



Good to eat

January 6, 2009

Local chef shares benefits of whole food shopping and cooking in three-day course.

By Pauline Oo

Although she runs two restaurants, Brenda Langton still finds time to shop at her favorite co-ops and cook at home. The owner of Café Brenda and Spoonriver fell in love with cooking at 15, when she landed an after-school job at a natural foods vegetarian restaurant in St. Paul.



Local chef Brenda Langton will whip up several wholesome meals during the U's "Health Living, Health Eating" course.

Photo: Travis Anderson

"Cooking at home is a must. We simply cannot go out all the time," says Langton, who in March will share her philosophy and practices for healthy cooking, eating, and shopping during a three-day course offered through the University of Minnesota's Center for Spirituality & Healing.

"Even though I'm a restaurateur and I want people to come out to my restaurants, people need to cook at home. I feel so sad when people say to me, 'I don't cook,' because I can't imagine not cooking at home. It's so healing, so nourishing. It feeds my mind, my body, and my soul."

The course, "Healthy Living, Healthy Eating," will take place 6 p.m. to 9 p.m. Tuesday, March 10; Tuesday, March 17; and Tuesday, March 24, at Roth Distributing, 1300 W. 47th St., Minnetonka. The cost of \$225 includes a copy of Langton's *Café Brenda Cookbook* and food samples.

Langton is a pioneer of the Twin Cities' sustainable and local food movement. At 21, she opened Café Kardamena, a gourmet vegetarian and seafood restaurant in St. Paul. Eight years later, she opened the eponymous Café Brenda, offering innovative vegetarian dining. Spoonriver came along in 2006, with a menu that included grass-fed beef, lamb, and naturally raised pork from local sources. That summer, Langton started the Mill City Farmers Market specializing in vendors of local, sustainable, and organic products.

"We are thrilled to work with Brenda on this innovative offering," says Mary Jo Kreitzer, Center for Spirituality & Healing director. "For years Brenda has demonstrated her strong commitment to holistic health and we're eager to help her take that message to the broader public."

The Center for Spirituality & Healing, located on the Twin Cities campus in Minneapolis, is a national leader in the field. In addition to hosting guest teachers, such as Langton and health and wellness expert Andrew Weil, the center conducts National Institutes of Health (NIH)- and FDA-funded research and clinical trials to scrutinize complementary therapies. One study, for example, examined how stress reduction can help organ transplant patients reduce anxiety, depression, and sleeplessness.

Langton will prepare two types of breakfast, a lunch, a dinner, and a dessert during each class. On the menu are such treats as buckwheat potato croquettes; soba noodles with toasted sesame oil, soy sauce, and green onions; squash and wild rice soup, and baked apples stuffed with walnuts, raisins, sesame butter, and maple syrup.

"At home, my meals never take more than 30 minutes, and I like to cook with whole grains, vegetables, fish, chicken, and noodles," says Langton, who cooks at home about four nights a week for her husband and their 18-year old daughter.

"This [course] is not about gourmet natural food cooking, it's about how to cook simply but quickly because time is a problem for so many of us," she adds. "It can be for either the person who doesn't know anything about cooking or for the person who does cook a lot. My hope is that [the classes] will inspire people to practice simple cooking techniques and to make foods that will keep them strong."

Participants should bring a notebook because, in addition to recipes, Langton will share her "little tricks" for grocery shopping.

"I disagree 100 percent with the naysayers of co-ops or people who say that buying natural and organic is expensive," she says. "Granted, we cannot all afford organic vegetables and fruits. I understand that. So, we make our choices—Which ones can we buy? Which ones are more important to buy? And which ones are naturally grown with [fewer chemicals]?"

The most rewarding part about teaching for Langton, who has taught numerous one-day cooking classes, typically comes at the end of a class session--"when we're eating and sitting around and talking."

"Everybody is so happy," she explains. "It's really gratifying to see and hear from the students, to learn what they got out of the class, and to know that they will take these ideas home and cook."

Register for "Healthy Living, Healthy Eating" at the [Center for Spirituality & Healing](#) or by calling 612-624-9459. The three-day course (March 10, 17, and 24) is limited to 50 people.

Brenda on co-ops and eating well

"I'm a huge fan of the co-ops. Large supermarket chains have aisle after aisle of things I don't eat and they inflate many of the so-called natural food prices. I want a big produce section and a good bakery, and I want to be able to shop for grains and beans, and meats from small farms [and] not mass-produced, commercially farmed meats that are not good for us."

"White rice is [cheap but it's] something to eat occasionally, not all the time for nutritional value. Buying whole grains [including brown rice] and organic beans is not expensive at all, and cooking legumes, like peas and beans, as a protein is healthy."

"We have to eat better. Multiple diseases are caused by a bad diet—heart disease, cancer, or diabetes. There's no reason to deny the science out there now."



Take a slice out of stress

January 6, 2009

Advice on maintaining a healthy work environment in uncertain times

From an article by Mary Jo Kreitzer and Joanne Disch

In these economically unsettling times, many of us may notice a decline in our health and well-being as stress erodes the quality or productivity of our work lives. The pressure may also provoke some of us to act in uncustomary ways.

To maintain a healthy work environment and the balance between work and your personal life, consider these strategies:



Work stress getting you down? Two University nursing faculty offer advice.

Acknowledge the reality. As difficult as it might be, face the facts and learn as much as you can about impending changes. If you're a leader, brief your staff as often and as thoroughly as possible.

Be aware of how you deal with stress. Do you become reactive, fearful, angry, discouraged, or threatened? An interaction with a colleague, an e-mail, or a meeting can trigger a response that you may later regret. Pause, and take time to respond thoughtfully.

Don't act like a victim. Most change is beyond any one person's control. It's easy (and unproductive) to point fingers. Instead, focus on things within your sphere of control and influence, even if it's only how you respond to what's happening. Consider what you can do, rather than dwell on what you can't change. Keep informed, and stay away from water cooler conversations that dampen spirits and fuel rumors.

Learn new skills, including how to manage and reduce stress. Take stock of your skills and abilities, and identify other ways in which they may be useful to the organization. Take advantage of any resources your organization offers, such as new skill trainings and stress reduction programs.

Build time in for yourself and your family or friends. Most workplaces will be in VUCA (volatile, uncertain, chaotic, and ambiguous) mode in response to the uncertain times. Setting aside time for family or friends, or doing something special for yourself, is an important personal survival strategy. It could be as simple as an hour for a walk or coffee with a friend.

Mary Jo Kreitzer is founder and director of the Center for Spirituality and Healing at the University of Minnesota. Joanne Disch is the director of the Katherine J. Densford International Center for Nursing Leadership.

Activities and resources for taking charge of your health

The Center for Spirituality & Healing and the [Life Science Foundation](#); together maintain the Web site [Taking Charge of Your Health](#). The site is a gateway to a wealth of resources often overlooked as stress reducers in today's autobahn society.

Many activities found on the site can be performed right at your desk with the aid of an unlikely stress-reliever (and perhaps more often the deliverer of that very stress)—your personal computer. For example, under the [Mind-Body Therapies](#), one can find simple, guided audio recordings such as the Body Scan, Shift Your Emotions, a [Meditation Exercise](#), and other relaxation exercises.

A range of articles written by expert contributors illuminates the benefits of creative arts therapies, imagery, breathing exercises, [mindful movement](#) and many more.

Additionally, the Center for Spirituality & Healing offers many [online learning modules](#) at no cost.

Options available on the physical U of M Twin Cities campus:

Meditation Tuesdays

Refresh and recharge yourself with an informal hour of meditation and light stretching. No prior experience or special clothes necessary. Staff and Faculty are welcome. [Meditation Tuesdays](#) will be held weekly beginning Jan. 27 in the newly renovated Meditation Room (3rd Floor of the Mayo Memorial Building) from 12:15 to 1:15 pm.

Mindfulness-Based Stress Reduction

Mindfulness Based Stress Reduction (MBSR) is about taking control of our lives, being aware of influences that affect our well-being and health, and finding peace-of-mind and balance in an oftentimes chaotic world. MBSR will teach you to consciously and methodically deal with stress, pain, illness, and the demanding challenges of everyday life. There is a charge for the class. For schedule and pricing information, see [MBSR](#).



Crossing over

January 6, 2009

Hakim Abderrezak follows the twists and turns of the North African migration story.

By Danny LaChance

In *Cannibales*, a recent Moroccan novel, a group of North and sub-Saharan Africans gather on the northern Moroccan shore preparing to make a clandestine crossing to Europe.

"All your papers," demands the captain of the boat that will deliver them to their new home. "Passport, I.D., birth certificate, address book: in short, any document that could be used to identify you."



Hakim Abderrezak, University of Minnesota assistant professor of French and francophone studies

Photo: Kelly MacWilliams

One by one, they hand over their identifying documents. All will be burned, they know—a step necessary to ensure that they cannot be deported if they are discovered by European authorities.

Moments like this capture the imagination of Hakim Abderrezak, assistant professor of [French and francophone studies](#). In an age of globalization, Abderrezak says, "African papers link these people to countries that have not been able to offer them the opportunities that they long for. African passports limit." Burning them sets characters like those in *Cannibales* free from those limits.

A scholar of literature and film, Abderrezak studies the representation of Maghrebis—those who hail from the North African nations of Morocco, Algeria, and Tunisia.

The movements of Maghrebi people to and from Europe and the rest of the world has changed dramatically in recent years, Abderrezak says. "When we used to talk about migration, it was about émigrés going to France. They'd settle, have families, and would not leave because their children were born there and were French," he explains.

Now the children and grandchildren of Maghrebi immigrants in Europe are increasingly returning to the Maghreb region in order to rediscover their roots. This reverse migration is striking, Abderrezak says: "Some people want to go back to their family's country of origin because they've been shown or told that they're not completely French."

Once they are there, of course, they discover that neither are they Moroccan or Algerian or Tunisian. "They don't speak the language, they don't have a job there, they don't have an identity there. When they're in France, they're called immigrants. But when they're in the Maghreb, they're still immigrants," he says.

Abderrezak is particularly interested in what he calls "illegal literature," novels about migration in an age when access to Europe has been made tighter by stricter immigration policies.

European media coverage emphasizes this illegality. "Images of distraught men, women, and children being rescued or escorted by the authorities, or of bodies being fished out of the sea, are often seen in newspapers and on television shows all over the world," Abderrezak says. "The image is monolithic: North Africans are shown as criminals, as invaders trying to breach Spain."

Literature and film offer an alternative to media coverage, says Abderrezak, and helps the reader and viewer understand the complex and ambiguous experiences of Maghrebis.

Abderrezak's fascination with the literature of migration stems from his own experiences. The son of Maghrebi immigrants, he was born, raised, and educated in Normandy, France. But as he was growing up, he and other children of immigrants were commonly known as *les jeunes issus de l'immigration*, or "the generation of youth produced by immigration," a term that portrayed them as others within their own society.

"It was stunning to be defined that way when you were born in France, didn't come from another country, and are French according to the law," Abderrezak says. "That prompted me to look at the novels and films that have tackled this inaccuracy and, more importantly, identify several types of marginality."

It's the topic he took up when he migrated across the Atlantic and began doctoral research at Northwestern University. Abderrezak found that when you're trying to understand identity and culture, distance can lend a needed perspective.

Now that he's settled in Minneapolis, Abderrezak is looking forward to working as part of a new generation of francophone scholars who are seeing Maghrebi migration in its current forms.

Despite the number of books on Maghrebi migration to France, there are almost no major critical works on contemporary literary and cinematic representations of the migration to places like Spain, Turkey, Saudi Arabia, and the United States. Abderrezak is in the process of remedying that situation with a book of his own.

This article edited from Verve, the magazine of the Department of French and Italian.



Full stream ahead

January 7, 2009

For nearly 40 years, Ray Wakefield has shared his passion for language, history, and culture with students

By Danny LaChance

For many years, the University's Dutch program hosted an annual visitor from the Netherlands, an up-and-coming young author who would spend the year teaching and writing in the Twin Cities. And every year Ray Wakefield, an associate professor of German, Scandinavian, and Dutch, would take the visitor to his cabin on the North Shore for the quintessentially Minnesota experience of standing in a frigid current late at night during the April smelt run, a mass migration of tiny fish in the streams that feed Lake Superior.



Ray Wakefield as Erasmus of Rotterdam. In the 1970s he would walk the University in costume, signing up curious students for his Dutch classes.

Photo: Kelly MacWilliams

One year Wakefield ruptured his Achilles tendon in a volleyball game several weeks before the trip. He never considered canceling it, nor the end-of-the-school-year fish fry that traditionally followed. So there he was, wading into the icy spring water at midnight in a full leg cast, showing a Dutchman how to position his net to catch smelt.

"One of the graduate students was with us, and every time my crutch would fall out from under me and begin to float away, she would run and grab it and bring it back to me," Wakefield recalls, laughing.

A newcomer to Minnesota in 1969, he founded the Dutch program in 1970. Under his stewardship, the program grew into one of the largest and best known in the nation. The Dutch writers he brought to campus put Minnesota on the map for Dutch readers.

"The experiences these writers had [in Minnesota] would show up in novels, books, essays. Dutch readers know more about Minnesota than we would think," Wakefield says.

A teacher of language, history, and culture, he has been a force behind significant developments.

A decade into his career here, he headed a task force that overhauled foreign language instruction at the University. Collaborating with federal initiatives and the American Council on the Teaching of Foreign Languages, Wakefield helped implement at Minnesota national standards for better assessment of students' proficiency in foreign languages. Proficiency tests, he explains, put everyone—University and high school faculty, prospective employers—on the same page in evaluating a student.

He also helped shift the teaching of languages toward a way that seems obvious now. His colleague Klaas van der Sanden describes it as "thinking that one might actually learn how to use the language in real-life situations, instead of by going through grammar rules in meaningless exercises, like a thousand versions of 'Father's pipe is made of clay.'" Thirty years ago, though, it represented a break with established methods.

For Wakefield, nothing quite compares to the thrill of teaching students about Medieval culture. His courses, he says, aim at replacing romanticized ideas about knights in shining armor and damsels in distress with a complex picture of a radically different way of life.

For instance, Medieval culture is steeped in communal rather than personal identity, a fact that alters ideas about something as fundamental as justice. Sexually assaulting a married woman of noble birth, for example, was a criminal act not because it violated the dignity of the victim, but because it incited large-scale acts of violence.

"The rights of the women involved aren't mentioned at all," Wakefield says of Medieval transcripts of judicial proceedings. "The disturbance of the communal peace of the kingdom is the key. Not the individuals—that's insignificant. It's the fact that the king's knights are killed, that a melee has erupted, that the peace is disturbed."

To get students to understand this and other values of the Middle Ages, Wakefield shows films that capture the period's idiosyncrasies, like the French film *Perceval le Gallois*, in which characters communicate with stylized gestures and appear taller than trees, as they do in Medieval manuscript illuminations. *Monty Python and the Holy Grail* also makes the cut. Buried in its silliness are rich allusions to Medieval culture that reflect the scholarly background of the film's creators. "Almost everything in the film that seems too outrageous to be true ties into the studies of the authors at Cambridge and Oxford," Wakefield says.

Once his students have analyzed these portrayals of the Middle Ages, Wakefield turns the tables on them and has them write and produce a scene that could be added to one of the films. They then show the scenes to the class and write an analysis explaining how their historical knowledge informed their decisions on location, props, lines, gestures, and locations; every detail must fit into their analysis of the Middle Ages. This exercise, Wakefield says, leads to historical research and more sophisticated analysis than merely analyzing an existing text.

The results, he says, are both inspiring and voluminous. "I have to put limits on the analysis, because some of these students would write a small book," Wakefield says.

But getting carried away by the material is part of the learning process, and he himself has no fear of going out on a limb to capture their attention.

A few years back, he was teaching a class on Medieval poetry as part of his German Civilization and Culture course. He wanted the students to hear the distinctive beauty of sounds from a mystic poem of the period: the reduction of its every line to one scintillating, rhyming syllable, the majestic sense of repetition that captured his imagination when he was a first-semester graduate student. And so, on a whim, he closed his eyes, took a breath, and began to recite aloud.

When he finished, he opened his eyes to a sea of faces with mouths agape. So caught up was he in the beauty of the poem that he didn't notice how shocked the students were, unaccustomed to seeing their professors burst into sonorous recitation.

He thinks that moment had something to do with a comment he received on his student evaluations at the end of the semester.

"The student said, 'It was really intense. I thought sometimes his head would explode,'" Wakefield laughs. "And I thought, 'Maybe I should cut down a little bit.'" Luckily for his students and colleagues, that's not likely to happen anytime soon.

Decorated by the Dutch

In a career punctuated by awards, Ray Wakefield has received none cooler than becoming an officer in the Order of Oranje-Nassau, the equivalent of Dutch knighthood, awarded by Queen Beatrix of the Netherlands in 1991. Most recently, he received the College of Liberal Arts Arthur "Red" Motley Exemplary Teaching Award for 2007-08.



Above the clouds

January 20, 2009

UMD student ascends Mount McKinley

By Jordan Hanson

Seventeen thousand feet up Mount McKinley in Alaska, Dean Einerson sat in the snow with a cup of soup, looking out over the tops of the clouds below. After facing high winds, freezing temperatures, and storms, he found himself just below the summit of the mountain that has the highest vertical rise in the world.



Dean Einerson climbs the steep rock of Cassin Ridge on Mount McKinley.

Photo: courtesy of Matt Giambrone

"The journey to the top is always the most interesting part," says Einerson, a graduate assistant in the environmental education program at the University of Minnesota, Duluth (UMD). "It's something about having to overcome all of the doubts and fears of the climb."

Einerson made that trip in 2008 with climbing partner and fellow UMD alumnus Matt Giambrone. When Einerson started as an undergrad at UMD, he had never climbed before. He attributes much of his transformation from novice to expert to his experiences with the UMD climbing facilities and the Recreational Sports Outdoor Program (RSOP) Fitness Center.

"Our climbing program is one of the best in the U.S.," says Einerson. "We have a world-class training and guiding faculty, and they are there to be taken advantage of."

He describes Kaija Webster, the climbing program director, as a personal mentor. Webster has shown thousands of people how to climb, and Einerson says she taught him a lot of important lessons about safety and perseverance.

At least twice a year, Einerson tries to make a big climbing trip to different mountains around the world. He has climbed all over North America and in Ecuador, Kenya, and Central Europe, with upcoming trips planned for the Canadian Rockies and the Eiger Mountains in the Alps.

To train for difficult climbs, Einerson uses all of the resources provided by UMD and the surrounding area. The climbing wall, weight room, fitness center, and track at UMD, along with the help of a personal trainer, aid him physically. And the natural terrain of the Lake Superior's north shore couldn't be better for ice climbing practice. According to Einerson, the best ice climbing is at Orient Bay on Lake Nipigon (about 75 miles northeast of Thunder Bay, Ontario). But he warns that preparation is crucial, due to the inherent danger of climbing.

"It's important to remember the consequences of what you are doing," he says. "I have never been to Alaska when someone hadn't recently died or been seriously injured."

The next mountain on Einerson's horizon is his master's degree—and eventually Ph.D.—in environmental education. He is currently teaching class as part of an assistantship, and eventually he would like to teach undergraduate students full-time in outdoor education or therapeutic recreation. This spring he will teach a mountaineering course with the RSOP, and will use the snow banks in a UMD parking lot to replicate the icy sheers of a mountain. He is also studying the motivation of rock climbers.

Einerson recommends that anyone at UMD interested in climbing should visit with the people in the RSOP and attend climbing clinics. That's how he got his start, and it helped steer him to the top of Cassin Ridge along one of the most challenging routes up Mount McKinley.

Jordan Hanson is a communications major at UMD.

Outdoor adventure resources

[The Recreational Sports Outdoor Program](#) works with many different facilities at UMD that promote recreation, fitness, and exploration of the outdoors. RSOP operates out of various facilities within the Sports and Health Center (SpHC) as well as external locations on and off campus. Facility users must carry the appropriate pass at all times, and facility hours are subject to change by program need.

[The Center for Outdoor Adventure \(COA\)](#) on the Twin Cities campus provides participants with alternative recreation experiences revolving around the great outdoors. Each semester, COA offers a full schedule of trips and clinics to introduce participants to the fundamentals of outdoor adventure skills and environmental ethics. Activities range from backpacking to ice climbing, both locally and nationally.



Primed to give?

January 23, 2009

U researchers found that preliminary questions and conversation can soften you up for a pitch

By Rick Moore

Salespeople and fund-raisers have been striving to get "a foot in the door" for decades. But recently a new strategy has entered the arena—the maddeningly false friendliness of the caller. And apparently, there's a method to the niceness.



University of Minnesota researchers have found that preliminary questions and conversation are effective at softening you up for a pitch.

University of Minnesota researcher Kathleen Vohs—a marketing professor at the Carlson School of Management—and two co-authors have found that preliminary questions and conversation that may seem like polite chitchat are actually quite effective at softening you up for a pitch. And when they are accompanied with an appeal that includes certain cues, the strategy is likely to increase donations and sales. The new study appears in the *Journal of Consumer Research*.

According to Vohs and her colleagues, it's all about "self-control resources." After answering a series of initial questions in experiments, the self-control of research participants declined, making them more vulnerable for a request for money. It's during a second stage that the actual donation or sales appeal is made, usually accompanied by a cue such as a compliment or a favor like a free gift.

"When people have already been stripped of the resources needed to resist temptations and then encounter these cues, it's like a one-two punch," Vohs says. "It's not just that the person gets depleted. They then have this cue... and they fall for it."

In a mental state weakened by answering questions, we end up giving more, the authors explain. So when a telemarketer asks something as simple as, "How are you today?" consumers might keep their antennae up for what's coming next.

"The initial act of answering seemingly harmless questions is enough to produce a state of mindlessness which increases the odds of complying with a larger target request," the authors note. Vohs does offer that not everyone makes an equally prime sales target, and "some people are more savvy than others," but says that anyone can run the risk of succumbing to a crafty pitch, especially if she or he feels an affinity for the pitcher.

