and thorium (see sidebar). And by measuring the proportions of different forms of oxygen, he can tell how much rain fell at the time the rock was deposited.

In [previous work](#), Edwards and a colleague used those techniques to trace variations in the strength of monsoon rainfall in China and linked weak monsoons to the fall of several historical dynasties. Since then they have tracked the monsoons with great accuracy back 400,000 years, when Homo erectus, not Homo sapiens, inhabited the region.

"The monsoon history is an exciting piece of work coming out of Minnesota," says Edwards. "It's the best-dated climate record covering this time period. We pieced it together from many stalagmites of varying ages."

Strong monsoons correlate well with climatic warming in Europe, and weak ones with cooling, such as the low temperatures caused by "calving" of glaciers that raised the amount of sea ice in the northeastern Atlantic Ocean. Such events can be dated with greater accuracy by determining the strength of monsoons in the general time frame when the events occurred.

In another example, about 1,500 years ago an abrupt, worldwide climate change sent the average temperature in Greenland soaring by a whopping 16 degrees C in the space of a decade. Edwards and his colleagues detected the "signature" of this warming in Chinese cave stalagmites, where it appeared as a strengthening of the monsoons during that period. Labs around the world have adopted Edwards's work with cave rocks to study climate and to plot the course of climate change in time.

"It's amazing to me what you can find in the natural world if you know how to look," he says. "For instance, ... looking at stalagmites from a cave and learning about climate change."

Published in 2010

Ages of Rock

Here's how Edwards dates rocks. Rainwater percolating into caves dissolves trace amounts of uranium, which precipitates out in the minerals that form stalagmites. One form of uranium, U-234, decays radioactively into a form of the element thorium—Th-230—with a half-life of 245,500 years; that is, half of any quantity of U-234 decays every 245,500 years. By measuring the ratio of Th-230 to U-234 one can tell how long ago the uranium was deposited. Edwards developed the modern methods for measuring Th-230 and U-234, using an instrument called a mass spectrometer.



Facing a difficult condition

December 8, 2010

U researchers work to help identify and treat 'face blindness'

By Rick Moore

Imagine you're a school-aged child and this is your reality: You go to school and nobody looks familiar; your classmates are essentially a sea of faces, none of which is recognizable from the day before. A girl walks over to chat and she seems to know a lot about you, but you can't place the face—and she seems equally perplexed, if not a bit agitated.

Then, at a family gathering, you find out that the strange faces in your house are actually cousins, although you wouldn't know them from your classmates, whom you wouldn't know from anyone else on the street.

The condition is known as prosopagnosia, or "face blindness," and according to U professor Al

Yonas, it may affect 1 to 2 percent of the population. The problem is, very few people are aware of it, which makes proper diagnosis problematic. Yonas is hoping to change that reality.

Studying face blindness at the U

Prosopagnosia is essentially the inability to recognize a face that you've seen before and should be able to recall. You can read emotions in a face, but identifying the person is next to impossible without cues like a unique hairstyle or distinctive jewelry. It's much different, Yonas notes, from being unable to remember somebody's name, which afflicts all of us from time to time.

There are two types of face blindness—one the result of some sort of brain injury and the other developmental or congenital. Until recently, most of the research has focused on face blindness in adults. Notables with face blindness include primatologist Jane Goodall, artist Chuck Close, and neuroscientist and author Oliver Sacks, who wrote the book *The Man Who Mistook His Wife for a Hat*, which deals in part with face blindness.

Since 2008, Yonas's lab in the Institute of Child Development has focused on identifying the condition in children (see video). Yonas and his research assistants have developed a number of tests for face blindness and have collected data from about 200 control subjects—children of various ages who don't have the condition.



The goal is to make more people aware that face

blindness exists, as Yonas suspects many children are misdiagnosed with other cognitive disabilities.

"A lot of people don't know they have this condition," he says. "They go through their life with the disability and they don't know anything is wrong."

That can lead to uncomfortable and unrewarding social interactions, and it's not uncommon for sufferers to become withdrawn.