"If you really, really, really don't want to give them any money, you have to cut off the conversation immediately," she suggests, "otherwise you risk getting into this worn-down stage."

Or, according to one wily consumer, turn the tables—engage the caller in so much answering chitchat they he or she has no enthusiasm left for the pitch.



A fresh look at the Dark Ages

January 25, 2009

They didn't write much, but they set the stage for Western civilization

By Deane Morrison

When he died, his men led his stallion to the edge of his grave. With a slash of a sword, they sent the trusty steed into eternity with its master, in a grave that would lie undisturbed for 11 centuries.

He was Childeric, a Frankish king and ally of Rome in the early Dark Ages, a time that saw Roman power wane and the kingdoms of Europe start taking shape. Discovered in 1653 in what is now Belgium, his grave contained many riches, including 300 golden bees inlaid with garnets in a then-emerging style. Overall, Childeric's possessions bore the clear stamp of both old Rome and a new era of artistry and commerce for Europe north of the Alps.



Peter Wells holds a sword, dating back some 14 centuries, from the study collection of the Department of Anthropology.

Photo: Patrick O'Leary

The life of Childeric embodies University anthropology professor Peter Wells's challenge to the traditional idea that equates the Dark Ages with war, disorganization, and cultural inertia. Wells lays out the case for his ideas in his latest book, *Barbarians to Angels: The Dark Ages Reconsidered*.

Why bother with what happened between A.D. 400 and 800? Because, Wells says, to understand how our world works today, we need to understand how it got that way.

"A lot of our ideas and practices derive from the distant past," he explains. "People of the past faced the same sorts of problems we face today. If we can learn from them what to do, it may help us deal with our current problems.

"For example, in the Roman period we can study the effects of bad farming practices that led to erosion. Or we can look at environmental problems from cutting down too many trees to [fuel forges] in the Iron Age. Similar issues of deforestation occurred with the Mayans. It helps us put world trade and globalization in perspective."

Through a glass lightly

That image of the Dark Ages as a time when nothing significant happened and barbarians ran wild comes to us from a few Rome-friendly writers of the time, says Wells. Instead of barbarians, the period was dominated by artisans and tradesmen who may not have written much, but produced a culture rich in material wealth. (The angels of the title come from one shining example of artistic achievement in the Dark Ages: the illumination, or illustration, of Biblical texts. Upon seeing such texts in Ireland, the 12-century writer Gerald of Wales pronounced them "the work of angels.")

The evidence for this view of the Dark Ages comes not from written material, but from tangible objects like personal ornaments, belt buckles, combs, jewelry, pottery, and swords found in graves and sites of ancient settlements. The Dark Ages acquired their name because we haven't been able to "see" into them, thanks to the dearth of written material compared to the Roman period, Wells says. The few surviving texts tend to deal with elites and "are by writers bemoaning the weakening of Roman political power."

The decline in writing during the Dark Ages reflects changes in the political map of Europe. Writing flourished under Rome, notes Wells, because when a society reaches a certain scale of complexity, it must communicate over great distances. Rome unified a grand landscape, and writing played a vital role in record-keeping, taxation, and other functions.

"But the new societies that emerged when the Roman political power declined had no need for writing," Wells continues. "No such grand scale political empire existed again until Charlemagne. Runes were used in the Dark Ages, but mostly for short messages or identification purposes.

"The whole issue of why some societies use writing and some don't is a huge question."

A thousand economic engines

In the realm of crafts and commerce, however, the Dark Ages set the stage for the flowering of Western civilization. Artisans created new styles to distinguish their culture from that of their Roman-dominated predecessors. Brooches, for example, bore multiple light-reflecting facets and stylized forms of animals, all aimed at attracting and holding a viewer's attention.

But brooches did plenty more than just hold clothes together. Displayed prominently on shoulders or chests, they trumpeted both personal status and regional identity. Like T-shirts with the home team's insignia, they distinguished a Frank from members of other Germanic tribes, or an Anglo-Saxon from a Goth.

Trade was alive and well during the Dark Ages, as finely wrought vessels of gold, silver, and bronze, along with some weapons, came from the Mediterranean and beyond and were fashioned in specialized workshops. A Swedish scholar has argued that there must have been political stability throughout Europe to support such a wide trade in such objects, not to mention the large numbers of shops and crafts workers.

"As [attractive] products became available, people worked harder to get them by growing surplus crops, mining metals, and making leather and textiles," says Wells. "There's lots of evidence for weaving." And thus was a brisk economy born.

The Dark Ages are, of course, a modern creation, as history continues seamlessly. The period is generally regarded as ending with Charlemagne, who was crowned Holy Roman Emperor in Rome on Christmas Day 800. His reign marked the dawn of a new era of literacy, but not a complete break with Dark Ages practices.

"One could see Childeric as a predecessor of Charlemagne, showing many of the same features," muses Wells. "He just didn't have as good a publicist."

On December 2, 1804, almost exactly one millennium after the crowning of Charlemagne, Napoleon Bonaparte had himself crowned emperor of France. Seeking to bury the memory of the Bourbon kings and their fleur-de-lis emblem, he had an apt symbol of France's ancient power sewn into his coronation robe: hundreds of golden bees.

Childeric would have been proud.

In the year 2525

The differing views of the Dark Ages given by texts and archaeological objects beg the question of how our era will be remembered. In our case, accuracy may suffer from a glut of information; Peter Wells sees interesting questions in what will survive and who will decide what to preserve. Plenty is online, but high-tech media may not be readable in the future. In 2000, says Wells, a committee of scientists considering a time capsule for New York's Central Park decided that pen on paper was the best way to preserve information. So if you want your name to live on, polish that penmanship.

Tangle in Teutoburg

In A.D. 9, Germanic warriors trapped and massacred three Roman legions in a narrow pass. The Battle of Teutoburg Forest put a damper on Roman military expansion in continental Europe. (Note to *Gladiator* fans: That battle occurred two centuries later, along the Danube River.) Peter Wells recounts the pivotal event in his book *The Battle That Stopped Rome*. The victory by the Germanic leader, Arminius (later germanized to Hermann), became a legendary example of underdog Germans standing up to imperial power.



Modern-day Muirs

January 25, 2009

Notes to mend a nature deficit disorder

By Adam Overland

In every walk with nature one receives far more than he seeks. — John Muir

John Muir said that, and I suppose he would know. He took many walks, perhaps the most notable—one of a thousand miles. Most of us drive today, or at least, we take far fewer walks.

Nature requires a patience and attention difficult to pay in this age of deficit. For many in the city, such a nature deficit disorder might benefit from being the next entry in the American Psychiatric Association's DSM-V. Perhaps by cataloging it as a psychological illness, nature would receive its rightful recognition.

To be sure, there is not a deficit of nature at the Minnesota Landscape Arboretum. The sights, sounds, and smells inspire patience and observation with more than 1,000 acres of gardens and landscapes, 5,000 plant varieties, and natural areas from woodlands and wetlands to prairie. And it's a great place to take a walk—just ask arboretum research fellow Julia Bohnen and naturalist Matt Schuth. Or better yet, take a look at their ever-evolving creation, the Nature Notes [blog](#).

Since late summer 2008, their observations throughout their daily work at the arboretum have been taking shape online. It used to be that Schuth and Bohnen, both longtime employees of the U's arboretum, would literally post paper notes on a "Nature Notes Board" in the lobby of the Visitors Center (in fact, they still supplement the blog with paper notes for those who visit in person). Other staff and even visitors to the arboretum are encouraged to submit their own comments to the blog. The writing is borne of part habit, part altruism, and all nature's inspiration.

"For my part, I have journaled nearly all my life...it is therapeutic for me, especially when combined with being outdoors," says Bohnen. She's committed, and if a particular day of work doesn't allow enough quality nature time, Bohnen will go for a walk at the day's end, making sure, of course, to take along a pad of paper.

Look at this entry from January 5, 2009:

"The moon was half full when I walked at Spring Peeper last night after dark. A bright planet, perhaps Venus, was in the sky to the west of the moon. The western horizon had a pale blue wash from the setting sun. Overhead the few stars that were visible were caught in a streaked web of thin clouds. The night was calm and mild; just a breath of air stirred the leaves on the oak trees. In the moonlight, I could see the tracks of rabbits and other meadow inhabitants. On the Oak Knoll the oak trees were silhouettes in the moonlight; the large mature oaks seemed to be reaching into the sky and grasping for the stars. The shadows cast by the oaks laced the patches of snow in a network of gray threads. The snow crunched under my boots, my toes caught under the crust on each step."

Schuth, who has managed the maple syrup operation at the arboretum for the last 18 years, also contributes to the blog. His inspiration no doubt grew from an early education. "I grew up on a farm in Wabasha, Minnesota, so I have been in nature most every day of my life since I was a wee tot," says Schuth.

For their readers' sake, Schuth and Bohnen hope that the blog will inspire them to come and take a walk, especially in the less developed parts of the arboretum, where untrampled nature awaits. "Now, when we note that the snow trilliums are blooming you could read it on the blog and come out to see them yourself," says Bohnen.

Of course, it is understandable if lately, the cold has uninspired your desire to venture outside.

But take heart in these words from December 24, 2008:

"Ahhhh, winter. When you are prepared for it and dressed appropriately, it can be a real pleasure. Today I got out and kicked around in the snow. With the cold temperatures, the snowflakes have not lost their sharp edges and loft. Down in the meadow the snow was up to my knees. It will be insulating all the little animals deep down inside. The snow is mounded over the bent sedges in the meadow creating soft shadows and illusions of larger rolling landscapes. The snow that fell overnight and early this morning is still clinging to the plants."

The opportunity for inspiration is ceaseless, insists Bohnen. "Even tasks such as spraying weeds can provide a good opportunity to see cool stuff," she says. (Likewise, I do believe I've heard that even the mundane act of doing dishes provides a good opportunity to look out a window and with warm hands watch the wonders of the natural world, but I have an automatic dishwasher and could not say for sure.)

Bohnen's work at the arboretum and on the blog is in consideration of future generations, too. A restoration area she manages began as a hay field and a cornfield, she says. She worked to reintroduce a plant community to the land. "Part of the restoration process is based on scant notes and records from times long past," says Bohnen. "If those records had been more detailed our efforts at restoration could be better. I hope someday that my notes might be part of a significant record of nature at this time in this place." Rest assuredly, snow trillium, that these notes will survive the winter.

"Today during a windy blustery day Les noticed that a European starling had taken refuge in a barn swallow nest under the eaves of the old apple house at the HRC (Horticultural Research Center). The nest is tucked way up under the peak of the building and may have felt like a reasonably comfortable hideaway from the flurries for this cavity dwelling bird."

The Minnesota Landscape Arboretum has 8.5 miles of cross-country ski trails and 1.25 miles of snowshoe trails in the winter.



Turkeys trot away from a solitary bench at the Minnesota Landscape Arboretum.



The feeding tube?

January 29, 2009

Study links TV viewing to unhealthy eating years later

By Deane Morrison

For the first time, researchers have found an association between TV viewing and future eating habits in older adolescents.

High school kids who watched a lot more television than their peers at age 16 were likely to have worse eating habits five years later, a new University of Minnesota study indicates.



Heavy TV watching among teens is associated with lower-quality diets later, a University study shows.

But this isn't to say that those who watched the least TV had nutritionally terrific eating habits, says study leader [Daheia Barr-Anderson](#), an assistant professor in the University's School of Kinesiology.

"Children and adults in general aren't eating well," says Barr-Anderson. "There are lots of individual, social, and environmental variables at work. But even though the intake of fruits and vegetables was suboptimal [for all adolescents in the study] to start with, they were even lower for those watching a lot of TV."

Watch a [video](#) of Daheia Barr-Anderson discussing her work. And put down that doughnut!

Barr-Anderson and her colleagues surveyed 1,366 Twin Cities-area adolescents on their TV viewing habits at the average age of 15.9 and on their eating habits five years later, when the average age was 20.5. The researchers divided them into three groups: limited viewers, who watched less than two hours a day; moderately high, two to five hours; and heavy viewers, at least five hours.

Five years later, there was a significant downward trend in the quality of diet as TV watching increased. For example, the total daily servings of fruits and vegetables ranged from 3.41 among limited viewers to 2.53 for heavy viewers.

In contrast, nine servings are recommended by the U.S. departments of Agriculture and Health and Human Services for a person consuming 2,000 calories a day (recommended servings rise and fall depending on caloric needs).

The intake of not-so-healthy foods ranged in the opposite direction: weekly visits to fast food outlets from 2.03 to 2.33, daily servings of snack foods from 1.93 to 2.20, and daily servings of sugar-sweetened beverages from 1.14 to 1.33.

For a person on a 2,000-calorie-a-day diet, about 1,735 are necessary to supply enough nutrients, according to the recommendations. That leaves 235 "discretionary calories," which can quickly be eaten up by just two 12-ounce regular sodas (140 calories each) or one small order of French fries (230 calories).

"I think kids see what their parents are doing. Until it becomes the norm in the family not to sit in front of the TV for hours or eat junk food, it's not going to change."

The study could not identify the reason for a correlation between TV watching and future diet, but several possibilities exist. For one, some people may have a general disposition toward eating poorer diets and watching a lot of TV.

Or, embedded in the habit of watching television may be factors that steer adolescents toward lower-quality diets.

"Food advertising is a possibility. Repeated exposure to these [unhealthy] foods [in ads] may lead adolescents to consume more of them," Barr-Anderson speculates.

A second candidate is the tendency to eat while parked in front of the tube.

"Studies have shown that adolescents consume a lot of their caloric intake while watching TV," Barr-Anderson says. But in order to pinpoint a culprit, "there's a great need for more investigations."

Parents who want to guide their children toward healthier habits should--to the best of their ability--place firm caps on the amount of TV viewing and monitor what types of food the kids are eating, says Barr-Anderson, who notes that the American Academy of Pediatrics recommends only "quality" television for no more than two hours a day. She would also like to see less advertising of high-calorie, sugary, and fatty foods on television.

But parents also have to monitor themselves.

"I think kids see what their parents are doing," she points out. "Until it becomes the norm in the family not to sit in front of the TV for hours or eat junk food, it's not going to change."

The study is published online in the *Journal of Behavioral Nutrition and Physical Activity*.



Cellulosic ethanol scores high

February 3, 2009

Ethanol from cellulose may mean lower costs to health and the environment than gasoline or corn ethanol

By Becky Beyers

Saying "fill 'er up" with cellulosic ethanol instead of gasoline or corn-based ethanol may be even better for our health and the environment than previously recognized, a new University of Minnesota study shows.



Cellulosic ethanol—made from wood, grasses, or the non-edible part of plants—has fewer harmful effects on human health because it emits smaller amounts of fine particulate matter, an especially damaging component of air pollution, the researchers find.

Ethanol made from cornstalks and other biomass holds promise for reducing health hazards as well as pollution.

Earlier work showed that cellulosic ethanol and other new biofuels also emit lower levels of greenhouse gases.

The study will be published in the journal *Proceedings of the National Academy of Sciences* later this month and will be posted online this week.

"Our work highlights the need to expand the biofuels debate beyond its current focus on climate change to include a wider range of effects, such as their impacts on air quality," says lead author [Jason Hill](#), a resident fellow in the University of Minnesota's Institute on the Environment.

The study is the first to estimate the economic costs to human health and well-being from gasoline, corn-based ethanol, and cellulosic ethanol made from biomass.

The researchers found that depending on the materials and technology used in production, cellulosic ethanol's environmental and health costs (19 to 32 cents per gallon) are less than half the costs of gasoline (71 cents per gallon), while corn-based ethanol's costs (72 to about \$1.45 per gallon) range from roughly equal to about double that of gasoline.

Watch a [video](#) of Jason Hill discussing his research into cellulosic ethanol.

"These costs are not paid for by those who produce, sell, and buy gasoline or ethanol. The public pays these [health and environmental] costs," says study co-author [Stephen Polasky](#), a professor in the University's applied economics department.

The authors looked at pollutants emitted at all stages of the life cycles of the three types of fuel, including when they are produced and used. They considered three methods of producing corn-based ethanol and four methods of producing cellulosic ethanol.

"To understand the environmental and health consequences of biofuels, we must look well beyond the tailpipe to how and where biofuels are produced. Clearly, upstream emissions matter," Hill says.

The paper also points out that other potential advantages of cellulosic biofuels, such as reducing the amount of fertilizer and pesticide runoff into rivers and lakes, may also add to the economic benefit of transitioning to next-generation biofuels.

Regents Professor [David Tilman](#) of the University's ecology, evolution and behavior department also contributed to the paper, as did scientists from Stanford University and the Argonne National Laboratory of the U.S. Department of Energy. The Initiative for Renewable Energy and the Environment, a signature program of the University of Minnesota's Institute on the Environment, provided a portion of the research funding.



Salty lake cities

February 17, 2009

Road salt accumulates in metro-area waters, a new study finds

By Maia Homstad

Road salt used throughout the winter is making the state's lakes, rivers, and groundwater saltier, a situation that could harm aquatic life and drinking water, according to a University of Minnesota study. But additional training of snow plow drivers and more judicious use of road salt could help lessen the impact and save the state money.



Road salt isn't staying on the roads; it's getting into Twin City waters, a new University study shows.

The researchers studied 39 lakes, three major rivers, 10 tributaries, and numerous observation wells. Their results came as a shock: About 70 percent of the road salt being applied in the metro area is retained in the watershed. The University researchers recently reported their findings to the Local Road Research Board, which funded the study.

Nearly 350,000 short tons of road salt, in the form of sodium chloride, are applied for de-icing in the seven-county Twin Cities metro area every year.

"Nobody has asked the question, 'Where does the road salt go after the winter is over and roads are safer?,'" says research team leader [Heinz Stefan](#), a civil engineering professor at the University's St. Anthony Falls Laboratory. "Our study has been concerned with that question in particular."

Watch a [video](#) of Heinz Stefan and Eric Novotny discussing their research.

Stefan, along with Eric Novotny, Andrew Sander, Dan Murphy, and Omid Mohseni, tracked the movement of chloride applied by humans throughout the metro area water system, distinguishing it from salt of geological or natural origin. They found that the salinities (the concentration of chloride ions in milligrams per liter, or mg/L) of 39 metro area lakes have increased over the past 22 years, following a similar trend in road salt purchases by the state of Minnesota.

Although there is much variation, the median salinity in metro-area lakes stands at about 87 mg/L. It is rising at about 1.5 mg/L per year, which puts it on course to double in 58 years. The Minnesota Pollution Control Agency has set a salinity standard of 250 mg/L (equivalent to a teaspoon of salt in five gallons of water) for surface waters designated important for aquatic life and recreation.

Some lakes already exceed that salinity, especially in March and April, when snow melt washes salt into lakes and rivers. Highest were the surface waters of Spring Lake--essentially a storm detention pond near I-394 in Minneapolis--which showed an average salinity of 505 mg/L, with an annual maximum of 1018 mg/L. On the low end, White Bear lake posted average and maximum salinities of 31 and 43 mg/L, respectively.

In contrast, metro-area lakes had near zero salinity in the 1950s, when road salt application began.

The long-term effects could be severe. Various studies have shown that continuous salinities of 250 mg/L can be harmful to aquatic life and can affect the taste of drinking water. In 2008 the Minnesota Pollution Control Agency listed five metro area streams as already impaired by chloride. Increases in sodium and chloride have been shown to decrease the biodiversity in wetland areas, altering the development of wood frogs, decreasing the number and types of fish available, and increasing mortality rates of organisms that rely on an aquatic system. Increases in sodium and chloride have also been shown to increase mobilization of heavy metals in the soil along major highways.

To help reduce the effects of rising salinities, winter road managers for counties and cities and at the Minnesota Department of Transportation recommend more judicious use of road salt by training snowplow drivers to get the most out of the amounts they apply. For example, using sodium chloride at pavement temperatures below 15 F is generally not effective. At higher temperatures, the managers suggest using liquid salt solutions (brines) at a rate of only one to three cups of salt per 1,000 square feet, and applying the salt prior to snowfall events. Training began at the University of Minnesota two years ago; since then the University has reduced use of road salt by 41 percent, and it saved more than \$50,000 in the first year.

Other, less harmful chemicals that increase winter road safety are available, but they cost more, Stefan says.

A pdf of the [report](#) is available.



A textbook effort

February 17, 2009

U Bookstore navigates options to ease textbook pain for students

By Rick Moore

Late in the afternoon of January 20, as the sun was setting on the first day of spring semester classes, the cash registers at the U Bookstore in Coffman Union were abuzz. Thirty-three tills in the textbook section were churning out transactions, and a trail of students marched with bookstore bags in hand—or with bags in each hand as counterweights—toward the exit.

Twice a year, this back-to-school shopping ritual elicits groans and complaints from students because for many, a backpack full of heavy books means a considerably lighter wallet.



A recent survey indicated that the average College of Liberal Arts student spends a little more than \$900 per year on books and the average science student just over \$1,000.

Photo: Patrick O'Leary

"It's freaking expensive," says Young Hong, a University of Minnesota senior majoring in accounting.

A quick survey of students who were cracking open their new textbooks bore out the relative truth of that statement. Hong and two acquaintances had spent from between \$400 and about \$600 for the spring semester, and that followed \$700 in textbook purchases for Hong last fall.

Kirsten Hellquist claimed the highest tab of the half dozen students sampled. The junior biology major blurted out the figure that was obviously at the top of her head: \$960 spent on textbooks for the spring. She says she usually averages about \$750 and has never had a semester under \$500.

A host of factors conspires to make students unhappy about textbook prices, but one non-factor, ironically, is the refrain heard most often—that the U Bookstore is making a huge profit at their expense. In reality, the University Bookstore has one of the lowest gross margins (the difference between how much it pays publishers for books and the selling price) among its large-school peers. And it is in the middle of a string of initiatives to help ease students' pain and give them more options.

A complex equation

The cost of textbooks has been an issue for decades, according to Bob Crabb, the director of University Bookstores since 1993. He says a recent survey indicated that the average College of Liberal Arts student on the Twin Cities campus pays a little more than \$900 per year on books; the average science student just over \$1,000.

"A textbook costs more than a best-selling novel and people don't understand why that needs to be," says Crabb. But "textbook publishers need to spread their development and production costs over a much smaller [reader] base. And the development costs for a textbook are much higher than for a novel or general book."

"Textbooks are very expensive, and textbook publishers have a monopoly," he adds. "Once the professor has chosen the textbook, the bookstores around the country don't have any bargaining power [with the publisher]."

It may come as a surprise that college bookstores operate at a relatively small gross margin for textbooks. Crabb says that 25 percent is the norm, which compares to a margin of about 31 percent for Target (for all merchandize), and 40-45 percent for Macy's. He expects the U to operate at a gross margin of less than 20 percent for the current academic year. If that happens, it's likely to be the lowest margin of any of the 86 stores in the National Association of College Stores' Large Stores Group, Crabb says.

Trying to meet the appetite for used books

Buying used books can be a great way for students to knock off a substantial share of the price of an expensive textbook... when used books can be found. "There's only used-book prices; there's no used books," jokes student Kyung Hoon Kim.

The lack of used books for certain courses can be a common complaint among students. But providing them for students is not as easy as one might think.

According to Crabb, once textbook choices are made by faculty, the University Bookstore checks on their availability from the approximately half dozen used book wholesalers. The U also estimates how many of those titles it may be able to buy back from its own students. After calculating the availability of used books, it places the order for the new books that are necessary.

Profits from new books are no greater for the U than for used books. "It's exactly the same margin," says Crabb, adding, "We try to get absolutely as many used books as we can."

In fact, rather than having a wholesaler come in and run a used book buyback, the U Bookstore buys books directly from students and stores them in a warehouse off campus. That means additional costs for storage and the need to sell some excess titles to wholesalers down the road, but it's a risk Crabb is happy to take. "We think it's making sense financially, and it's definitely giving the students a lot more used books."

Crabb says that the model that the University is striving for, whenever possible, is for students to be able to buy a used book for 75 percent of the cost of a new book, then sell it back at the end of the semester for 50 percent of the new price. For a \$100 book, the net expense for students would be \$25. Faculty play an important role in this equation and need to let the Bookstore know of their next semester's book choices well before the finals week buyback period.

Another factor that hinders colleges around the country is the distaste publishers have for used books in general. If books can be recycled three or four times over, the profits for publishers and authors are diminished. Hence, publishers are coming out with new editions more frequently than they used to in an effort to quash used book sales, Crabb says.

Nonetheless, he notes that used book sales at the U are up 93 percent over the last five years, "and that's because of some very deliberate efforts we've made to go after that [used book] business."

Faculty join the cause

Some U faculty are asserting their collective bargaining power on behalf of students. For example, a group of professors agreed on five textbooks that they deemed would be acceptable in teaching a biochemistry course. They then went to publishers asking for their lowest bids for those books, and found one for \$86—a savings of more than \$60 for students.

Given the large number of students in certain U courses, it makes sense that publishers would go out of their way to offer a more lucrative deal. "We recommend that as a model for faculty members to use in approaching publishers," Crabb says.

Electronic books are becoming another option for some students. When e-books are offered, students take a card from the bookstore shelf to the register. On their receipts, they are given a URL and a PIN code to access a site where they can access the contents of the book. For one calculus class at the U, an e-book cost students \$37, compared to \$150 for the paper version.

The Bookstore is also testing the feasibility of renting textbooks, with a limited number of offerings last fall and again this spring. The rental fee for students is about one-third the cost of a new textbook, but of course they have to return it after the semester is completed.

Crabb says students seem to appreciate the option, but it might be too early to tell whether or not they'll miss not having the option to keep the books. And from the University's standpoint, it's imperative to pick textbooks that have a substantial shelf life. Says Crabb: "It probably has to be rented four times in order to get your costs back."

One-stop shopping

The bottom line is, as trends and technologies change, the Bookstore is doing its best to stay ahead of the curve—and to stay in business. "If it were just textbooks, college stores wouldn't be able to make it financially," Crabb says. That's where the other bookstore staples come into play—clothing, gifts, and trade books—that have a higher margin. "We're trying to maximize all those businesses to keep the textbook [prices] down."

While he encourages students to continue to shop around for the best deals, he hopes that the U Bookstore can continue to be the preferred one-stop shopping destination for all of a student's textbook needs.

"And it has to be at a reasonable price," he adds. "It can't be overpriced or no one will come."



Dry spells spelled trouble in old China

February 18, 2009

In ancient China, drought may have helped topple dynasties

By Deane Morrison

History does not record whether Chongzhen, the last of China's Ming emperors, appreciated his country's summer rains. Let's hope he did while they lasted, because new evidence suggests a letup in those rains could have fueled the popular uprising that toppled Chongzhen and his 276-year-old dynasty in A.D. 1644.

China has seen many dynasties rise and fall, but a study led by U researchers and their colleagues at China's Lanzhou University has identified a weakening of the summer Asian Monsoons as a possible last straw for some of them. Such

weakening, and the attendant loss of precipitation, accompanied the fall of three dynasties and now could be reducing rainfall in northern China again.

The work rests on climate records preserved in the layers of stone in a 4.6-inch stalagmite found in Wanxiang Cave in Gansu Province, China. The stalagmite built up over 1810 years; stone at its base dates from A.D. 190, and stone at its tip was laid down in A.D. 2003, the year the stalagmite was collected.

"It is not intuitive that a record of surface weather would be preserved in underground cave deposits. This research nicely illustrates the promise of paleoclimate science to look beyond the obvious and see new possibilities," says David Verardo, director of the U.S. National Science Foundation's Paleoclimatology Program, which funded the research.

By measuring amounts of the elements uranium and thorium throughout the stalagmite, the researchers could tell the date each layer was formed. And by analyzing the "signatures" of two forms of oxygen in the stalagmite, they could match amounts of rainfall—a measure of summer monsoon strength—to those dates.

"Summer monsoon winds originate in the Indian Ocean and sweep into China," explains study leader Hai Cheng, a research scientist at the University of Minnesota. "When the summer monsoon is stronger, it pushes farther northwest into China."

These moisture-laden winds bring rain necessary for cultivating rice. But when the monsoon is weak, the rains stall farther south and east, depriving northern and western parts of China of summer rains. A lack of rainfall could have contributed to social upheaval and the fall of dynasties.

The researchers discovered that periods of weak summer monsoons coincided with the last years of the Tang (A.D. 618-907), Yuan (A.D. 1271-1368), and Ming (A.D. 1368-1644) dynasties, which are known to have been times of popular unrest. Conversely, the research group found that a strong summer monsoon prevailed during one of China's "golden ages," the Northern Song Dynasty (A.D. 960-1127). The ample summer monsoon rains may have contributed to the rapid expansion of rice cultivation from southern China to the midsection of the country. During the Northern Song Dynasty, rice first became China's main staple crop, and China's population doubled.

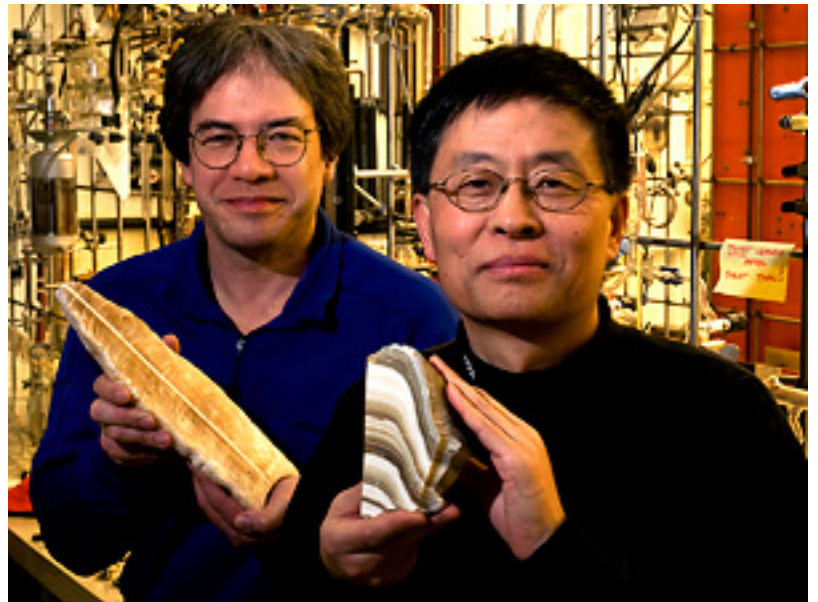
"The waxing and waning of summer monsoon rains are just one piece of the puzzle of changing climate and culture around the world," says [Larry Edwards](#), a professor of geology and geophysics and a 2009 Guggenheim Fellow. For example, the study showed that the dry period at the end of the Tang Dynasty coincided with a previously identified drought in Meso-America that has been linked to the fall of the Mayan civilization.

The study also showed that the plentiful summer rains of the Northern Song Dynasty coincided with the beginning of the well-known Medieval Warm Period in Europe and Greenland. During this time—the late 10th century—Vikings colonized southern Greenland. Centuries later, a series of weak monsoons prevailed as Europe and Greenland shivered through what geologists call the Little Ice Age. In the 14th and early 15th centuries, as the cold of the Little Ice Age settled into Greenland, the Vikings disappeared from there. At the same time, on the other side of the world, the weak monsoons of the 14th century coincided with the end of the Yuan Dynasty.

A second major finding concerns the relationship between temperature and the strength of the monsoons. For most of the last 1810 years, as average temperatures rose, so, too, did the strength of the summer monsoon. That relationship flipped, however, around 1960, a sign that the late 20th century weakening of the monsoon and drying in northwestern China was caused by human activity.

If carbon dioxide is the culprit, as some have proposed, the drying trend may well continue in Inner Mongolia, northern China, and neighboring areas on the fringes of the monsoon's reach, as society is likely to continue adding carbon dioxide to the atmosphere for the foreseeable future. If, however, the culprit is man-made soot, as others have proposed, the trend could be reversed, the researchers said, by reduction of soot emissions.

Lawrence Edwards is the George and Orpha Gibson Chair of Earth Systems Sciences and a Distinguished McKnight University Professor.



Researchers Lawrence Edwards and Hai Cheng display stalagmites. These cave features are storehouses of climatic information.

Photo: Erika Gratz



What's that sound?

February 18, 2009

The U's annual Spark festival showcases electronic music

By Matt Sumera

Much of what we hear nowadays is a form of electronic music, from cell phone ring tones to the latest film soundtrack, from the sound of Xboxes and Wiis to the tunes at the top of the Billboard Hot 10.

And yet, for many listeners, the idea of electronic music seems impossibly abstract and obscure. The Spark Festival of Electronic Music and Arts, scheduled from February 17-22, aims to change that. Now in its seventh year, the festival, as co-artistic director and Associate Professor of Music Composition Douglas Geers notes, is meant to "open the door and invite people in."



Part of the U's Art to Z seasonal events program, the Spark festival highlights the quirky yet increasingly common world of electronic music

Spark is a world-class music festival, a training ground for composers, and a "community engagement tool putting creators and audiences together," according to Geers. "It's R & D for things that might appear in popular music, musical theater, science fiction movies, and so on in the future."

A brief history of electronic music

In 1626, Francis Bacon wrote about "sound-houses" in his utopian tale, *The New Atlantis*: "We have also sound-houses, where we practise [sic] and demonstrate all sounds and their generation. We have harmony which you have not, of quarter-sounds and lesser slides of sounds . . . we make divers [sic] tremblings and warblings of sounds, which in their original are entire."

Such dreams of expanding the limits of known sounds have long interested composers and musicians alike. It is this yearning—to create something that has never before been heard—that has driven the development of electronic, computer, and other forms of experimental musics. Lamenting the limits of the orchestra in 1916, Italian Futurist composer Luigi Russolo wrote in his manifesto, *The Art of Noise*, "we must break out of this limited circle of sounds and conquer the infinite variety of noise-sounds."

By mid-century composers, scientists, radio engineers and a host of others began to make the early dreams of unlimited sound creation a reality.

Pierre Schaeffer, a French radio technician, created one of the most famous early tape collages, "Étude aux chemins de fer" (1948), entirely out of train sounds, in the process defining a whole new musical genre, *musique concrète*. The American composer John Cage's early composition, "Williams Mix" (1952), is made up of five hundred sounds, including city sounds, country sounds, electronic sounds, and small sounds requiring amplification to be heard at all. And as an early realization of Bacon's "sound-houses," French composer Edgar Varèse developed his famous piece, "Poème électronique," for the 1958 World's Fair, a sound installation using four hundred loudspeakers to create a fully immersed, walk-through listening experience, effectively mixing the worlds of sound, music, art, and sculpture.

Creative collaboration

While interdisciplinary research is a common academic catch phrase these days, electronic and computer music has always functioned across disciplinary lines. Without the collaboration of composers, scientists, mathematicians, musicians, computer programmers, acousticians, artists, and others, the soundscapes of electronic music would sound very different today.

Some of the most famous composers of electronic music, in fact, have come from a variety of professions outside of music. The celebrated Greek composer Iannis Xenakis, for example, was originally trained as an architect, later employing the laws of statistics and calculus as forms of compositional practice.

The "father of computer music," Max Mathews, developed his groundbreaking theories while he was the director of the Acoustics Research Department at Bell Telephone Laboratories, the research base of AT&T. Bell Labs, itself, was an important center in the history of computer music, representative of the tie-ins between such music and industrial uses. As Paul Théberge notes in his book *Any Sound You Can Imagine: Making Music/Consuming Technology*, the later development of synthesizer and digital keyboards for home use resulted in "an interdependence between various industrial sectors, including the microprocessor, computer, digital audio, and musical instrument industries."

The merger of high and low

While all of these developments may sound rather arcane, they influenced a variety of broad trends in popular music. Varèse, for example, was a favorite of Frank Zappa. Perhaps more noteworthy, The Beatles were greatly influenced by the sounds of electronic and computer music, producing their most notable experiments as early as 1966, ending their album, *Revolver*, with the heavily manipulated song, "Tomorrow Never Knows." Indeed, their debt to electronic music was so great that they even included an image of one of the most important electronic composers, Karlheinz Stockhausen, in the famed montage on the cover of *Sgt. Pepper's Lonely Hearts Club Band*.

In a reverse of these influences, popular music trends are now having an impact on current electronic compositions.

While Varèse, Stockhausen, Xenakis, and others may define one path into electronic music, the sounds of reggae, dub, hip hop, and countless dance forms are another path. For composers of electronic music, acknowledging the influences of popular music has been a slow generational change. But as Geers notes, younger composers are realizing "there's something beautiful about both Johnny Cash and Xenakis." And at the Spark festival, one has the chance to hear it all.



And so we write it down

February 24, 2009

New Regents Professor Madelon Sprengnether writes about the mind

By Adam Overland

Books line the walls of Madelon Sprengnether's office in Lind Hall. She's read most of them. At home, she admits, she doesn't have enough bookcases to hold her collection. Knowledge is built like this; sometimes, what we know is so much that we cannot hold it all in our mind, and so we write it down.



Madelon Sprengnether, a new Regents Professor of English, has published widely on Shakespeare and Freud.

Photo: Kelly MacWilliams

Sprengnether might argue that last point, insisting that our minds hold far more than we'll ever know and won't easily give up our memories. Sometimes, writing can act as a way to find what we've forgotten about ourselves.

A University professor of English, Sprengnether is also a writer and literary scholar whose works add the weight of experience to what is, at once, the burden and lightness of the human condition.

Strange bedfellows

Elected a Regents Professor (the University's highest faculty rank) last spring, Sprengnether has taken on two of the central figures in Western culture—Shakespeare and Freud—and changed the way we see them.

"I've been lucky to be at a university, in a department, and in a particular moment of time when I could follow my interests," she says. "Nobody has ever said, 'You can't write about [that] because that's not in your contract.'"

The unifying thread in her long body of work? "My interests are intensely psychological, and they always have been. I've always wanted to tell the truth," she answers.

"I've been lucky to be at a university, in a department, and in a particular moment of time when I could follow my interests. Nobody has ever said, 'You can't write about [that] because that's not in your contract.'"

Besides Shakespeare and Freud, she has published widely and influentially on contemporary female writers and feminist psychoanalytic theory. Her co-edited collection "The (M)other Tongue" was the first anthology to bring together essays in feminist psychoanalytic criticism and firmly established the field. Her book "The Spectral Mother: Freud, Feminism and Psychoanalysis" analyzed Freud's avoidance of the figure of the mother in his writing, while offering a new theoretical position regarding the pre-oedipal period.

Sprengnether was also a core member of the group of scholars who founded the U's Women's Studies Program and the Center for Advanced Feminist Studies.

Changing the U

In the mid-1990s, Sprengnether almost single-handedly changed the fate of the graduate Creative Writing Program in English by spearheading the movement of the M.A. in Creative Writing degree to the full M.F.A. degree necessary for national competition.

As director of Creative Writing during that time, she dramatically upgraded the infrastructure of the program to meet the demands of national visibility and distinction. She redesigned the curriculum, building an ambitious program of visiting writers, enhanced publicity, contacts with the Twin Cities literary community, full funding for incoming students, and opportunities for students to write reviews.

The results: In 10 years the University's M.F.A. program has risen from a position near the bottom to 11th among 274 programs ranked by the national organization Poets and Writers.

Things looked different when Sprengnether came to the University in 1971. In her college days, "There was just a handful [of M.F.A. programs], notably the Iowa Writers' Workshop," she says. "You didn't have many options if you wanted to get a graduate degree in creative writing. If you were interested in writing, you did that on your own, or you found like-minded people to form a community."

That's exactly what Sprengnether found herself doing at the University—forming a community that recently ranked third nationally in a poll of preferences expressed by more than 10 percent of the total M.F.A. applicant pool in the United States. This ranking circulates widely and will no doubt affect the number of applications to the M.F.A. program this year, says Sprengnether.

"Only Iowa and Michigan are ranked above us in this poll, so we've made it into the top three," she notes.

The malleability of fate

Lately, Sprengnether has been researching memory.

"I was blown away by some of the things I read. We think of the past and present as being completely separate, but, in fact, your memory is something that can only happen in the present, so what does that mean? It dramatically overturned my sense of the function of memory. Is the past fixed? Evidently not your personal past," says Sprengnether.

What it amounts to, she explains, is that science is changing our metaphors. Memory is no longer a fixed place—it's shifting around.

"The upside is, maybe you really can change your past by the way you think about it," she says. "If you've had something really bad happen to you, then it doesn't have to stay that bad. It makes the past seem more open and fluid than I ever thought."

Through her personal experience she's putting the changing metaphor of memory into words in an upcoming book. Her explorations start with an old memory that at the time seemed to mean little:

"I had a stepfather who was in my life for about four-and-a-half years when I was a teenager," Sprengnether says. "It was at a time in my life when I could not pay attention to him as a person—didn't want to know him, didn't get to know him, and knew as little about him as a person as I could know, and then he was gone. He killed himself."

"My life went on, and I didn't think about it. A few years ago, I started thinking about my teenage years and about his place in my life. ... I started to realize how much he set me on the path that I followed in an educational sense, and, in fact, when I looked back I thought, 'He gave me my career without my knowing it, and I owe him for that—a lot.'"

For more about Madelon Sprengnether, see her [departmental Web site](#) or her [alumni site](#).

Other Regents Professors named with Sprengnether are Allen Goldman, physics; Steven Ruggles, history; and Eric Sheppard, geography. In spring 2009, three open professorships will be filled, bringing the total number of Regents Professors to 30. Faculty are invited to submit nominations by March 9. For more information, see [Regents Professorship](#).



TORT returns to Pantages

February 26, 2009

Annual Law School musical will be
March 6 and 7

By Rick Moore

The unlikely marriage of law school and musical theater has become a new rite of spring at the U—an alternate version of "March Madness." And this year's ceremony stands to be the biggest and best production to date.

The University of Minnesota Law School's Theatre of the Relatively Talentless (TORT) will present its seventh annual musical, "It's a Wonderful Law School," on March 6 and 7 at Pantages Theatre in downtown Minneapolis. Like all previous TORT productions, the musical was produced entirely by Law School students.



Law students perform in the 2008 TORT musical at the Pantages Theatre.

"It's a Wonderful Law School" (loosely based on Frank Capra's classic, "It's a Wonderful Life") follows the story of Georgie, a kind and caring third-year law student who finds herself doubting her decision to go to law school and considering a transfer to (gasp!) the Carlson School of Management. (Disclaimer: The previous sentence is from the promotional copy from the Law School and is in no way an indictment of the Carlson School.) Clarice, a new professor trying to earn tenure, is assigned to help Georgie avoid that horrible mistake (same disclaimer) by showing her what the Law School would have been like without her. From there, the hijinks ensue.

The cast of characters includes names you'll recognize from the Capra classic, including Sam Wainwright, Bert and Ernie, and the irrepressible flirt Violet. And the TORT production's equivalent of Mr. Potter is every bit as mean-spirited and intimidating as the "It's A Wonderful Life" antagonist. We'll leave it at that.

Putting together an original, full-length musical parody with a Law School twist provides a creative outlet for law students and faculty, and that was the impetus behind TORT's founding in 2002.

"It's a fantastic outlet for a bunch of weary students who spend way too much time in the library," says the show's director Gil Castro, a third-year law student who had leading roles in the last two productions. "The show is a blast to do, and as it turns out, it's going to be a great show."

More than 100 students are participating in this year's production as writers and as members of the cast, crew, and band. True to TORT tradition, all law students are allowed to participate, without regard to talent.

Another benefit of the show, Castro points out, is that first-year law students get to mingle with second- and third-year students, which doesn't always happen. "Most of my best friends in law school I've made through TORT," he says.