"Children with developmental prosopagnosia really are facing a gigantic obstacle," says Sherrysse Corrow, a doctoral student who works in Yonas's lab. "You don't know your father from a different man, your mother from a different woman. So everyone is essentially a stranger.

"For a child this poses a substantial social problem, but also a substantial safety issue. You don't know which members of your community are safe to you and which ones aren't." She adds that in school settings students become stressed "because how do you make friends if everyone is a stranger and you can't distinguish your friends from other classmates?"

Down the road, Yonas hopes that early diagnosis can lead to more effective treatments for the condition. At the very least, it could lead to children recognizing there's a reason for their difficulties, as happened when people learned more about dyslexia.

"We're hoping parents will be aware of the problem and contact us if they think their child may have this disability," he says.

For more information about Yonas's lab and to inquire about face blindness, visit [The Prosopagnosia Project](#).



People with prosopagnosia are unable to remember faces. They can identify facial characteristics as well as emotions, but can't recognize familiar faces over time. This image, with one recurring face in each row, is meant to demonstrate the ambiguity inherent in the condition. (See [larger image](#).)

Photo illustration by Patrick O'Leary and Megan Drabandt



Not the heat, but the diversity

December 14, 2010

Salamanders show why the tropics are so rich in species

By Deane Morrison

The tiny salamanders in [Kenneth Kozak's](#) lab don't look very strong. But they've just helped overturn a powerful idea.

Ecologists have long known that the tropics have more species than temperate areas. But the reason may not be what they thought.

The traditional explanation was that organisms, armed with the extra solar energy and rain of the tropics, could use those resources to evolve into, and sustain, more species. It was as if the tropics were characterized by sunny, rain-splashed sameness.

But when researchers Kozak, of the University of Minnesota, and John J. Wiens of Stony Brook University looked closely at salamanders in temperate and tropical mountain regions of North America, this notion evaporated.

"It had nothing to do with the [energy input]," says Kozak, an assistant professor of fisheries, wildlife and conservation biology and curator of amphibians and reptiles at the U's Bell Museum of Natural History. "But because the seasonal temperature change is so slight in the tropics, [a variety of] habitats are stable, and organisms adapt to them."

For example, as one goes up a mountain in Central America, habitats get chillier and deciduous forest gives way to conifers. The lack of seasonal change stabilizes these habitats year-round, allowing salamanders to evolve into "specialists" adapted just to the specific conditions at their respective elevations. This leads to more salamander species.



Kenneth Kozak will go to great lengths--and heights--to study amphibians.



What some salamanders lack in lungs, they make up for in looks.

But in the temperate southern Appalachians, mountains are low (the highest peak, Mt. Mitchell, reaches 6,800 feet), offering room for fewer climate-based habitats. And seasonal changes mix up the weather conditions so that salamanders at each elevation experience, at some point in the year, the conditions at every other elevation. None can survive by adapting to cold but not warmth, or to dry but not wet. This has a homogenizing effect that works against the evolution of new

salamander species.

The researchers' data and insights could prove invaluable in finding suitable habitats for salamanders and other species threatened by climate change. They published their study in Ecology Letters.

Lungless wonders

Kozak and Wiens studied lungless salamanders, which account for about 70 percent of the world's salamander species. The ancestors of these salamanders originated in temperate areas of North America and moved into the subtropical and tropical highlands 30-40 million years ago. They now number some 225 species, compared to about 100 for the Appalachians and other eastern North American areas.

Highlands may seem a strange place for salamanders to thrive, but not when you consider that these little amphibians breathe through their skin.

"The efficiency of gas exchange [oxygen coming in, carbon dioxide going out] works best in cool, moist conditions, which tend to occur at higher elevations," Kozak explains.

By examining museum records of where various species were found and gathering GIS data about the environmental conditions in those places, the researchers were able to piece together where the most species live and how their numbers compared to the local climates.

Besides finding that mountains offer a variety of climates even in the tropics, they discovered that new species evolve faster when contact with related species is minimal.