The TORT cast performed a full run-through of Act 1 at the Law School's Auerbach Commons on February 22 in front of a single visitor, as well as the staid countenances of the portraits of former deans Robert A. Stein and Carl A. Auerbach. The script was rife with references to Walter Mondale, the faculty who teach in his namesake building, and even the rival law schools in the Twin Cities and beyond. And the musical numbers could barely be contained in the confines of the commons, suggesting a more proper venue at the Pantages.

Will Georgie stay at the Law School or transfer to (gasp!) Carlson? Will Clarice earn her tenure? Will the cast of TORT have any energy left to enjoy a proper spring break? You can find out the answers to at least two of those questions by attending one of the shows. But one thing is certain. Despite the clever name behind the acronym, this is not a relatively talentless bunch.

Tickets, which are \$17 (\$12 for students with ID), are available at the State Theatre box office or through Ticketmaster. University students can e-mail tort@umn.edu for on-campus ticketing procedures. Advance purchase is recommended. For more information about "It's a Wonderful Law School," visit [TORT](#).

Courtly cameos

As per TORT tradition, there will be special cameo appearances by Law School faculty and prominent members of the legal community. Schedule to appear at the 2009 production are former Vice President Walter Mondale (1956 alum), U.S. District Court Judges James Rosenbaum ('69) and John Tunheim ('80), Minnesota Supreme Court Justices Paul Anderson ('68) and Lorie Skjerven Gildea, and Chief Justice Eric J. Magnuson.



Making their mark

February 27, 2009

Twins Jocelyne and Monique Lamoureux provide boost for top-ranked Gophers

By Rick Moore

Jocelyne and Monique Lamoureux walked toward the front doors of Ridder Arena a few minutes in advance of a scheduled interview. As they were approaching, it didn't take long to figure out who they were; all that shared DNA tends to be a dead giveaway. And a quick look at the numbers on their coats offered the final clue: 12 and 21.

Numbers 12 (Jocelyne) and 21 (Monique) may ultimately be to Minnesota women's hockey what Nos. 13 and 4 (Whalen and

McCarville) were to women's basketball five years ago. Time will tell on that one—since the Lamoureuxs follow in the footsteps of many outstanding Gopher hockey players—but in just their first season at the U, they've taken the hockey world by storm.

Monique leads the nation in scoring with 67 points (33 goals and 34 assists). Jocelyne is fourth in the country and second on the Gophers with 56 points. Between the two of them, they were named WCHA Rookie of the Week five times (Monique four times and Jocelyne once). They've each been named WCHA Offensive Player of the Week once, and they shared that honor on January 21 after a remarkable series against Bemidji State.

Moreover, they've been key additions this season to a Gophers team that is ranked No. 1 in the country and last weekend wrapped up its first regular-season WCHA title since 2004-05.

The individual statistics have turned some heads, too. Monique and Jocelyne are among the 43 nominees (along with fellow Gophers Gigi Marvin and Melanie Gagnon) for the Patty Kazmaier Memorial Award, presented each year to the top player in Division I women's hockey. Not bad company for freshmen.

Certainly, not everyone in the hockey world knows who the Lamoureuxs are—yet—but they may have a few more fans in Manhattan. The twins were profiled this week in a feature in the *New York Times*. From the *Minnesota Daily* to the *Times*... Impressive.

Growing up in the Great White North

The Lamoureuxs come about their athletic abilities and hockey prowess naturally. Their father, Jean-Pierre, was a goalie for a North Dakota team that won two national championships in the early '80s. Their mother, Linda, swam in college and has since become a marathon runner.

But their brothers may be their biggest influence, because they all competed on the same sheets of ice in their hometown of Grand Forks, North Dakota. Jean-Phillippe was a standout goalie for North Dakota who is now playing in the East Coast Hockey League. Jacques plays for Air Force, Pierre-Paul at the University of Manitoba, and Mario at UND.

As kids, "We always wanted to tag along and join with [our brothers]," Monique says. "When you play with them, you don't want them to think that [you're not very good], so you're always trying hard, because you want to prove yourself."

She has especially fond memories of practicing with her brothers' teams and getting pointers on playing defense from Pierre-Paul. "When you get to interact with your siblings in that way, it's definitely a bond you share," she says. "It's fun getting to play with them."

And they didn't just hang out with the guys on the ice. "Growing up, the girls would... I don't know what kind of games they'd play at recess. But when we came out, we'd go play football with the guys, and we'd be the only girls out there," says Jocelyne. "I think it definitely helped our competitiveness."

Even though their father and two brothers had allegiances to North Dakota, UND was not on Jocelyne's and Monique's final list, and they occasionally take some good-natured ribbing for that. "Growing up in Grand Forks, there was, I'd say, a unifying dislike for the Gophers," Jocelyne notes.

The choice came down to Minnesota and the Wisconsin Badgers, whom the Gophers edged out by a single point this year to win the league title. They made their decision while on a visit to Ridder Arena to watch a game against, of all opponents, Wisconsin. "During warm-ups, we were up in the concourse. We just kind of looked at each other like, 'Yeah, this is where we're going to go,'" Jocelyne says.

Helping put a good team over the top

Monique and Jocelyne aren't the only high-octane players on the Gophers; in fact, senior co-captain Marvin notched three goals in the season-ending series against St. Cloud State and has 24 for the season, the same total as Jocelyne. But the Lamoureuxs provide a measure of potential energy, along with linemate Brittany Francis, which puts opposing teams—and fans—on notice.

When the Lamoureuxs break out of their own zone to neutral ice, the crowd starts to stir in anticipation of some magic. Often, when they're on the ice and the Gophers are short-handed, their opponents appear no better off with an extra skater. (Monique's four short-handed goals this year are tied for second in the nation.)

Speaking of penalties, Nos. 12 and 21 are not exactly angels in Gophers clothing. Jocelyne leads Minnesota in penalty minutes, and Monique is not far behind. If their game leans toward being a bit too physical, you can blame it on the boys, especially the brothers.

"I remember when we were playing street hockey, my brother (Jacques) slashed me pretty hard on the back of the leg. Actually, it was very hard," Jocelyne says. "And I ran in crying to my mom and she just said, 'If you're going to play with the boys, that's going to happen.'"

Yes, they have taken their share of hits, and they've come back to the pond/rink/arena after every one. But that's not the entire story. "We held our ground pretty good," Jocelyne says without much of a smile. "We definitely weren't the receiving party of every hit." So it may be a good thing for opponents that checking isn't allowed in women's hockey.

Beyond that, their games are very similar. "I think she's better out of the corners than I am—passing the puck and threading it through people's sticks," says Monique. "I think I'm better at getting open in those situations and she's better in the passes, so it works out nicely. Other than that, I'd say she's probably a better stick-handler than me, but I think I probably have a little harder slap shot."

On the twins intuition thing

The Lamoureuxs were asked if their sense for each other on the ice is due more to having played together for so many years, or to some intangible intuition that twins share.

"I think it's a little bit of both," says Monique. "If she goes into a situation during a game, I can pretty much know what she's going to do with it. I'd say it's more of a predictability thing than a twin intuition thing."

"It's a twin thing from always being together," Jocelyne suggests. "Being with someone that much, you just know what they're going to do. You know how they'll react."

Monique and Jocelyne also share something with all four of their brothers—"matching" tattoos that the siblings decided to get over winter break. Apparently, Pierre-Paul came up with the design, and a tattoo artist came to the house. However, no one informed their father about the plan, and he wasn't exactly overjoyed when walking into the parlor. "I wasn't there, but I don't think he was too happy," Jocelyne says. "I think he's softening up to the idea, though."

The design includes a crest with half a star and half a maple leaf, representing the American and Canadian heritage of their mother and father. And the crest is surrounded with six hearts, representing each of the siblings. Jocelyne showed off her tattoo at the interview, but points out that hers is smaller than everyone else's—lacking wings and the Lamoureux surname. "I wasn't really big on tattoos, but everyone was doing it," she says. "I got the more modest version of it."

Jocelyne was asked if she and Monique share any quirky habits of note, perhaps a unique pre-game superstition. "No, I'm not really superstitious, I guess," she says. "I think that just leaves room for excuses." And, as she and her sister learned from playing with the boys, there is precious little room in hockey for those.

March 9 update: The Gophers enter the NCAA tournament as the No. 2 seed following a 5-3 loss to Wisconsin in the championship game of the WCHA Final Faceoff yesterday. Minnesota will host Boston College in a quarterfinal game at Ridder Arena on Saturday, March 14, at 4 p.m. The winner will move on to the NCAA Frozen Four March 20 & 22 in Boston. For more information, see GopherSports.com.



Monique Lamoureux (center) and sister Jocelyne (right) celebrate a goal against Harvard earlier this season.

Photo: courtesy University Athletics



Honey, I shrunk the cranium

March 2, 2009

Shrinking made Indonesian 'hobbit' fossils look deceptively like modern humans

When the remains of the pint-size 'hobbits' on the Indonesian island of Flores came to light in 2003, the discovery rocked the anthropology world.

Were they small modern humans, or a new species?

"The skeletons dated between 90,000 and 12,000 years ago, a period during which modern humans walked the earth," says University anthropologist Kieran McNulty. So the modern human theory was a possibility.



University anthropologist Kieran McNulty studied the fossil Indonesian "hobbit" skull.

Photo: Kelly MacWilliams

The answer hinged on the enigmatic nature of the one complete cranium discovered, which is named LB1 after the Liang Bua cave where it was found. Its facial features bear some resemblance to a modern human's. But the braincase is small, housing a brain only 30 percent the size of a modern human's.

And that's where McNulty comes in. In a study with Karen Baab of Stony Brook University Medical Center, he concluded that the hobbit people acquired their facial resemblance to modern humans as a consequence of shrinking in stature. And that's what it is: only a resemblance, and only in facial features.

The incredible shrinking method

If LB1 was a modern human, then modern humans that shrank over evolutionary time should end up with skulls bearing LB1's features. But if it was more closely related to an ancestral species of human, then that species, if shrunk, would develop skulls like LB1.

In other words, if a modern human and a fossil human species were both three feet tall, whose skull would more closely resemble LB1? The answer would point to LB1's next of kin.

McNulty and Baab could not, of course, actually shrink whole human generations. But they could simulate that. To do it, they compared cranial features in large modern humans to small ones like Andaman Islanders and the Khoe-San (pygmies) of Africa. They also compared skulls of large African apes (gorillas) to those of smaller chimpanzees and bonobos.

They noted that whether for humans or apes, the various parts of the skull rearranged their proportions in the same way with smaller body size. For example, as body size decreases, brains and eyes get relatively larger and the height of the cranium increases.

The researchers next pooled the cranial characteristics of several premodern human species to create an "average" skull. Then they "shrank" that skull, too, rearranging its proportions according to the pattern described above. This gave them a model of a fossil *Homo* species the size of a hobbit.

"The LB1 cranium fits very well a model of a fossil *Homo* at that size," says McNulty. "It's too different from the Andaman Islanders and the Khoe-San [to be a small modern human]. We think it's a closely related species to *Homo erectus*, or something even more primitive."

The researchers also noted that as fossil humans and African apes underwent simulated shrinking, their facial features looked more and more like those of a modern human. Such a resemblance on the part of LB1 could have thrown anthropologists a curve.

Why shrinking should result in predictable changes in skull shape is a complicated question.

"You can't just make things bigger or smaller," McNulty explains. "When things change size, they need different mechanical properties." Or, there could be certain spatial requirements for the brain. A host of factors determine the proportions of the "shrunk" skull.

Another baffling question about the hobbit people is how they got on an island like Flores in the first place, an island that also contained fossil dwarf elephants. Sea level drops dramatically during ice ages, but it was never low enough for the ancient Floresians to walk. And if they weren't modern humans, a boat seems unlikely, McNulty says.

"Maybe," he muses, "they got there by whatever event brought the elephants."



Corn plants and ethanol plants: a good mix

March 2, 2009

Compacted corn residue could boost efficiency of ethanol plants, study says

By Deane Morrison

Ethanol plants that use only the kernels of corn could slash their fossil fuel consumption and boost their energy efficiency by using the rest of the corn plant to generate heat and electricity, a new University of Minnesota study finds.

The study details the monetary and environmental costs and benefits of compacting the nonedible corn residue—known as corn stover—and burning it at ethanol plants to provide both heat and electricity. Currently, corn ethanol plants run largely on natural gas as a source of heat for processing the corn and on electricity from coal-fired power plants.

"Every unit of natural gas used emits 15 times as much carbon dioxide as burning a unit of biomass," says study author [Vance Morey](#), a professor of bioproducts and biosystems engineering. "Burning coal emits about 25 times as much."

The study took into account the fossil fuels required to collect corn stover, turn it into round bales, grind and compact it, and transport it to the ethanol plant or other facility that could burn it. Also accounted for was were the costs of replacing nutrients lost to soil when corn stover is removed. Even given those costs, the researchers calculated that using compact corn stover would reduce life-cycle fossil CO₂ emissions by the factors noted above.

Less is more

The key to corn stover lies in compacting the residue so that the semis carrying it to ethanol plants can make fewer trips.

The researchers studied a model system in which farmers produced large round bales of corn stover, which were stored at designated sites a mile or two from the fields. Then, using mobile units, the bales were first ground in tub grinders (similar to wood chippers). This produced a loose fluffy material that was immediately processed by a roll-press compactor.

The compactor produced slabs of corn stover with a density between six and 15 pounds per cubic foot.

"We're still working on compacting," says Morey. "We want to get a full 25-ton load on a semi. That's a typical maximum load."

Removing the corn stover from cornfields entailed more costs than the researchers had anticipated. The farm-to-ethanol-plant cost of delivering a ton of compacted corn stover came to \$77 per ton; 30 percent of that expense was accounted for by replacing the nitrogen, phosphorus, and potassium lost to the soil when the corn stover was removed from the fields. Moreover, refertilizing the soil produced 45 percent of the CO₂ emissions associated with collecting and delivering the corn stover, Morey says.

Producers must consider these nutrient replacement costs when deciding whether and for how much to sell their corn stover, he adds.

The researchers will next turn their attention to the costs and benefits of using other biomass, such as switchgrass, mixed prairie grasses, or alfalfa. Nutrients will have to be replaced for these crops, too, but the costs may be less since those plants need less fertilizer than corn. And alfalfa, a legume, can add nitrogen to soil. Also, says Morey, some nutrients are retained in ash from burned biomass and could be respread on fields.

Morey's colleagues in the study were Douglas Tiffany, an Extension educator in the Applied Economics Department, and bioproducts and biosystems engineering research associate Nalladurai Kaliyan. The study was presented as a report to the University's Initiative for Renewable Energy and the Environment, which funded it.



Compacted bales of corn stover could help ethanol plants, a University study shows.



Researchers identify compound that could prevent HIV transmission

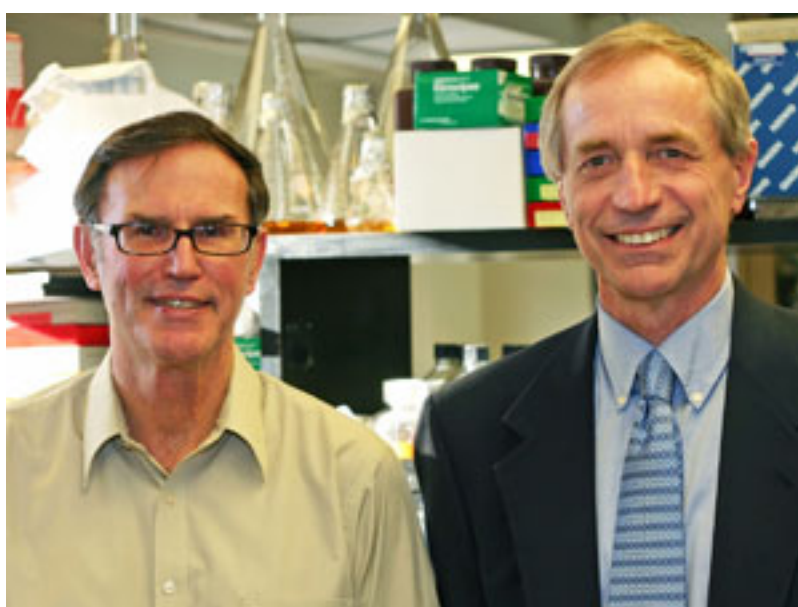
March 4, 2009

Glycerol monolaurate blocked vaginal infection of the nonhuman primate version of HIV

By Nick Hanson

Researchers at the University of Minnesota have identified a compound that, applied vaginally, can prevent transmission of the primate version of HIV, called SIV.

While it's not a cure and the compound still must go through human clinical trials before it used to prevent HIV, the research is a step toward preventing the devastating disease that affects 33 million people around the globe.



Ashley Haase and Pat Schlievert have discovered a compound that may help control the spread of HIV.

[Ashley Haase](#) and [Pat Schlievert](#), principal and co-investigator, respectively, in the Department of Microbiology, researched glycerol monolaurate (GML), a naturally occurring compound the FDA recognizes as safe. It is widely used as an anti-microbial and anti-inflammatory agent in food and cosmetics.

"After 25 years, an effective vaccine for HIV is still on the distant horizon, so not only vaccines, but all research into ways to prevent the continued spread of this lethal virus, remain critically important," Haase says. "If GML as a topical microbicide can add to our prevention, it could contribute to saving millions of lives."

After sexual exposure to SIV, the researchers found that the primates' natural defense system is activated, rushing immune cells (T-cells) to the scene of the infection. The virus uses these T-cells as fuel to expand infection locally and spread it throughout the body.

"So even though it sounds counter-intuitive, halting the body's natural defense system might actually prevent transmission and rapid spread of the infection," Haase says. "That's where GML comes in."

"After 25 years, an effective vaccine for HIV is still on the distant horizon, so not only vaccines, but all research into ways to prevent the continued spread of this lethal virus, remain critically important."

They examined GML because in 1992 Schlievert began using it to combat toxic shock syndrome, a potentially lethal bacterial infection. In recent years, research has shown GML is active against a variety of toxins and microbes and inhibits cytokines and chemokines, small molecules that play key roles in triggering the body's defense system.

Since it is the defense system they wanted to inhibit, it made sense to see if GML might prevent transmission, Haase says.

Before testing their theory, the researchers tested GML's safety by daily vaginal application of a GML gel-based topical solution and a neutral solution as a control. They found no adverse effects of GML in the monkeys.

"GML is recognized as safe, and is already approved for acute human use, but we were now able to show that GML could be safely applied every day for months," Schlievert says.

The researchers applied GML to five monkeys; five other monkeys were left untreated as a control group. An hour after GML application, the two groups of monkeys were injected with an infectious dose of the virus that in a tissue culture will infect 50 percent of the cells. Four hours later, the monkeys were again treated with GML and then given a second dose.

The researchers monitored the animals for evidence of transmission for two weeks, after which time infected animals would typically have hundreds of millions of virus particles circulating in the bloodstream. If there was no evidence of infection, the treatments and viral challenges were repeated. Four of five of the control group contracted SIV, while none of the five GML-treated group showed any evidence of acute infection after receiving as many as four large doses of virus.

The research is published in the March 4, 2009, online edition of *Nature*.

The researchers believe GML has potential to effectively prevent transmission of HIV to women, which is how a majority of new cases are acquired around the globe. Of the more than 33 million people infected with HIV or diagnosed with AIDS, 67 percent live in the sub-Saharan region of Africa, and women represent close to 60 percent of new infections in this center of the pandemic.

But Haase cautions that much work remains to be done before planning clinical trials in humans, including additional testing in other animals and developing dosing and delivery methods that will make it more likely that women will use GML to prevent HIV. Longer-term follow-up studies are also needed into occult, or hidden, infections that weren't apparent in the acute stage of infection but manifest months later.

"GML is exceptionally inexpensive, is widely used in foods and cosmetics, and is easy to formulate in many ways for vaginal use," Schlievert says. "The compound has been demonstrated in vitro to inhibit the growth of nearly all sexually transmitted disease microorganisms, and other causes of vaginal infections, without affecting normal bacteria. Its use by women may significantly improve overall vaginal health."

The National Institutes of Health funded the research. Collaborators include the University of Minnesota Medical School, School of Public Health, and College of Pharmacy; the Wisconsin National Primate Research Center at the University of Wisconsin-Madison; and the SAIC Frederick, Inc., at the National Cancer Institute in Frederick, Md.



From knickers to spandex

March 6, 2009

Though the Nordic Ski Team has seen fashions change in 70 years, the love of the sport is timeless

By Katherine Himes

Spring is tantalizingly close, but for the University of Minnesota [Nordic Ski Team](#), there's still just enough time for pulling on the spandex and clicking into the skating skis to make the best of winter's last hurrah.

The team celebrates its 70th birthday this month, one of the U's 25 [sport clubs](#) and 600-700 [student organizations](#).



Nordic Ski Team members pushing it in 1977 (left) and current member Jon Ertl skating at the Mora Vasaloppet

Pre-war beginning

In January 1939, 13 men and one woman created the University of Minnesota Ski Club, complete with a constitution and approval by the Senate Committee on Student Affairs. The group held weekly business meetings and outings to local ski areas every Sunday. Skiers participated in both alpine and Nordic competitions, and membership blossomed from 50 in the first year to 175 by the end of the second year.

Club officers organized meets with the University of Wisconsin Hoofers (a group that still exists), a dance, events during Sno Week—a popular University of Minnesota winter tradition—ski-themed movies open to the entire campus, club race championships, and entry into the National Ski Association. In its infancy, the club achieved tremendous success, earning the Central United States Intercollegiate Ski Union trophy for combined (alpine and Nordic) team championships in 1941 and 1942.

Post-war years

The Ski Club went on hiatus from 1943 to 1945 due to World War II, as many members enlisted in the armed forces. Following the war, the club continued to grow, and in 1958 it petitioned for varsity status. Though the University denied the request, skiers formed and participated in the Minnesota Intercollegiate Ski Conference with such schools as the University of Wisconsin, Macalester College, and Carleton College.

Travel to practices was challenging, and, unlike today, students did not have use of a University vehicle. Instead, they went, with skis, on the streetcar, mostly to Como Park in St. Paul.

A letter from outgoing club adviser Hans Hopf encouraged the team to "set up a fairly rigorous training schedule and get someone from within your Club to enforce this schedule so that your team can really train and become a good representative from the University." That year, 1958, forestry freshman Carl Bohlin won the national title by a landslide.

Team trips were frequent: typically every weekend, and, in keeping with the era, adult chaperones accompanied the skiers. By the mid-1950s, the club had established the tradition of traveling to Aspen early in the season. The club orchestrated all of these events with an operating budget of \$900. By the early 1970s, the Club had become so popular that membership topped out at 500 students.

Shift to Nordic

Sometime in the 1970s, the club shifted its focus exclusively to Nordic skiing. This decision paid off in 1985, 1986, and 1987, when the female skiers won back-to-back-to-back national championships, competing against varsity-level teams from across the country. In 1985 two University of Minnesota skiers were undefeated in regular season races: Terri Pauls and Lori Mommsen. Race distances changed from several miles to 10 and 15 kilometers.

In those days, Nordic skiing was still exclusively classical—the diagonal method where you get your push from the bottom of your skis. About 20 years ago, skate—or freestyle—skiing blasted into the sport, introducing an added measure of grace and speed and attracting a new generation of skiers who pushed from the edges of their shorter skis. Skiers in the club learn both techniques.

The team today

The Nordic Ski Team continues to be led by student officers, but it now competes in local "citizen" races held in Minnesota and Wisconsin, rather than collegiate competitions. Major competitions include the City of Lakes Loppet, a race held in late January in Minneapolis, the Mora Vasaloppet, the Bemidji Finlandia, and the largest and most notable ski race in the United States, the American Birkebeiner. Again, race distances changed, rising to a range between 25 and 50 kilometers.

The University attracts top skiers who can win these major competitions. Bjorn Batdorf claimed the City of Lakes Loppet Title in the 35K Freestyle, besting the times of over 800 other skiers. Dave Anderson won the Bemidji Finlandia classic race, and Matt Liebsch, a club alumnus, won both the Mora Vasaloppet and the American Birkebeiner. In addition, other skiers won age group awards in competition.

The team still holds an annual trip at the start of the season, but rather than heading to Aspen, they travel to northern Wisconsin and ski at Telemark Resort and on the Birkebeiner Trail. Over 28 skiers attended this year's trip. The club still holds daily practices, but skiers drive to nearby parks in University vans, and don't have to worry about carrying their skis on the streetcar.

According to president Joe Mitchell, "The Nordic Ski Team thrived this year. We enjoyed extremely high levels of participation, excellent race results, and good team bonding. We hope to build off this success and be even bigger, faster, and stronger next year."



A new day for stem cell research

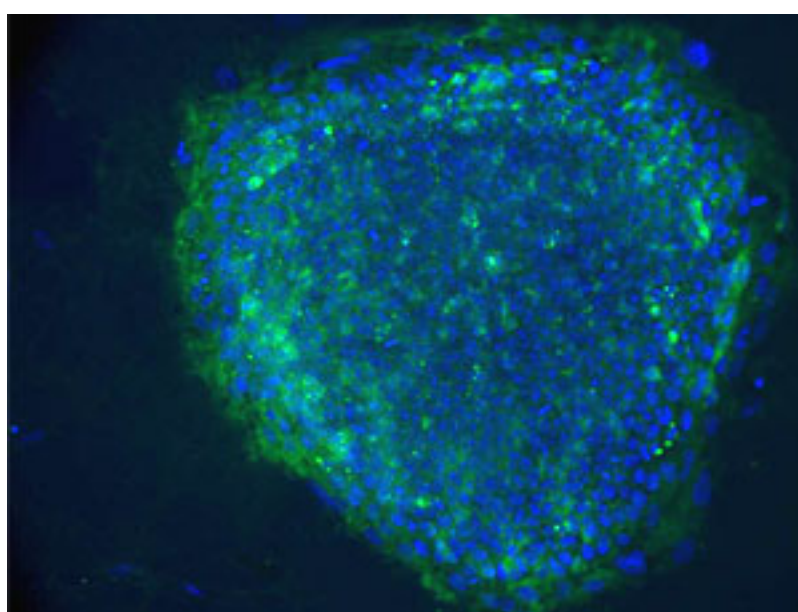
March 9, 2009

Obama's action opens possibilities for University's Stem Cell Institute

By Deane Morrison

On March 9, 2009, President Obama lifted former President Bush's executive order of August 9, 2001 restricting federal funding of human embryonic stem cell (hESC) research.

Researchers at the University of Minnesota Stem Cell Institute—the world's first institution devoted to stem cell research—welcomed the news, which comes as the institute prepares to celebrate its 10th anniversary this year.



President Obama has lifted restrictions on human embryonic stem cell research.

Photo: James Dutton, Stem Cell Institute

"In the USA, it's good news for anybody involved in stem cell research," says [Jonathan Slack](#), director of the institute. In Minnesota, he says, "we've always believed it's important to work on both embryonic and adult stem cells. We don't think any line of research should be closed down arbitrarily.

"We firmly believe this type of research should happen in public research universities with the transparency and oversight that comes with federal funding."

Obama's action opens wide the door to studying the use of hESCs to treat heart disease, neurodegenerative conditions, arthritis, cancer, and other conditions where the body's original cells are wearing out or, as in cancer, tumor growth has wreaked mechanical damage on cells and tissues, Slack adds.

University researchers will now have access to numerous lines of human embryonic stem cells that previously could only be studied using strictly private funding—a requirement that was often prohibitively difficult. The action also allows the Stem Cell Institute to supply researchers nationwide with hESC lines derived with private support after the 2001 executive order.

The backdrop

Embryonic stem cells are valued because they have the potential to give rise to virtually any type of cell or tissue found in adults. Human ESC cell lines are produced when cells are taken from the interior of embryos created, but not used, during in vitro fertilization procedures. The embryo is destroyed, but if the cells are successfully cultured they may give rise to lineages called hESC lines.

Since 1995 Congress, through the Dickey-Wicker Amendment, has forbidden the use of federal funds—which come mostly from the National Institutes of Health (NIH)—for any research in which human embryos are destroyed. In 1998 the Clinton administration allowed federal funds to be used for research on human ESCs, arguing that the cells were no longer embryos. On August 9, 2001, the Bush administration cut off federal research support except for those hESC lines derived before that date.

But of the 60 to 70 approved cell lines, only some 12 to 15 were actually available and usable, says [Dan Kaufman](#), associate professor of medicine and associate director of the institute.

A high hurdle falls

Under the Bush administration, no one was prohibited from research on hESCs derived after August 2001, as long as the work was performed using private funds. But this restriction, says Slack, meant "a lot of red tape." For example, it's a rare medical research lab that has used NIH funds for neither equipment, nor supplies, nor staff. Even working in a building built with federal support raised sticky problems for those who wanted to use human ESCs other than the 60 approved lines.

"We firmly believe this type of research should happen in public research universities with the transparency and oversight that comes with federal funding."

Few institutions have met the challenge of separating federally and privately funded operations to the extent necessary—but the University of Minnesota has made it a priority by creating space dedicated to privately funded work within the Stem Cell Institute. Researcher [Meri Firpo](#), an assistant professor of medicine, uses the space to derive hESC cell lines.

"The University of Minnesota has gone out of its way to allow me to have a nonfederally funded research lab," she says. "A lot of people don't have this kind of support."

With the lifting of restrictions, she'll be able to distribute the hESC lines she has developed to researchers elsewhere and collaborate with them on research. Her lines comprise both normal cells, which can be used to study basic human development, and cells containing genetic mutations associated with diseases, which may be used to model the diseases and design therapies.

She also studies the development of hESCs into pancreatic cells. Her goals: to gain a better understanding of such development and to generate cells for diabetes transplantation therapies.

For Kaufman's part, he is studying the development of normal blood cells and creating populations of "natural killer" white blood cells that specialize in attacking cancer cells or HIV. He has used hESCs from federally approved lines to make natural killer cells, but looks forward to having a wider choice of cells to work with.

"We want to make [natural killer] cells that are more efficient at killing tumors or at making cells that will be good at it," Kaufman says. "Now, in a pot of hESC cells, maybe one percent would lead to natural killer cells that kill, in particular, cancer or HIV. We'd like to get that to 10 percent. So we may use federal money to extend the work to new cell lines that may do a better job."

Researchers at the Stem Cell Institute also are studying hESCs as avenues to combating neurological and cardiovascular disease, among other conditions. Nationally, says Kaufman, clinical trials of at least three hESC-based therapies—for treating spinal cord injury, blindness, and diabetes—have been on hold awaiting FDA approval.

The action by Obama may already be benefiting the institute: Enrollment is booming in its NIH-funded course on hESCs. Taught every three months, it is for researchers who want to learn how to grow the cells.

"We allow five in the course. This time, so many applied that we're trying to accommodate eight," says Firpo. "More people are interested [in learning to do this research] and are coming here and learning about working [with hESCs] here."

"Lifting the restrictions "makes things, potentially, logistically easier for people like Meri and me and may attract people who weren't in the field before," Kaufman observes.

Despite the optimism over Obama's action, a loosening of purse strings is also necessary, says Kaufman.

"Congress will absolutely have to increase the [base] NIH budget," he says. "You can approve all the cell lines you want, but it won't do any good if the budget remains flat, as it has for four to five years." No one can predict for sure what Congress will do, but many of its members from both sides of the aisle are known to favor embryonic stem cell research.

As work on hESCs gears up, the University's Stem Cell Institute will continue to pursue other stem cell research. The institute has some of the world's pioneers in the use of adult stem cells, including those found in umbilical cord blood.

"We are also exploring using possibilities offered by a new approach called induced pluripotent stem cells, or IPS cells," says Slack. "[These] are skin cells that have been reprogrammed to go back to the original stem cell state. Then they can develop into new cells that might be used for damaged hearts or nerve cells or other diseases.

"As the nation's first established stem cell institute, we believe in exploring all pathways to scientific discovery. A lift on the stem cell restrictions is great for science."



The guilded age

March 10, 2009

Online gaming opens new doors to understanding human behavior

By Deane Morrison

In the fantasy game EverQuest II, players can pit their swords against a dragon's fangs, form alliances against evil warlocks, or go on a quest to win power and treasure. Sound like the real world?

It sure does to [Jaideep Srivastava](#).

After a study of "EQ2," the University professor of computer science and engineering and his social scientist colleagues concluded that such massively multiplayer online (MMO) games represent a microcosm of human society. But unlike real society, MMOs can reveal much greater detail about human social behavior because a computer tracks every move the players make.



Online games can reveal a lot about human behavior, says computer science and engineering professor Jaideep Srivastava.

The more than 300,000 EQ2 players may undertake their quests alone or as part of a guild of fighters, healers, weapon makers, tradespeople, or other sorts. As they achieve goals and gain points, they move to a higher level of play and get "a lot of social approval from other people," Srivastava says. They can also talk to other players in real time, shift alliances, and generally interact socially in most of the conventional ways.

"A quest is sometimes like a pickup game of basketball," says Srivastava. "Sometimes two people will go to a court and join in play. Or teams or clubs will decide to schedule a quest at a specified date and time." And people play games like EQ2 for familiar motives: to achieve something, to socialize, and to relax.

"Now we have a world where behavior is the same as real life, but also observable and measurable to a fine granularity," says Srivastava. "It's a highly instrumented environment where we can study things we never could in the real world and potentially learn things with applications in the real world."

In researching human behavior, social scientists often rely on surveys, Srivastava elaborates. But besides cost, surveys are subject to a self-reporting bias that makes people try to appear better than they are, even in anonymous settings.

For example, suppose one or more guilds or teams undertake quests of the same difficulty, but the groups have different organizational structures. Which team will succeed more? That kind of data gives social scientists clues as to how real structures behave.

"Now we have a world where behavior is the same as real life, but also observable and measurable to a fine granularity."

"Or," Srivastava says, "There's an organizational structure doing something and there's a crisis such as a member dying. What type of structure recovers faster, and how do they recover and regroup? This tells us something about how people form alliances."

This kind of window on behavior compares with Google's recently demonstrated ability to determine where various health conditions were prevalent, Srivastava says. Google had only to analyze the key words in searches originating from different parts of the globe.

"Google is a huge monitor for global minds," he says. And as for online gaming, "My social science colleagues are excited that the Web is a place where people interact. They say it's like the Hubble Space Telescope or an electron microscope for the social sciences because you can see social structures and behaviors so well."

One reason Srivastava and his colleagues trust EQ2 to mirror actual life is that in their study of 7,000 players (in which they used—you guessed it—surveys), the responses revealed predictable motivations. Men tended to play for the chance to achieve something. Among women, a minority played for achievement the same as men, but the chance to socialize was the strongest motive.

The survey also showed that when playing the game with a romantic partner rather than a friend, women reported greater satisfaction but men reported less.

"Given that women like the game's social aspects, women saw this as time to spend with their romantic partner," Srivastava says. "But men tended to want achievement more than socialization with a romantic partner."

Whatever the motive, EQ2 players trade in a goodly chunk of their real-world lives for the game: on average, players spend 26 hours a week at it, Srivastava says.

He would like to extend studies of online behavior to examine how people read various compositions, noting how much text they read at once, what parts they reread, where they put bookmarks, and so on.

"With e-books like Amazon's Kindle, which can record detailed data on reading behavior, such studies are now possible. It could help authors understand how their composition was viewed by readers," says Srivastava.

The research has attracted funding from the U.S. Army, because understanding such social structures and behaviors can be helpful in training. Srivastava and his colleagues are also funded by the National Science Foundation's Human and Social Dynamics program. Working with him are organizational theorist Noshir Contractor of Northwestern University, sociologist Scott Poole of the University of Illinois, Urbana-Champaign, and social psychologist Dmitri Williams of the University of Southern California. EQ2 is a product of Sony Online Entertainment.



Watch them soar

March 10, 2009

Nine students chosen to perform with prestigious dance company on Northrop stage March 19

By Pauline Oo

When choreographer José Limón toured Poland with his New York-based dance company in 1957, little did he know how much the landscape of rubble-strewn cities and people still reeling from the ravages of World War II would move him. He created *Missa Brevis* in response to war and people's resilience, and the following year it premiered in a bombed-out church in Budapest.



U students rehearsing last fall for the dance program's offering of *Missa Brevis* in February.

Photo: V. Paul Virtucio, courtesy of University Dance Program

On March 19, nine University of Minnesota dance students will join the Limón Dance Company at Northrop Auditorium on the Twin Cities campus for this stirring and much praised piece. For most, it will be their first time dancing with a professional company.

"I'm ecstatic," says Lauren Baker of the chance to train and perform with the Limón dancers. "I'm graduating in May, so I'm looking forward to having this sort of experience to help build my confidence to go into the professional world."

Set to music by Hungarian composer Zoltan Kodaly, *Missa Brevis*, which means "short mass" in Latin, is a tribute to the human spirit conveyed through movement. It begins with a group of dancers huddled defiantly together in an expression of solidarity and courage. One dancer, however, watches from the sidelines. The group eventually breaks up into quartets, trios, and solos, and, ultimately, all the dancers, including the lone figure, return to the stage as a community united by hope and perseverance. Throughout, they perform Limón's signature movements, which emphasize dramatic expression, nuanced and expansive movement, and the human soul.

Baker says she has learned a great deal about the company and the Limón technique since September from visiting artist Sarah Stackhouse and University associate professor of dance Carl Flink and his wife Emilie Plauché Flink. Stackhouse, a former principal dancer with Limón, came to the Twin Cities campus in the fall to stage *Missa Brevis* with a full student cast. The Flinks, both of whom were Limón company dancers, served as rehearsal directors. Twenty-two student dancers performed *Missa Brevis* as part of the dance program's annual Dance Revolution concert in February.

"For the [dance program] production we did not have live music, but this time around for Northrop we will be having a choral group," says Baker, whom Stackhouse had picked, along with eight lucky others, from the student cast of 22. "I'm looking forward to that. [The live music is] going to add that extra challenge of really having to pay attention, because it's not going to be the same every time at our rehearsals or on performance night." Singers from the Oratorio Society of Minnesota will perform the choral score.

The students started working with the company this week, and they'll continue to plug away right up to the day of the show. "The Saturday [at the beginning] of spring break we'll dance from 10:30 a.m. to 6:30 p.m., and that Monday to Thursday of spring break we'll dance for eight hours a day, with the performance on Thursday night," says University senior Jeremy Bensussan.

But he isn't complaining. Bensussan supplemented his earlier lessons with Stackhouse and the Flinks with a weeklong stint at the José Limón Institute in New York over winter break.

"What Sarah offered us were refined ideas to bring the *Missa Brevis* choreography to life—[for example, the ideas] of tension and release, lightness of the body and heaviness, never finding complete uprightness (a large contrast to ballet), and the impulse of movement coming from the center of the body and radiating outwards," he explains. "I wanted more ... what this trip gave me more than anything was the ability to break down the choreography into its fundamental parts and build it from the ground up."

The *Missa Brevis* performance at Northrop coincides with the 2009 North-Central Regional American College Dance Festival Association conference (March 18-22), which the University Dance Program is hosting for the first time. About 400 faculty and students from other dance programs will converge on the Twin Cities campus for master classes, film screenings, impromptu concerts, and the Limón show.

"It's just a dream; I never thought I would have this opportunity to dance with the company, and [additionally] to perform in front of my peers from all over," says Baker, also president of the U Student Dance Coalition, a group that organizes lectures and workshops to help dance majors further learn and grow as artists. "I love being on the stage. It's where I'm happiest."

Did you know?

Students majoring in dance call their teachers by their first names—because that's fairly common in a dance setting, says U senior Jeremy Bensussan.

A typical dance major has ballet three to five times a week, followed by jazz twice a week, and modern dance four times a week. "Each class lasts one-and-a-half hours," says Bensussan. "Of course, between these technique classes we also engage in courses to make us think critically of the nature, origin, and personal expression of dance. These include history, anatomy, and dance composition, as well as many optional courses like yoga, Pilates, dance and popular culture, and tap dancing."

Missa Brevis is part of a three-dance program that begins at 7:30 p.m. March 9 in Northrop Auditorium. The Limón Dance Company will also perform *Into My Heart's House*, inspired by José Limón's love for the music of J.S. Bach, and *The Traitor*, Limón's take on the betrayal of Jesus by Judas Iscariot. Tickets, which include a preshow interview with company director Carla Maxwell, are \$31 to \$55; buy [online](#) or call 612-624-2345.



UNIVERSITY OF MINNESOTA

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UMD professor is real-life Indiana Jones

March 11, 2009

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Biking bonanza

March 11, 2009

U prepares for new bike center,
bicycle-sharing program

By Rick Moore

The University of Minnesota is poised to take two substantial steps forward in making bicycling a more convenient and lucrative option for its students, staff, and visitors.

The wheels were set in motion March 10 with the announcement of two major projects at the U—a new bike center to be located in the Oak Street Parking Ramp on the East Bank of the Twin Cities campus, and a bike-sharing program that will put 1,000 new bikes at public kiosks on campus and in Minneapolis. The projects are among more than \$4 million worth of improvements that were announced by Bike Walk Twin Cities, a federally funded initiative to increase biking and walking in Minneapolis and neighboring communities.

The bike center, which will receive \$524,000 in Bike Walk Twin Cities funds, will serve an estimated 6,000 cyclists on campus as well as commuters and other visitors. It will be housed at the ramp's former transit station waiting area at Oak and Delaware Streets S.E., and services are likely to include bike repair; retail sales of items such as tires, tubes, fenders, and racks; secure, 24-hour bike storage; restrooms, changing rooms, and lockers; an electronic trip-planning kiosk; and program space for clinics and outreach activities. The U hopes to have the center operational by the start of the coming fall semester.

President Bob Bruininks, himself an avid cyclist, joked about noticing a bike center on the Midtown Greenway in Minneapolis a while back and suggesting that the University develop something similar. "And I got the standard, stock answer, 'We're already working on it,'" he said.

"This center becomes more than a secure place to park your bike and change clothes," he noted. "It's a community space that rewards existing bike commuters and welcomes new bicyclists to our campus with services to make their rides more efficient and convenient."

A new technology may also help the U capitalize on federal funding that has been approved for employers to provide tax-free stipends to employees who commute by bike. The University would be able to track the commuting trips of cyclists through the use of Radio Frequency ID (RFID) technology. Commuters would attach RFID tags to their bikes, and RFID "readers" placed in strategic locations would track the cyclists' trips through these zones.

Grab a bike and go

With the new bike-share option, the University and the city of Minneapolis will join together on a program that offers community members an easy way to get around town for short trips. The Minneapolis Bike Share Program, which received a \$1.75 million grant, will give riders the option of checking out one of 1,000 bikes—scattered at 75 different secure kiosks at the U, in downtown, and in Uptown—at any time and returning it to a self-service kiosk of their choice. Day passes will be available or users can purchase a season pass for about \$50.

The bike-share idea has become incredibly successful abroad, most notably in Paris and Barcelona. Last year Paris put more than 20,000 bikes on its streets, and Parisians are using them for more than 120,000 short trips each day, which translates to 43 million trips per year.

As Minneapolis mayor R. T. Rybak pointed out at the announcement, bicycling is becoming an increasingly important component of the transportation system in Minneapolis and in the Twin Cities metro area. And it's not by accident. "We've been working on this in a systematic way for many, many years," he says.

Likewise, Bruininks championed some of the many things the University has been doing as part of its "deep commitment to build a much more sustainable environment," including joining the Chicago Climate Exchange (to reduce carbon emissions) and promoting the use of bus passes by students and staff—the U Pass and Metro Pass, respectively. The new biking programs stand to make the U a shade greener.

They may also help the standing of Minneapolis, which ranks as the number two city for biking in the country, behind only Portland, Oregon. Rybak is confident that there may be a shake-up in the rankings. "Portland, watch out," he jabbed. "We're on our way."