"This finding is important for global climate change. It says that in predicting suitable habitats for species that may be displaced by climate change, you can't just look at the rate at which species adapt physiologically, you also have to look at interactions with other organisms, other species," says Kozak. "Unfortunately, this makes it harder to predict responses of species to climate change."

Kozak is a [McKnight Land-Grant Professorship](#) recipient for 2010-12.

Published in 2010



Starwatch January 2011

December 21, 2010

By Deane Morrison

The morning sun starts coming earlier in January, but even it can't upstage Venus. The *grande dame* of planets opens the second decade of our young century with a dazzling display in the eastern predawn sky.

Revelers who stay up into the wee hours on the 1st—or any day in January, for that matter—will have no trouble spotting it. As the month goes by, S-shaped Scorpius rears above the horizon and slithers past Venus.

Can you see the color difference

between the white planet and Antares, the scorpion's red heart? Look on the 16th or 17th, when the two objects will be close and no moon will interfere.

Saturn, in Virgo, is well up in the south at dawn. If you have a small telescope, consider braving the early morning cold to get a glimpse of its rings, which now tilt nearly 10 degrees from horizontal to give the planet a deeper 3-D appearance. If you spot a dark gap in the rings where they curve behind the northwestern edge of the planet's disc, count yourself lucky; you have just seen Saturn's shadow.

A recent study suggests that the rings were formed by ice torn from a large moon as it spiraled down into Saturn. If this "lost moon" idea is correct, it could help explain why the rings contain so much ice and so little rock, unlike other solar system bodies like meteors and comets.

Southeast of Saturn, Spica represents an ear of grain in the virgin's hand. The brightest star in Virgo, Spica actually consists of two stars orbiting each other every four days. The larger has 10 times the mass of our sun and is 12,000 times brighter, while the smaller weighs in at seven times the mass and 1,500 times brighter. Even from a distance of 260 light-years, this caliber of candlepower is enough to make Spica the 15th brightest star in the sky.

Jupiter, second only to Venus in luminosity, is the leading light in the evening sky, shining after nightfall in the southwest. It has company this month in the form of Uranus, a dim giant that you'll need a small telescope or a steady pair of good binoculars to see. We get our best chance an hour and a half after sunset on the 3rd, when Uranus will be half a degree—one full moon width—to the upper right of Jupiter.

In the east, the bright winter stars are coming into their own. Sirius, the brightest star in the sky, hangs low in the south in Canis Major, the larger of Orion's two hunting dogs. Orion himself anchors the knot of familiar constellations that also includes Gemini and Taurus. Below the three stars of Orion's belt hangs his sword, home of the Orion Nebula, an immense cloud of gas in which stars are being born.

January's full moon arrives on the 19th. It will be only two hours past perfect fullness when it rises and will shine all night. Algonquin tribes called it the wolf moon, for the hungry howling of the wolves this time of year.

Earth reaches perihelion, its closest approach to the sun, at 12:34 p.m. on the 3rd; at that moment we'll come a mere 91.4 million miles from our parents star. And speaking of close encounters, University of Minnesota physicists are building instruments for Solar Probe Plus, a NASA spacecraft that will zoom in to a sizzling 4 million miles from the sun. Data from SPP will shed light on why the sun's corona is so much hotter than its surface and how the corona accelerates ions into the high-speed, 3-D stream of particles known as the solar wind.

The University of Minnesota offers public viewings of the night sky at its Morris, Duluth and Twin Cities campuses. For more information and viewing schedules, see:

Morris, UMN 16-inch telescope schedule: cda.mrs.umn.edu/~kearnsk/Telescope/PubObs.htm

Duluth, Marshall W. Alworth Planetarium: www.d.umn.edu/planet

Twin Cities, Department of Astronomy (during fall and spring semesters):
www.astro.umn.edu/outreach/pubnight

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Find U of M astronomers and links to the world of astronomy at <http://www.astro.umn.edu>.



The Orion Nebula is a gigantic and colorful region of new star formation.