President Bob Bruininks looks on as Minneapolis mayor R. T. Rybak hoists a prototype bicycle from the new Minneapolis Bike Share Program.

Photo: Rodrigo Zamith



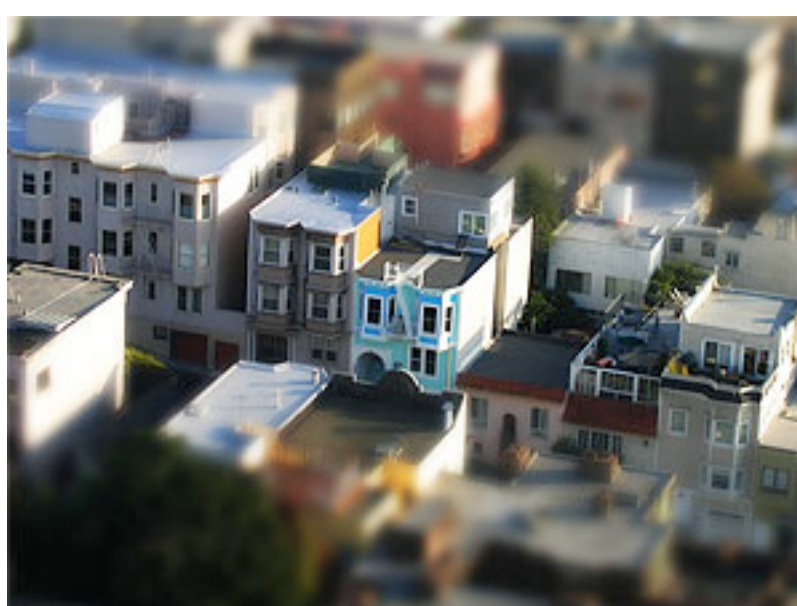
Transforming communities

March 12, 2009

U research finds that well-designed transportation projects can help entire community

By Megan Tsai

Just a decade ago, visitors to the East St. Louis, Illinois, neighborhood of Emerson Park were greeted by vacant homes, broken streetlights, and a 25 percent unemployment rate. The suburb of St. Louis, Missouri, was a classic example of urban decline. Once a thriving area, the neighborhood gradually lost population and tax base as factories and businesses moved elsewhere, leaving behind abandoned buildings and industrial pollution.



Researchers say that with good design, communities have the power to turn transportation projects into long-term community investments.

Photo: Dawn Endico, Flickr Creative Commons

Today, large pockets of the once-dilapidated neighborhood have been successfully redeveloped. Many area residents now live in one of the 300 new low- and moderate-income housing units, including the first private housing development built in three decades. Children enjoy the neighborhood's new playground, and grown-ups have an affordable way to travel to jobs in the city.

The changes are a result of Emerson Park's new light-rail transit station and some highly involved community members. When initial plans for a light-rail extension bypassed the neighborhood, the community spoke up. They advocated for a station in their neighborhood—and won. The new Emerson Park station and the surrounding area have become the hub of the neighborhood's redevelopment success.

More than transportation

Why do some projects, like the Emerson Park station, do more than just increase mobility? And how can other transportation projects create similar benefits such as promoting economic growth, improving health, protecting the environment, creating great places, increasing civic participation, and making communities safer? Those questions are exactly what an interdisciplinary group of researchers set out to tackle in "Moving Communities Forward," a research project requested by the U.S. Congress and conducted by the Center for Transportation Studies (CTS) at the University of Minnesota for the American Institute of Architects (AIA).

"When we conceptualized the study Congress called for, we took the approach that good design requires the input of people from a wide variety of backgrounds and disciplines," says CTS director Robert Johns. "We wanted to make sure our research reflected this same principle, so we selected an interdisciplinary group of talented researchers. This allowed us to capture the full spectrum of design perspectives."

Researchers in landscape architecture, geography, urban planning, architecture, and civil engineering crisscrossed the country looking at a unique group of transportation case studies—projects that enhanced their communities in ways beyond increased mobility. They studied projects that seemed to promote economic development in both urban and suburban areas. They wanted to explore whether these projects actually created economic growth or simply transferred it from one place to another.

"Some land development under way in one place may simply be development that would have occurred at another place with no net gain to the overall community," says John S. Adams, a University of Minnesota geography professor. "On the other hand, if a transportation facility brings underused resources into more effective use, such as connecting unemployed or underemployed workers to job opportunities, it can lead to economic growth."

The research team also examined transportation projects that enhanced the health and environment in their surrounding communities. These innovative projects included a greenway overpass allowing animals, pedestrians, and cyclists to safely cross a Florida interstate and a cycle center in Chicago's Millennium Park providing showers, a bike repair shop, and parking for 300 bicycles.

Researchers studied environmentally sustainable buildings as well, including the Pentagon Metro Entrance Facility in Arlington, Virginia, and the Salt Lake City Intermodal Hub.

The transportation projects that succeeded in creating great places—places where people want to live, work and gather—all had one thing in common: good design. But as the researchers discovered, defining good design is a challenge because the process varies from community to community.

"The design processes are tailored to community issues; one size does not fit all," says Lance Neckar, University of Minnesota landscape architecture professor. "However, in every case, the coordination over a long period of time—sometimes decades—between planners and designers was necessary to create a community-wide impact."

Involving community members in the early planning stages of project design not only creates a better final project, researchers found it also increases civic pride and enhances community engagement. The projects that successfully involved their communities had similarities: they engaged the community, used many methods of participation, involved political and community leaders, used visualizations such as sketches and computer renderings, included design experts in the early planning stages, and maintained a clear sense of the desired outcomes.

Finally, researchers examined how transportation projects could increase safety. They found that by using safety audits and including safety experts in the design process, safety improvements, especially for pedestrians, could be achieved. Communities planning transportation projects should also consider "before and after" safety audits to determine whether safety improvements were realized.

Turning projects into principles

The research team studied dozens of transportation projects designed to address individual community needs in a variety of settings. Despite the wide range of projects, the study authors found common themes in the reasons for each project's success. They turned these themes into six design keys communities can use to create transportation projects that accomplish more than simply improving mobility. These principles are:

- * *Use an integrated design process in which planners, designers, transportation officials, and builders develop a unified plan.*
- * *Include all community stakeholders from the start of the project.*
- * *Use three- and four-dimensional images and graphics to increase citizen involvement, understanding, and buy-in.*
- * *Create human-scaled structures and spaces to make busy transportation hubs more manageable.*
- * *Use easy-to-read signs and directions to make navigating complicated multimodal systems easier and safer.*
- * *Design projects to be both durable and adaptable to new transportation modes and community needs.*

Putting principles into action

Interest in repairing and rebuilding the country's infrastructure is increasing rapidly. Researchers say this interest makes using the study's design principles more important now than ever before. With good design, communities have the power to turn transportation projects into long-term community investments.

"This study is a guidepost for what makes investments in transportation really work for communities," says Andrew Goldberg, senior director of federal relations for the American Institute of Architects. "It's something we can bring to Congress and the new Obama administration and say, 'These are some of the things you can do to make sure money is spent wisely.'"

However, the ability of these projects to enhance communities is not guaranteed.

"[They have] that potential, but [there's] not necessarily a built-in positive transformational effect unless you have people that really take hold of the idea of good design and work towards it," says Neckar.

In the future, the "Moving Communities Forward" researchers hope their work accomplishes exactly what the study's name implies: helping communities create transportation projects that do more than get users from Point A to Point B.

For more information, visit [Moving Communities Forward](#).



Beyond the legalese

March 13, 2009

U students aid asylum seekers and undocumented immigrants through the legal process

By Pauline Oo

They meet Mexican families who have been in the United States for years and are now facing exile, Asian and African nationals who have fled persecution from government or rebel groups in their homeland and are now living in limbo, teenagers from Nicaragua who have hiked miles and are now looking at deportation....



First-year University of Minnesota law students Kalli Bennett, Jordan Shepherd, and Christopher Luehr.

Photo: Patrick O'Leary

Each spring and winter break, members of the University of Minnesota Asylum Law Project (ALP) volunteer across the United States at nonprofit organizations that work with immigrants and people seeking asylum. In addition to helping the attorneys on staff with research and case briefs, the students—all in their first-year at the University of Minnesota Law School—visit immigration detention centers, conduct client interviews, interpret if they have foreign language skills, and attend immigration and juvenile court.

"Most of the time a first-year law student does no practical, legal work," says Jordan Shepherd, ALP president. "Every professor will tell you to just study, study, study; to learn the stuff, because all the basics of that first year you'll use for everything else you do. So, the main draw of ALP for law students is the practical experience their first year."

Law School graduate Emily Good, who now works for the local nonprofit Advocates for Human Rights, trains ALP's members on the basics of asylum law prior to each trip. "So when we go in to help these organizations, we have a little bit of background on what it means to do legal research and legal writing," says Shepherd.

The Asylum Law Project started in 1992 with a small group of University of Minnesota law students traveling to Miami to assist Haitian refugees maneuver the legal process. Over time, the project has grown by leaps and bounds. Membership hovers around 100 this year, and the students can choose to help immigrant advocacy or legal aid offices in one of six cities—El Paso (for three weeks); Miami (three weeks), Minneapolis (two weeks); Las Vegas (two weeks); Florence, Arizona (one week); and Nashville, Tennessee (one week).

Miami was Lauren Henry's choice. The aspiring lawyer flew home to Tampa for the winter holidays then drove south to volunteer at the Human Rights Institute in St. Thomas University.

"I had an amazing experience there learning about the removal process [of undocumented immigrants] and the different ways to seek asylum," says Henry. "We were asked to write several briefs in addition to our court observing time. The chance to work independently and learn in order to help someone with a specific problem was the best part. In law school we are learning through past problems, but ALP gave me the chance to learn about an issue through the eyes of an actual client and work to solve a legitimate need. I was so much more motivated to find out all I could about the immigration system this way."

The United States has nearly 12 million undocumented immigrants, or foreign-born people who entered the country without proper visas or who were admitted temporarily and stayed past the date they were required to leave. The Pew Hispanic Center estimates that two-thirds of this population had been in the U.S. for 10 years or less and approximately 7 million were employed, making up nearly 5 percent of the U.S. labor force.

Mexico, according to the Department of Homeland Security, continues to be the leading source of unauthorized immigration (increasing from 4.7 million in 2000 to 7 million or 61 percent in January 2008), followed by El Salvador, Guatemala, the Philippines, and Honduras. California leads as the state of residence for this population (2.9 million), followed by Texas, Florida, and New York.

"The typical term you hear in the news is 'illegal immigrants,' but 'undocumented' is the terminology that most advocates try to use," says Shepherd, who spent winter break in El Paso with Las Americas Immigrant Advocacy Center. "The U.S. code does criminalize people for entering without valid documentation. But there are myriad reasons why somebody would come in to the United States. As an advocate, we have to determine whether they have a valid claim for some form of relief, whether they can be granted asylum."

"So many people get lumped in [to being called a criminal] and get shipped off without any sort of chance to say, 'Wait, wait there's a reason I'm coming here; if you ship me back something bad is going to happen to me,'" he adds.

"The U.S. code does criminalize people for entering without valid documentation," says Shepherd. "But there are myriad reasons why somebody would come in to the United States. As an advocate, we have to determine whether they have a valid claim for some form of relief, whether they can be granted asylum."

Unlike the U.S. Refugee Program, which protects refugees by bringing them to the United States for resettlement, the U.S. Asylum Program offers protection to qualified applicants who are already in the United States or are seeking entry. Asylum seekers are typically those who have been persecuted or fear they will be persecuted on account of their race, religion, nationality, membership in a particular social group, or political opinion. Petitions, however, can take more than a year to process and immigration courts do not grant asylum easily.

In January, Shepherd worked on a case in which a Chinese man was seeking asylum. The case is still pending, with a hearing scheduled for April, and the asylum-seeker remains behind lock and key.

"The detention center [I visited] in El Paso was almost like a tent-city on the edge of town. You wouldn't know it was a detention center if you drove past it," says Shepherd. "It has fences, and there are pictures inside. But it's a detention center. You can't come and go. Your case hasn't been resolve, and you may not be going anywhere soon."

Shepherd says his time with Las Americas fueled his determination to pursue a career in asylum law.

The Asylum Law Project covers about half the cost of any one member's trip, including lodging, through grants and fundraising. (Members are allowed just one trip each year.) Students have to pay for food and transportation to their chosen city.

But no one seems to be complaining.

"All students have the chance to work with practicing attorneys and do legal research," says Christopher Luehr, one of ALP's five vice presidents. "Some are lucky to write briefs that are sent to judges, pending the attorney's approval ... [I joined ALP because] I am interested in assisting foreigners who have made the trip to my home country. I lived in China for a number of years and received help and support from so many people, some of them strangers. In a way, I'm trying to return the favor by helping those who are trying to navigate their way through a legal system that would be intimidating to most U.S. citizens."

More good deeds

Like members of the Asylum Law Project, students across the University of Minnesota are engaged in projects great and small that help a community, from one-time cleanups and weeklong spring-break service trips to regular tutoring sessions and volunteer efforts in far-off countries. Here are some examples:

Students from the School of Architecture are traveling to the Houston area this spring break to help rebuild a home wrecked by Hurricane Ike. Two members of Architecture for Humanity Minnesota will join the group to supervise construction. The trip offers the students career networking opportunities and practical experience with construction, particularly in response to natural disasters.

In May 2008, members of the Global Studies Student Association traveled to Villa de San Antonio, Honduras to help with a variety of projects at an orphanage. Some of the students taught English classes, others organized and created a book checkout system for the library or built tables for a computer lab. This May, the students are returning to help the orphanage with its sustainable-farming activities.

Over spring break, students in the fisheries and wildlife course FW 3565 will learn about the management, conservation, and ecology of Yellowstone National Park. They will interact with managers and researchers from the National Park Service, U.S. Geological Survey, and Montana Conservation Corps, as well as carry out research projects on topics such as coyote abundance relative to elevation and the effect of elk browsing on aspen regeneration following a fire.

Miami sounds good in the winter

The Asylum Law Project is looking for former members or Law School alums who are interested in asylum and immigration issues. The group is hosting the ALP Alumni Reception on Thursday, April 16, at 7 p.m. in Auerbach Commons at Mondale Hall.

The reception kicks off the Law School's Alumni Weekend. For more information, call 806-679-2114 or e-mail shep0199@umn.edu.



Time to dance

March 16, 2009

The madness of March is in full swing for Gopher sports teams

By Rick Moore

It's tournament time in Minnesota, and for fans of the Golden Gophers, there is more than usual to cheer about.

A weekend of excitement in sports was capped with the announcements on Sunday and Monday that both the men's and women's basketball teams have earned invitations to the NCAA tournament, a.k.a. the "Big Dance." The men's team was picked as the No. 10 seed in the East Regional, and will open the tournament against No. 7 seed Texas on Thursday in Greensboro, North Carolina. The Gopher women were also tabbed as a No. 10 seed, and will play their opener at No. 7 Notre Dame on Sunday.



Brittany McCoy hugs coach Pam Borton after Monday's announcement that the Gophers were chosen to play in the NCAA tournament. The No. 10-seeded Gophers will open against No. 7 Notre Dame Sunday in South Bend, Indiana.

Photo courtesy Sylvia Hesse

For the men, it will be their sixth NCAA tourney appearance, their first under second-year head coach Tubby Smith, and their first since 2005, when they fell in the first round to Iowa State 64-53.

"First, I want to thank the NCAA selection committee and say how excited we are to be in the tournament. It's one of the greatest sporting events in our culture and our country. I am excited for our players," Smith said following the announcement of the brackets. "To be going there in just two years, I am very happy with the direction of our program.... Being a No. 10 seed, we are just excited to be playing. Rick Barnes and the Texas Longhorns are from a very tough conference. He is an outstanding coach and they have outstanding players so we know we will have to be at our best to give them a good game."

The invitation punctuates a dramatic turnaround for the team under Smith. Two years ago the Gophers won only three conference games en route to a 9-22 season. This year, they raced to an undefeated record in 12 non-conference games (including an upset of Louisville—the No. 1 seed overall in the tournament—in December) and enter the tournament with a 22-10 overall mark.

They may have punched their ticket to Greensboro with a 66-53 victory over Northwestern in the Big Ten tournament on Thursday, despite losing the following day to top-seeded Michigan State, 64-56. For the team and its fans, it will be a chance to revel in the excitement of the Big Dance, which dominates the nation's sports pages this time of year.

"When Coach (Tubby) Smith came here, one of the main things he emphasized was going to the NCAA tournament," said senior Jon Williams, the only current Gopher who participated in the tournament in 2005. "He told us he was going to do everything to make us better players. I think last year we were a good team and now we're an even better team. There's nothing but progress this year and I'm sure there's more to come."

The women will be making their eighth NCAA tournament appearance and sixth during the seven-year tenure of coach Pam Borton. In 2004 the Gophers made a thrilling run during the tournament, beating UCLA, Kansas State, Boston College, and then Duke to advance to the Final Four. They finally bowed out to Connecticut in another thrilling game in New Orleans. Last year Minnesota lost its first round NCAA game to Texas, 72-55.

The Gophers finished the season in fifth place in the Big Ten with an overall record of 19-11. The game against Notre Dame (22-8) will tip off at approximately 1:30 p.m. and will be televised on ESPN.

Hockey teams extend their seasons

Basketball, as fans of the maroon and gold know, is far from being the only sport in town this time of year, and other Gopher teams are immersed in their own playoff marches.

The men's hockey team swept its opening-round, best-of-three WCHA tournament series with St. Cloud State this weekend, winning 4-2 Friday and 3-0 Saturday. (The sweep gave the Gophers a perfect 6-0 record against the Huskies this year.)

That puts Don Lucia's team, which has a 17-12-7 record this year, into the WCHA's Final Five next weekend at the Xcel Energy Center for the 11th year in a row. Minnesota will face UMD—which swept Colorado College on the road—on Thursday at 7 p.m.

The women's hockey team continued its impressive season with a tense, 4-3 win over Boston College in the quarterfinals of the NCAA tournament Saturday at Ridder Arena. That puts the second-seeded Gophers (32-4-3) into the Frozen Four next weekend in Boston, where they will face Mercyhurst in a semifinal game on Friday. The other semifinal match-up will feature top-seed Wisconsin against defending national champion UMD. The winners will meet for the 2009 championship on Sunday, March 22, at 11 a.m.

The Gophers jumped to an early 2-0 lead against Boston College barely three minutes into the game on a pair of power-play goals by co-captain Gigi Marvin, her 27th and 28th tallies of the year. After Boston College scored to make it 2-1, Minnesota answered with two more quick goals in the span of 42 seconds—an unassisted goal by Rachael Drazan and a tip-in by Brittany Francis off a shot by co-captain Melanie Gagnon—and nine minutes into the game it appeared as if the home team would coast to an easy win.

But the Eagles mounted an impressive comeback over the final two periods, and it took a good deal of penalty killing in the second period and solid goaltending by Alyssa Grogan (who was credited with an assist on Marvin's first goal) to preserve the victory.

The trip to the Frozen Four will be the Gophers' first since 2006 and first under head coach Brad Frost. Minnesota won back-to-back Frozen Four titles in 2004 and 2005.

"I'm really proud of the way the players battled and competed," Frost said after the game. "It was a heck of a hockey game. I don't think anybody thought we were going to jump out like that and score 4 goals in the first [nine] minutes. Once we were up 4-1, I don't think anybody anticipated that it would be coming down to the final seconds either and be a one-goal game. But we're ecstatic that we're heading to Boston and helping to represent the WCHA. Our season is still alive, so we're very happy about that, and look forward to playing Mercyhurst on Friday."

For more information on all of the University of Minnesota's sports teams, visit GopherSports.com.

Watch a [video](#) about the four first-year players on the women's basketball team, all of whom are from Minnesota.



Nursing the revolution

March 18, 2009

Nurses are the linchpin of health care reform

By Deane Morrison

The police brought her in late at night, traumatized by the sexual assault she had just endured. But the woman had at least one piece of luck: Conducting the pelvic exam at Regions Hospital, St. Paul, was a forensic nurse who knew how to collect evidence.

Coaxing the details of the attack from the woman, the nurse learned that the assailant had used the victim's cell phone. So she swabbed it for DNA. At the trial, that evidence helped convict the man.



Nurses like the University's Patricia Painter, right, are at the forefront of research

Photo: Tim Rummelhoff

The nurse was a colleague of [Carolyn Garcia](#), an assistant professor of nursing at the University of Minnesota, who also works as a sexual assault nurse examiner at Regions. The story highlights the increasingly expansive roles nurses play in health care. With the U.S. population aging, chronic conditions like Alzheimer's disease and type II diabetes on the rise, and primary care doctors often scarce, nurses are assuming greater responsibilities and leading the wave of health care reform.

At the University, the School of Nursing has already sown the seeds of such a future. A key element is preparing advanced practice nurses like Garcia, who holds a doctorate and is certified as a public health nurse.

The school has recognized that to lead the coming transformations in clinical and community health care, most advanced practice nurses—such as nurse practitioners, nurse anesthetists, nurse-midwives, and clinical nurse specialists—need a clinical doctorate covering areas like research, policy, and clinical scholarship, rather than the master's degree that has historically been the norm.

Accordingly, the school is transitioning to the Doctor of Nursing Practice degree for advanced practice nurses, says [Connie Delaney](#), dean of the School of Nursing. "In fall 2008 we admitted our last class of master's degree students," she adds.

Delaney specializes in informatics, the discipline concerned with managing and extracting useful information from databases. The school established the country's first DNP program with specialties in informatics and in integrative health and healing; the second is a joint program with the University's Center for Spirituality and Healing.

The work of several University nursing faculty illustrates the dynamic work of tomorrow's nurses.

Seeing the whole person

The great strength of nurses rests in their capacity for taking a holistic view of patients.

"Our practice is focused on health promotion and disease prevention," says [Mary Chesney](#), a clinical assistant professor and pediatric nurse practitioner. "For example, when caring for an elder person in the early stages of Alzheimer's disease or arthritis, a geriatric advanced practice nurse will also focus on how cognition and mobility issues affect the person's quality of life."

"In villages and small cities, certified registered nurse anesthetists are critical for maintaining hospitals and doing outpatient or surgical procedures. They take the burden of being the only one on call off the doctor."

In the child health field, Chesney once coordinated care for fragile children who were seeing up to 10 specialists at a University-affiliated primary care center. She made sure they received immunizations and other general care, monitored medications to head off any harmful interactions, and helped parents with documents necessary for such purposes as receiving Medicaid or putting a child back in school.

"They have to have that go-to support person," Chesney says. "Many research studies have looked at the quality of care by nurse practitioners and nurse-midwives, and we've scored very high. We can do 60 to 80 percent of what a primary care doctor does, but we need more of us. In villages and small cities, certified registered nurse anesthetists are critical for maintaining hospitals and doing outpatient or surgical procedures. Nurse practitioners take the burden of being the only one on call off the doctor."

Nurses, says Chesney, are well positioned to help the health care reform movement achieve its three aims: improving the health of the population, improving patients' experiences so they feel they're in the driver's seat, and controlling costs.

Nurses often care for people with progressive conditions, says [Joseph Gaugler](#), an associate professor and psychologist.

For example, residents of nursing homes may lose touch with distant family members, but Gaugler is working with nurses on a "digital mailbox" to restore that connection. The concept is simple: residents hand-write notes, which are automatically uploaded, scanned, and sent via the Internet to family members, who can respond with notes or pictures of their own.

"Nurses are integral to setting up the networks," says Gaugler, who is piloting the system in ThreeLinks Care Center in Northfield, Minn. "They can introduce the technology to residents, provide information on them, or be part of the residents' networks."

On the ground

Freud may have asked what women want, but it's researchers like associate professor [Melissa Avery](#) who are answering.

In a series of focus groups held around Minnesota several years ago, she listened as Latina, American Indian, Asian, West African, and white women told of their needs and burdens. One finding: Women from a reservation were interested in having a doula, someone to support them through pregnancy and labor.

Working with the University's Powell Center for Women's Health and reservation staff nurses, Avery, a certified nurse-midwife, helped secure funds to support a doula program. Her connections led her to launch a pilot study of whether exercise during pregnancy can help American Indian women treat gestational diabetes. And she has just applied to the Centers for Disease Control to fund another pilot project to test whether a combination of exercise and a better diet can prevent gestational diabetes.

"It's a way to help women help themselves," says Avery of her work. "Also, it's an example of nurses working with underserved populations. Nurses have a history of doing this kind of work."

Garcia, too, continues that role through her work with the Latino communities of the Twin Cities.

"Four of 10 Latinos don't finish high school," she says. Talking to girls, she finds that besides the usual stresses causing them to drop out, they may do so because their parents are being deported or they have to replace an injured parent doing factory work.

Among several projects, Garcia has a pilot program in which mothers and daughters are given digital cameras and asked to document an issue of concern to them such as poor nutrition, crime, or poverty.

"It helps mother and daughter connect and gives them positive reinforcement," says Garcia. "At the end, they create a photo exhibit and invite their target audience to view and respond to it."

When she was a graduate student, Garcia had a similar project in which immigrant Latino girls and boys took pictures of healthy or unhealthy things in their environment. They photographed trash, parks, polluting factories, smoking, an apple being washed, and pregnant friends.

From a bridge, one boy shot Interstate 35W and its myriad cars.

"I saw it as congestion," Garcia recalls. "But the boy had this reason for taking the picture: 'I can see the blue skies and the cars,' he said. 'But if I were in Mexico City on this bridge, I couldn't see the cars or the sky.' It's fun, exciting stuff."

Nursing celebrates centennial
The University of Minnesota School of Nursing celebrates its centennial this year. It also hosts the 33rd annual **Midwest Nursing Research Conference** March 27-30.



Power from the sun

March 19, 2009

U professor uses solar energy to make fuel; offers insight at Ada Comstock lecture

By Pauline Oo

Growing up, Jane Davidson went to an all-girls high school and didn't know any engineers. But the University of Minnesota professor of mechanical engineering was good at math and science, and she had a chemistry teacher who encouraged her to enter the field of engineering.



Mechanical engineering professor Jane Davidson is director of the University of Minnesota's Solar Energy Laboratory.

Photo courtesy Institute of Technology

"I think she saw that I was a little bit of a maverick, and that I would be willing to try something that girls at that time weren't trying," says Davidson. "It was 1968 when I started college, and I was the only girl in my class."

Davidson, who directs the U's Solar Energy Laboratory, was recently named an Ada Comstock Distinguished Scholar. The Women's Center in the Office for Equity and Diversity Women created the award in 2005, with support from the Office of the Vice Provost for Faculty and Academic Affairs, the Graduate School, and University Libraries, to honor the accomplishments and leadership of distinguished female faculty at the University. Award winners receive a piece of artwork by a Minnesota artist and get the chance to publicly share their research in the Ada Comstock lecture series that year (see sidebar). Davidson will speak about how to use solar energy to make fuels in "Solar After Dark: Going Green at Night" at 4 p.m. Tuesday, March 24, in Cowles Auditorium in the Hubert H. Humphrey Institute.

"The idea is that you can make the fuels during the day when the sun is shining, and then you can use them whenever you want, including at night," says Davidson, whose current research focuses on solar systems for buildings and solar thermo-chemical cycles to produce fuels. "[Solar power is] the most abundant source of energy that we have on earth. It's clean, and it doesn't produce CO2 and greenhouse gases."

Davidson's path to everything solar was laid in 1985, thanks to George Lof, who ran the Solar Energy Applications Laboratory at Colorado State University. Lof, who is considered one of the great U.S. leaders in solar energy, (he built the nation's oldest known solar home in 1957) and is almost 100 today, approached Davidson, then an assistant professor at the university and interested in cleaning up polluting gases from coal power plants.

"He asked me if I would be interested in working on a solar energy project with him," she recalls. "I said, 'Sure, that'd be interesting.' And I've never looked back. I've loved it ever since. It's amazing to have mentors—what impact they can have on your life."

Davidson has served as editor of the American Society of Mechanical Engineers' (ASME) *Journal of Solar Energy Engineering*, and at present sits on a number of renewable energy committees, among them Gov. Pawlenty's Clean Energy Technology Task Force, America's Energy Future Renewable Electricity Panel, and the ASME Global Climate Change Task Force.

"Not only is Jane working in a really important area—how to harness power directly from the sun—but she is also working with the state and federal government to advise them on energy policy," says Caroline Hayes, University of Minnesota mechanical engineering professor. "This is critical for making new solar and energy technology broadly available in the near future so that we, as a society, can mitigate the rising costs of energy, global warming, and impact on the environment as rapidly as possible."

Fossil fuels—coal, oil and natural gas—provide more than 85 percent of all the energy consumed in the United States, nearly two-thirds of the country's electricity, and virtually all of its transportation fuels. Solar power, on the other hand, contributes less than one percent of electricity generated in the United States.

"[I hope people will leave my lecture] with an appreciation of the fact that solar energy can be an important part of how we produce energy," says Davidson. "It will be an important part of the mix of both electricity production and fuel production in the U.S. The technologies are out there to use solar energy to do a variety of things."

A dessert reception will follow Davidson's free lecture. To reserve your seat at "Solar After Dark: Going Green at Night," e-mail women@umn.edu.

On the side: Women in engineering

"Women are very successful in the field, and a number of women have become great leaders in engineering," says U professor Jane Davidson. "Unfortunately, we still have not as many women as ideal. Certainly, better than when I started school in the late 60s, but not much better than the mid 70s. We still have a long way to go."

When asked why aren't there more women in engineering, Davidson replied: "If only we had an answer to that, we could come up with a fix."

Over the years, though, Davidson has been involved in a number of outreach programs at multiple universities across the United States. Closer to home, she and U colleague Sue Mantell codirect a National Science Foundation-funded research experience for undergraduates in mechanical engineering. Each summer, they bring about 15 outstanding students from all over to the Twin Cities campus.

"They work here for 10 weeks with faculty mentors," says Davidson. "We've had a 50-50 mix of men and women every year, and it's very exciting to see how that works. It's unique to engineering to have that mix. In fact, almost all of the women have gone on to graduate school."

Ada's women

Professor Jane Davidson joins a growing list of Ada Comstock Distinguished Women Scholars. Each year, a committee made up of University faculty picks a professor from the humanities, arts, or social sciences in the fall and another colleague from the sciences or engineering in the spring.

Once the selections are made, Women's Center director Peg Lonnquist and another committee, comprising artists at the U, decide on the gift—a piece of art—to give to each winner. The artwork, always by a female Minnesota artist, varies from year to year following a chat with the recipients, says Lonnquist. (Davidson will receive hand-blown glass art by Stacy Kelly.)

Recipients then deliver a lecture on a topic related to their field during their respective (winning) semesters. The award is named after Ada Louise Comstock, a Minnesota native who taught rhetoric at the University of Minnesota and in 1907 became the U's first dean of women.

For more information, visit the [Women's Center](#).



High on research

March 23, 2009

New study on how anti-drug messages affect youth

By Ellie Lijewski

It's hard to watch any TV show these days without coming across at least one ad demonstrating the harmful effects of meth, heroin, or marijuana. Most people watch and tune out as with other commercials, but do our minds and bodies react to these messages?



Ellie Lijewski with professors, from left to right, Ron Faber, Marco Yzer, Bruce Cuthbert, and Angus MacDonald.

Photo: Rodrigo Zamith

A study here at the University of Minnesota, Twin Cities aims to discover just that.

A team of reserachers is examining how adolescents between the ages of 15 and 19 process and interpret anti-drug ads. The team chose this subject because too little is known about the types of health-related messages that are effective and how they work.

This research project is unique in not only its aims, but in its team, resources, and procedures. It combines students, including me, and faculty from several departments who will work over three years to discover more about anti-drug advertisements and their efficiency, effectiveness, and connection to the brain.

The goal is to learn more about the neuroanatomical basis of message processing to prevent substance abuse among adolescents.

Big chance

I was one of 45 students granted a Freshman Research Award through the Freshman Research Program in the College of Liberal Arts (CLA). Working with the Office of Admissions, CLA hand matches the students with faculty and programs to create the best possible partnerships.

This semester I am working with faculty and graduate students to design and implement a portion of this health communication study. When I first came to the University of Minnesota in the fall, I had no idea that I would be involved in an interdisciplinary research project focusing on neuroscience and marijuana.

The most important thing to me, however, is that I am getting this experience so early in my academic career; I am working on something that only select upperclassmen usually get to do.

The National Institute on Drug Abuse (NIDA) funded the study, which is broken up into two parts. Part one looks at the features of anti-drug public service announcements (PSAs) that lead to changes in teen perceptions of and behavior toward marijuana. The second goal is to examine whether effective anti-drug PSAs are related to the activation of certain brain networks. For this portion, we will work with neuroscientists from the psychology department to use functional neuroimaging, which shows how the nervous system processes information from the environment, to determine how the anti-drug ads are perceived by the individual and affect the body.

My award stipulated that I work with School of Journalism and Mass Communication (SJMC) professor [Marco Yzer](#). Specifically, we have been measuring the perceived and actual effectiveness of these ads. We are also trying to explain the effects of weak ads versus strong ads and why anti-drug ads sometimes are ineffective or even counter-effective.

Dream team

An exceptional aspect of this project is the number of people working toward the same goal.

Besides Prof. Yzer, the team includes advertising professor [Ron Faber](#), psychology professors [Angus MacDonald](#), [Monica Luciana](#), and [Bruce Cuthbert](#), and marketing professor [Kathleen Vohs](#), as well as several graduate students. Even more mind-boggling, though, is that I get the chance to meet and work closely with them.

One aim of the CLA Freshman Research Program is to "expand opportunities for undergraduate research in CLA." My inclusion in this project has done just that. Research, something that had only been remotely interesting to me before, now seems like the most exciting and fascinating subject—something that contributes to everyday learning and knowledge.

I can now tell you what MediaLab is (a program that helps design and execute study questionnaires such as the ones we'll be using), how to submit a grant proposal, what the IRB (Internal Review Board) is and why it is so important to researchers (it has to approve every procedure), and what the amygdala is (a part of the brain deep in the temporal lobes associated with emotion and affected by stimuli).

I'm learning how to work with people who don't even necessarily speak the same academic language, how to solve problems, and how to go about designing and testing unprecedented topics and procedures, all on a deadline. I've discovered that it takes a huge amount of effort to set up studies and recruit volunteers.

Head start

The most important thing to me, however, is that I am getting this experience so early in my academic career; I am working on something that only select upperclassmen usually get to do. The people I've met, the experts I get to listen to, and the relationships and networks I am forging through this experience are priceless. CLA strives for students to "gain insight into the role of innovation and discovery in a particular discipline." I have reached that goal and am continuing to discover and realize new possibilities.

Marco Yzer has a great attitude about research that extends into all the work we do together: "The number one thing to get out of an experience like this is an enthusiasm for research. Much more than skills, research is about natural curiosity and asking questions, research is a tool for pursuing those questions, basically it is just playing around with thoughts we have. Research without enthusiasm is hell, you will hate it, you will be bored ... Research is a process that takes you from an idea or a thought to a tangible [product]."

Being the only undergraduate, let alone freshman, working on this incredible research project is intimidating, yes. When I first began, I was sure absolutely everything would go straight over my head. How could a public relations major and English literature minor understand AND be a contributing member of the team? So, I listened. And listened. And listened some more, making mental lists of words to Google later. I've found, however, that as we go along, I understand more about the project, and I am even able to offer a helpful suggestion every once in a while. In the end, I'm learning more than I thought possible, and it's more rewarding than I ever thought it could be.



Gophers down Irish

March 23, 2009

Women's basketball team defeats Notre Dame to advance in NCAA tourney

By Rick Moore

The Gopher men's and women's basketball and hockey teams were scattered halfway across the country over the weekend seeking success in post-season tournaments. Unfortunately, three of the four teams saw their seasons come to an end.

The women's hockey team bowed out to Mercyhurst 5-4 in the semifinals of the Frozen Four in Boston on Friday; the men's hockey team lost to 2-1 UMD in the WCHA Final Five in St. Paul on Thursday night, dashing its hopes for an NCAA tournament bid; and the men's basketball team dropped its first-round NCAA tournament game to Texas 76-62 in Greensboro, North Carolina, also on Thursday night.

The only luck of the weekend came Sunday for the women's basketball team at the home of the Irish. The No. 10 seed Gophers went into South Bend, Indiana, and knocked off No. 7 seed Notre Dame 79-71 in a first-round NCAA tournament game. They'll now move on to the round of 32 against No. 2 seed Texas A&M Tuesday at 6 p.m., also in South Bend.

The Gophers (20-11) jumped out early against the Irish, hitting 11 of their first 13 shots and taking a 42-30 lead at the half. Both teams found themselves shorthanded in the second half. Notre Dame's leading scorer Lindsay Schrader was relegated to the bench after suffering back spasms. And Minnesota had to play most of the half without Brittany McCoy and Jackie Voigt, both of whom were in foul trouble.

The Irish made a number of runs, but the Gophers were able to withstand every one. When Notre Dame cut the lead to 55-53 about midway through the second half, Katie Ohm responded for the Gophers by hitting three straight three-pointers in a span of three minutes, which pushed the lead back to eight points. The Gophers never trailed by less than seven after that.

Senior guard Emily Fox led Minnesota with a game-high 23 points. Ohm finished with 15 points on 5-for-9 shooting from three-point range, and Zoe Harper came off the bench to establish an important inside presence, grabbing 13 rebounds in 20 minutes of playing time. Ashley Ellis-Milan also added 10 points.

"I'm really proud of our team, and I'm really happy for this group to be able to pull off this win today," Minnesota head coach Pam Borton said after the game. "It was a great team effort. Everybody contributed on both ends of the floor in a great college women's basketball environment. It was a great win, and we did all the necessary things to win this basketball game."

Texas A&M (25-7) finished tied for third in the Big 12 conference with a record of 11-5. The Aggies beat Evansville 80-45 in their first-round game on Sunday.



Katie Ohm drives past a Notre Dame player in the Gophers' 79-71 victory over the Irish on Sunday. Ohm finished the game with 15-points, all on three-pointers.

Photo courtesy Sylvia Hesse



Weather underground

March 24, 2009

Predicting weather 10-15 miles up from half a mile underground

By Deane Morrison

One just doesn't expect cosmic rays streaming in from outer space to predict weather disturbances 10 to 15 miles above our heads. But they did, even though the gizmo detecting those rays lies under half a mile of rock.

This odd result emerged from work by a large international team of researchers, including several University of Minnesota physicists, studying cosmic rays hitting an underground detector in the University-operated Soudan Underground Laboratory, located half a mile deep in an old iron mine in northern Minnesota.



Turbulent "cloud streets" stretching hundreds of miles near Iceland. Cosmic rays contain clues to weather in Arctic regions, U physicists found.
Photo: NASA

Hit parade

The frequency of cosmic ray "hits" correlated closely with a rare and sudden warming of the stratosphere called, appropriately, a sudden stratospheric warming (SSW). An SSW can affect both the severity of winters in northern regions and levels of ozone over the poles. Being able to detect and study these events will help weather forecasters and climate modelers improve their predictions.

"The advantage of this technique is, we have [cosmic ray] records from various experiments in the world that go back several decades," says team member [Alec Habig](#), a professor of physics at the University of Minnesota-Duluth. "Now we can go back in the historical records and see [how cosmic ray data correlates with stratospheric weather events over long periods of time]. People trying to figure out how weather in the upper atmosphere works will have another tool to build models of it."

In the Arctic and Antarctic, winds whip around the poles in a circular pattern called a polar vortex. But if the heart of the vortex can be likened to the eye of a hurricane, sometimes, says Habig, that eye wobbles off center and causes various weather events.

"It's as if the vortex is taking an excursion," he says. From wobbling of the vortex to SSWs to weather on the ground, everything is connected "but it's not a simple correlation."

"It's fun sitting half a mile underground doing particle physics. It's even better to know that from down there, we can also monitor a part of the atmosphere that is otherwise quite tricky to measure."

How can weather anywhere have anything to do with cosmic rays?

These extremely fast, energetic particles are generated far from the solar system, and some reach the end of their journey by colliding with air molecules in Earth's atmosphere. Among the debris from such collisions are unstable particles called mesons. If mesons can keep from hitting other air molecules long enough, they will decay to form even tinier particles called muons.

Muons also travel fast, and many keep going right down to the Earth and deep into solid ground. About 40,000 a day hit the Soudan detector.

For many years, the rate of muon hits has been observed to rise slightly when the upper atmosphere has warmed. That's because when air warms, it expands, spreading out the air molecules. This improves mesons' chances of avoiding collisions long enough to decay into muons. Therefore, more muons are produced and more penetrate to the detector.

The rain of muons usually counts as background noise in the detector, which was set up to catch even teensier particles called neutrinos. But in February 2005, the cacophony generated a dividend that surprised even the seasoned researchers when a small but clear rise in the rate of the muon "hits" coincided with an SSW.

SSWs occur on average about every other year, but they are dramatic: In just a few days the temperature can shoot up as much as 75 Fahrenheit degrees and stay there for a couple of weeks. And they have been devilishly unpredictable. But maybe now that will change.

"It's fun sitting half a mile underground doing particle physics," says team member Giles Barr of the University of Oxford. "It's even better to know that from down there, we can also monitor a part of the atmosphere that is otherwise quite tricky to measure."

The study was led by scientists from the UK's National Centre for Atmospheric Science and the Science and Technology Facilities Council. The detector in the Soudan lab is part of the MINOS experiment, a project of Fermi National Accelerator Laboratory in Batavia, Ill.



Identity in clothes

March 25, 2009

The Goldstein's current exhibit offers a whirl-wind tour of ethnic clothing near and far

By Pauline Oo

If you look closely enough, you just might see the beautiful, nearly bare princess in that richly embroidered skirt and blouse just inside the Goldstein museum. Or not. "Some things are best left to the imagination," says Kathleen Campbell, co-curator of the museum's current exhibit, "Expressions of Stability and Change: Ethnic Dress and Folk Costume," through June 14.

The outfit from Mexico, which supposedly tells the story about magical leaves, flowers, and feathers swooping in to protect a princess's modesty after an admirer chances upon her bathing, is one of 30 ensembles of ethnic dress and folk costumes chosen to represent how apparel is used as a form of cultural expression and unification.

The exhibit is organized geographically, with clothing from the Americas greeting visitors as they enter and apparel from Africa, the Middle East, Europe, and Asia displayed counterclockwise through the museum. Labels appear alongside each outfit—ranging from a robe to a whole collection of items—to explain where it came from (country), what it was made of, who wore it, when it was worn (year and occasion), and, for some, what the symbols or design on it meant. Pictures or photos are also included to better illustrate how an outfit is worn. Two University students from a museum studies class helped curators Kathleen Campbell and Jean McElvain with the design the space.

"To our eyes, some of the clothing may look strange," says Campbell. "But this exhibit is about looking at ethnic dress as an outward symbol of cultural identity."

In addition to clothing, Campbell says ethnic groups are tied by religion, places, aesthetic preferences, ways of organizing their society, and language. For example, some groups like somber or dark colors; others like to reveal the body.

"We avoided using 'traditional' because the word doesn't capture that dress changes over time," explains Campbell. "Ethnic dress is not static. It changes in response to other cultures, technology, and the roles of men and women in the society."

For example, European folk costume of Norway, Poland, and Croatia has evolved from mostly handmade to machine made and is now worn only for festivals, weddings, and other special occasions. In Nigeria, Guatemala, and Bhutan, on the other hand, ethnic dress often still includes hand-woven, hand-printed, or hand-dyed textiles and is still worn on a daily basis. Additionally, weaving patterns and colors are distinct from village to village or town to town.

"Even though it changes," Campbell adds, "people have feelings of meaning and belonging in a group when they where the dress. People outside the group know these people belong to a particular group."

Take the *Baba riga*, for instance, on one of the walls of the Goldstein. The Hausa people of Nigeria, West Africa, wear the voluminous (about the size of a dining table for six) calf-length formal robe, and they have been making them since the early 1900s. Simple as it looks, the *Baba riga* is actually made from narrow-strips of weaved cotton and embroidered with an asymmetrical design around the neckline. Embroidery is an important indicator of social status among the Hausa, and the designs are commonly found on other objects, such as pottery, bowls, basketry and body decoration.

Speaking of voluminous, another outfit that is surely a can't-miss: the deep blue *uchikake* (wedding kimono) embroidered with silk and metallic peacocks, peonies, and cherry blossoms. It is lavish in every respect—color, size, and embellishment. Today this kimono is worn only by Japanese brides for special ceremonies, and most would rent it.

"You can go in and appreciate this exhibit at different levels, from superficial to detailed," says Campbell. "Even at the superficial level, you'll go away with some important impressions—there's a huge variety in ethnic dress, there is so much handiwork, and ethnic dress for men are every bit as interesting."

The exhibit is supported in part by the University of Minnesota Imagine Fund and donations from the McKnight Foundation, the College of Design, and the Friends of the Goldstein. Some of the ancient and modern outfits are on loan; others were selected from the Goldstein's vast collection of international apparel, which includes hundreds of donated ethnic costumes—collected over a span of 75 years—from the International Institute of Minnesota.

The Goldstein Museum is located on the second floor 241 McNeal Hall, 1985 Buford Ave., St. Paul campus. Visiting hours are Tuesday, Wednesday, and Friday from 10 a.m. to 4 p.m.; Thursday from 10 a.m. to 8 p.m., and on weekends from 1:30 to 4:30 p.m. Closed on Mondays. Admission is free.



The Goldstein museum's current exhibit features the richly embroidered folk costumes from Sweden (right) and Norway.

Photo: Pauline Oo

Related lectures

Thursday, April 2, 6 p.m.
"Kalabari Dress of Nigeria as an Example of Cultural Authentication," by Joanne Eicher, Regents Professor Emerita, College of Design

Thursday, April 23, 6 p.m.
"Somali Immigrants in Minnesota and Scandinavia: Cultural Authenticity and Economic Dynamism," by Benny Carlson, economic history professor, University of Lund, Sweden, and fellow at The American Swedish Institute in Minneapolis

Both events will be held in 274 McNeal Hall; a reception follows. For more information, see design.umn.edu.

Related class

The Osher Lifelong Learning Institute is offering Bookends: Exploring Heritage Through Ethnic Dress, a class on the ideas behind the exhibit. Participants should bring an object, memento, photo, or memory of their family's traditions to share with the group. Limit 20 people. Thursdays, April 16 and 23, 10 to 11:30 a.m., 333 McNeal Hall. Learn more at www.cce.umn.edu/olli.



Looking back at a current event

March 25, 2009

A University-led project paved the way for national rural electrification

By Deane Morrison

They had never seen anything like it, these families who farmed the rolling land near the Mississippi River town of Red Wing.

Bundled up on the darkening Christmas Eve of 1923, they gazed expectantly at a lone pine tree on the W.A. Cady farm in the community of Burnside. Strung with electric lights, the pine awaited the flip of a switch to burst into radiance.



It's hard to imagine farms without electricity. But it took the University-led Red Wing project to show the value of rural electrification.

The families were among the first beneficiaries of the Red Wing Project, an experiment to test the feasibility and value of bringing electricity to rural America. A University of Minnesota professor named E.A. Stewart had worked tirelessly with Burnside families to make their new power line a reality. Soon, feed grinders, water pumps, cream separators, grain threshers, and other farm implements would run on electricity.

When the switch was thrown, the Christmas tree lit up as if to symbolize rural electrification's bright future—and the success of the Red Wing Project. The project was commemorated March 26, 2009, at a **centennial** celebration of the University's Department of Bioproducts and Biosystems Engineering (BBE).

Formed in 2006, BBE united the faculties of agricultural engineering and bio-based products (formerly forest products). It traces its ancestry back to the founding of the Division of Agricultural Engineering in 1909 and to the wood technology program of the 1920s.

The Red Wing project stands out as the first great example of service by the academic ancestors of BBE faculty.

"It led to a whole series of developments, one of the biggest of which was making life for people in rural areas more like life for people in urban areas," says BBE professor **Vance Morey**. "It led to more efficient and productive farms and reduced the drudgery of farm work, which was just as important because it gave people more time to do other things."

Power surge

In early 20th-century America, supplying the countryside with electricity was not a universally popular idea. Private utility companies tended to oppose it because they believed that having long power lines serving widely spaced farms would be unprofitable. Others, according to author D.E. Nye in *Electrifying America: Social Meanings of a New Technology*, thought rural electrification "threatened the balance between man and nature."

But the Red Wing project proved them wrong. It brought University agricultural engineering faculty and farmers in Goodhue County together with other parties, including other University faculty and Northern States Power Co. (NSP), in pursuit of the stated objective "to determine the optimum economic uses of electricity in agriculture and to study the value of electricity in improved living conditions on the farm."

Stewart and other engineers had to figure out how to transfer all kinds of machines run by human or horse power to electric power. How were they to integrate motors into a feed grinder? Where to run the wiring in a barn?

It was a tall order, but they got the job done. And once the farm families had tasted electrification, they let it be known they were not willing to give it up despite its cost.

For example, electric milking machines cut milking time and allowed a farm to keep more cows. And not having to pump water by hand, lug pails of it to the house, and heat it over a wood stove to get bathwater? Priceless.

Historians often see the formation of the national Rural Electrification Administration in 1935 as the seminal event in the electrification of the American countryside. But the success of the Red Wing project in the previous decade provided the prime model for the REA's effort.

Although the Red Wing project's power line was experimental, "it arguably provided the greatest impetus to rural electrification of any event prior to the establishment of the REA in 1935," says Xcel Energy (formerly NSP) spokesman Patrick Cline.

"We are proud that some of the most important early developments related to rural electrification occurred at the University of Minnesota," adds BBE department head **Shri Ramaswamy**.

At the March 26 ceremony, the Red Wing project will be designated as a national historic landmark by the American Society of Agricultural and Biological Engineers.



The name says DigME--and they do

March 26, 2009

The U is helping give Roosevelt High School students experience with digital technologies

By Diane L. Cormany

Imagine being a high school student, being handed an iPod touch, and told to go do your homework. Such was the assignment for students in Roosevelt High School's Digital Media Studies program, who used Google Maps and a built-in GPS to map their Minneapolis neighborhood.



Through the DigME program, Roosevelt High School students use social media to get more engaged with academic subjects.

Known as DigME, the new learning community gives students a chance to work with the kind of audio, video, and computer technologies that are shaping society.

The program, which was the brainchild of Roosevelt English teacher Delainia Haug and dean of students Damien Poling, has tapped the expertise of faculty and students from the University's College of Education and Human Development.

The DigME curriculum emphasizes critical thinking and hands-on technical skills in numerous subjects. For example, while students mapped their neighborhood for teacher John Wood's 9th-grade geography class, they also worked with artist Wing Young Huie to document the area via digital photography. In social studies, they evaluated data about neighborhood crime and used digital tools to evaluate neighborhood water quality for science class.

DigME students also create audio, video, blogs, and wikis—essentially online collaborative communities. In the process, students learn essential group work skills, along with organizational, management, and communication abilities, Haug explains. Teaching students to use the Internet responsibly and critically also develops creative and independent thought, she adds.

DigME also helps students realize that college is a possibility for them. In October students visited campus and took part in seminars related to digital media in the classroom, the arts, and the workplace.

Research shows that people will need critical media literacy to succeed in 21st-century society, says Haug, who has discovered a significant gap in digital literacy among the students in DigME. At the start of the school year, the skill level ranged from those who knew how to write html to some who didn't know how to send an attachment with e-mail.

"Our kids come from backgrounds where they don't have access [to digital technology] outside of school," Haug explains. "It's our obligation to provide them with access."

Roosevelt's student body comprises many lower income students and English language learners. About one-third of DigME's 150-plus students have no computer in the home. The program recently acquired 30 laptops, along with the iPod touches.

"There is a social justice aspect to the program," says curriculum and instruction professor Cynthia Lewis, who helped Haug shape DigME's goals and leads the partnership with the University.

Students faced a steep learning curve during the fall term but are starting to make the media their own, says DigME program coordinator Poling, a graduate student at the college. "They're engaged when they're working with the technology. It's been huge leaps for them as far as what they're used to." Roosevelt Principal Bruce Gilman and Executive Director of Technology Coleen Kosloski have likewise been critical to getting DigME off the ground, says Lewis.

DigME also helps students realize that college is a possibility for them. In October students visited campus and took part in seminars related to digital media in the classroom, the arts, and the workplace. The visit helped fulfill the University's commitment to connecting with diverse potential students, as well as Minneapolis Public Schools' goal to prepare every student for college.

Lewis and her colleagues intend to research how the digital media curriculum helps drive achievement, persistence, and postsecondary learning.

In addition to Lewis's ongoing work, Rick Beach, Aaron Doering, and Cassie Scharber from the Department of Curriculum and Instruction and Shayla Thiel-Stern from the School of Journalism and Mass Communication, along with doctoral students Jessica Dockter and Candance Doerr, have offered ongoing professional development.

"[University of Minnesota faculty and students] have been absolutely a huge part from the ground level," says Haug. "If we need something, we can call them and they'll help us find it, or they'll come in and help us hash things out."



Speaking of language

April 1, 2009

At the U, nearly 40 language options provide a wealth of cultural opportunity

By Judy Woodward

It's your first visit to the home of your new Iranian acquaintance and you can't wait to try some of that terrific rose-water-infused cuisine you've heard about. Politely, your host offers you something to eat. You've been studying your Persian dictionary for just this moment, and you're ready.

"Wow, thanks," you say in Farsi, smiling broadly in the interests of international understanding. "I'm starving!"

Congratulations. You've just revealed yourself to be a social barbarian, completely unversed in the elaborate rituals of *taarof*, the Persian social code that governs virtually every aspect of behavior in the highly nuanced world of Iranian hospitality.

"A different language is not just another vocabulary; it's a different vision of life," says Mahmoud Sadrai, instructor of Persian and linguistics. As a teacher of Persian, Sadrai believes that his job is to teach the culture as well as the vocabulary.

Persian is just one of the nearly 40 languages taught at the University of Minnesota. Every one of them holds the promise of introducing a new world and a fresh perspective on life, but only if the learner understands one critical point: When it comes to learning a language, your grasp of grammar may be impressive, your vocabulary large, and your accent native-like, but, if you don't understand cultural practices like *taarof*, you haven't learned the subject.

Sadrai defines *taarof* as an elaborate "system of politeness strategies." He explains the social misstep involved in accepting food too quickly. "In Persian culture, you are obligated to offer food," he says, but it's also rude to accept too quickly. "You can't accept until the third offer," he says. A brash American might note inwardly at that point that the food is getting cold, but he would be missing the point. Sadrai says, "Even though you know your position [in the social hierarchy] you must go through the ritual of self-effacement. Part of *taarof* is saving face, and allowing others to save face."

An all-encompassing system that covers every social encounter, *taarof* explains why, for example, it might take an hour to bid your Iranian host a polite farewell. Noting that *taarof* helps define and enforce social hierarchies, Sadrai says, "It's a way of giving deference, but the politeness need not be sincere."

Widening the lens

There are all kinds of reasons to learn a language, says Elaine Tarone, director of the University's Center for Advanced Research on Language Acquisition (CARLA). Studies show, for example, that children in language immersion programs have greater cognitive flexibility and are more creative.

She also believes, though, that as Americans, we simply shortchange ourselves if we cling to our monolingual culture. "We have a limited view of being human if we see things through only one cultural lens," says Tarone, a Distinguished University Teaching Professor of Second Language Studies. "We Americans value freedom, yet we [risk] locking ourselves into one way of seeing the world."

Beyond mastering grammar and vocabulary, real communication depends on learning what she calls the "pragmatics" of a language. "As you become more proficient in a language, the knowledge of the culture becomes more important," Tarone says. "In fact, the two are so interrelated that you can't assess proficiency without talking about what [students] know about culture."

Say, for example, you need to apologize for a minor social blunder. To do that, a student has to understand not just words and sentence structure, but also the cultural nuances and the social standing of those who may have been offended. "You have to suit the language of apology to the degree of offense ... [and] to use the language at that advanced level, you need to know the culture," she says.

But acquiring a level of proficiency that ensures cultural as well as linguistic competence is no easy matter. Tarone points out that there are times when a student's native culture can consciously or unconsciously sabotage the learning process. Take the delicate matter of what Western society defines as plagiarism. American students are raised to be individualists, accustomed from their earliest school days to reformulate and synthesize assigned reading "in their own words."

Not so for students from some Asian cultures, says Tarone. "They may come from a culture where the learning model is to memorize from the experts," she explains. "They say, 'I am not worthy to change this expert's words.'" For these students, putting something in their own words is not the sign of healthy engagement with the subject matter, but the mark of a presumptuous usurpation of scholarly authority.

Such difficulties are not confined to Asian students striving to master English. Tomoko Hoogenboom, who was a lecturer and lead teacher in the U's Japanese program in Asian Languages and Literatures last year, knows her American students have extra difficulty mastering the elaborate forms of *keigo*, the Japanese system of honorifics used to establish formal social relationships. "In Japanese culture," she says, "there are so many ways of politeness. You need to find out where you belong."

Every public encounter in Japanese involves establishing oneself as a member of an in-group or an out-group, says Hoogenboom, and using specific language prescribed for each role. She explains that so apparently simple an exchange as entering an office and asking to speak to the boss can involve an exhausting linguistic calculus for those not comfortable in the intricacies of *keigo*.

The person who enters the office makes it clear that he or she is a member of the "out-group" by referring to the boss with special honorific forms. The staffer to whom the question is addressed must underscore his or her own "in-group" status by referring to the boss in what Hoogenboom calls "extra-modest" language.

Add to this ritual the fact that there are separate language forms reserved for men and women, and it's no wonder that Hoogenboom has her teaching work cut out for her.

Cultural discomfort can also result when Arabic and American social codes conflict, says Hisham Khalek, director of the Arabic Instruction Program in the Department of African-American and African Studies. Khalek, who has just published a new Arabic curriculum, *Exploring Arabic*, notes that Arabic attitudes toward social discourse go back to nomadic Bedouin life. "A visitor to the tribe was received for three days before he was asked his purpose," he says. By conducting general conversation with the stranger, tribesmen could assess character and behavior before the purpose of the visit was raised.

According to Khalek, that leisurely approach still prevails in Arabic business circles, to the frequent incomprehension of straight-to-the-point Americans: "If you have only an hour for lunch with an Arab businessman, the first 45 minutes will have nothing to do with business."

Artifact vs. organic

A scholar who takes a somewhat different view is associate professor of English David Treuer, a McKnight Land-Grant professor, novelist, and translator of texts from his Ojibwe.

"I'm leery of facile descriptions of how cultures work," Treuer says. "Languages are perfectly capable of expressing what they need to." He's conscious of the tenuous existence of Indian languages like Ojibwe, which is losing native speakers as the inevitable passage of time combines with the powerful lure of American popular culture.

"I work against the idea of seeing Ojibwe as an ancient language," says Treuer. "That shoves it into a museum intellectually. I think of it as vibrant, important, and capable of communicating everything. [But] Ojibwe is in danger of dying out. When people talk about culture in regard to a dying language [they're saying] 'Language is a diorama that shows us how life was.'"

"There are lots of things in a culture," he adds. "Kinship, ceremony, and history, but language is the most important. In the Ojibwe context, it links and connects all those other things together. Language provides a sense of solidarity."

Still, Treuer finds himself mildly impatient with the whole notion of capturing the essence of a culture in any neat formulation.

"As a novelist, I'm much more interested in nuance than in general meaning," he says. As a translator, he believes his job is to "communicate the particularities of a culture in text or speech. ... Translation from Ojibwe is not a matter of translating cultural essence. Cultures are anti-essential. A text is fixed. It stops moving. Cultures are complicated, varied—and always in flux."

Excerpted from Reach, winter 2009, the magazine of the College of Liberal Arts.



Mahmoud Sadrai is an instructor of Persian and linguistics at the U. The Persian language, written from right to left, does not always translate to English, thanks to both linguistic and cultural differences.

Photo: Cameron Wittig



A fine fix

April 3, 2009

On the trail of a vital botanical skill with University researchers

By Deane Morrison

Spring is the season for matchmaking, and a University-led team of researchers will soon be introducing partners in what may rank as the single most productive union on the planet.

That would be the one between specialized bacteria and the root cells of legumes like lentils, soybeans, peas, and alfalfa.

Such unions are actually symbiotic relationships that lead to the majority of the biological nitrogen production in agricultural systems, and from this, much of our plant-based protein. The researchers hope to find the best genetic matches between legumes and the bacteria that live in their roots; the better the match, the greater the protein production potential.

Better symbiotic relationships are important because they produce nitrogen that removes the need for millions of pounds of fertilizer each year. Moreover, more people around the world depend on legumes for protein than on meat, poultry, or fish. That's why the National Science Foundation has awarded the research team, led by University plant pathology professor [Nevin Young](#), a three-year, \$5.7 million grant for the project.

"We want to find which genes are important in forming effective legume-bacteria relationships," says Young. "Then we can ask which versions of those genes work best in different ecosystems."

Instead of studying all types of legumes, the team is using a model legume as a stand-in. Called Medicago (from the Greek words for "root" and "life"), it grows in Mediterranean countries and is a close relative of alfalfa.

The other partner to the union is bacteria called Rhizobium. Denizens of the world's soils, Rhizobium bacteria readily come into contact with legume roots. The bacteria and root cells [recognize each other](#), after which the bacteria settle into the roots and form swellings called nodules.

"In an environment where energy costs are rising, a large part of the world is developing, and the cost of nitrogen fertilizer is going up, it's good economics to try to reduce nitrogen inputs to the land."

Inside the nodules, atmospheric nitrogen is converted to ammonium, a form of nitrogen, in a process called nitrogen fixation. Plants can readily use ammonium to make protein; animals then eat the plants, and so protein passes up the food chain.

To find the best plant-bacteria matches, the team will draw on 400 samples of Medicago and about 150 samples of Rhizobium, both collected from around the Mediterranean. They will inoculate the plants with various strains of Rhizobium to see which combinations result in the best nodule formation.

Their results may show, for example, that one Medicago variety consistently forms better nodules than another variety. If so, the genes responsible for that difference must lie in regions of the genome that are different in the two plants.

To find those regions, the researchers will use state-of-the-art techniques to explore the DNA of all 400 Medicago samples. They then will be able to spot DNA sequences associated with superior ability to form nodules. Since genes are composed of DNA sequences, this will put the researchers in good position to identify which versions of which genes confer this desirable trait.

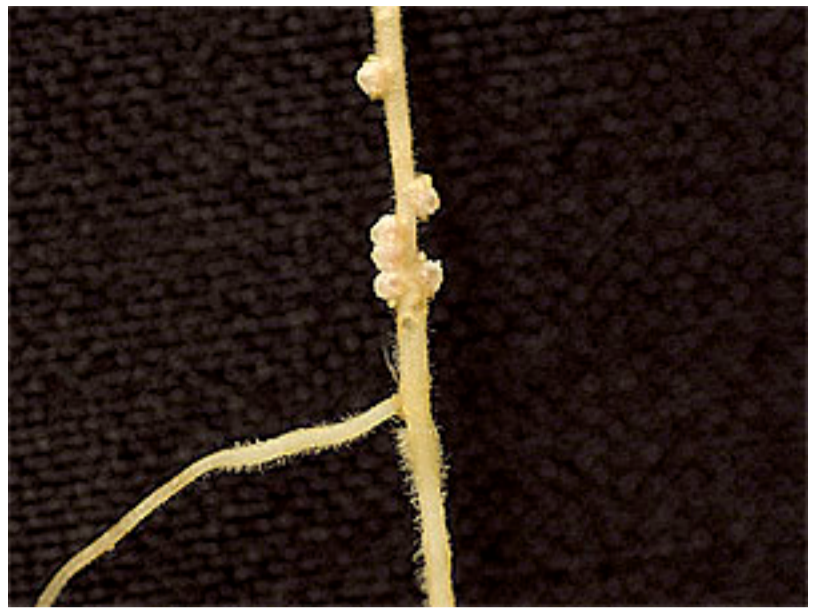
Once this is known, researchers can look for these genetic patterns in other legumes, especially those used as food crops, such as soybeans. The hope is eventually to supply farmers with the best combinations of legume varieties and Rhizobium strains to carry out nitrogen fixation.

Legumes supply protein not only to herbivores, but also to other plants by releasing their nitrogen to the soil when they die and decay. As legumes produce and supply more nitrogen, the need to apply this nutrient via fertilizer decreases.

[Michael Sadowsky](#), a professor of soil science and co-investigator on the project, says this will yield multiple benefits.

"In an environment where energy costs are rising, a large part of the world is developing, and the cost of nitrogen fertilizer is going up, it's good economics to try to reduce nitrogen inputs to the land," he says. "In reducing the need to make fertilizer, we'll reduce the negative impacts of fertilizers on lakes and rivers."

Besides Young and Sadowsky, University associate plant biology professor Peter Tiffin and researchers from Cornell University, Hamline University, and the National Center for Genome Resources are working on the project. The team includes other collaborators from around the world, and this summer three undergraduates apiece from Hamline and the University of Puerto Rico will work on the project at the University of Minnesota.



University researchers are out to boost a critical step in protein production that happens in nodules like these on the roots of legumes.
Photo: Carrie Thompson



Leading the way

April 7, 2009

Liberian President Ellen Johnson Sirleaf comes to the U

By Wokie C. Freeman

In January 2006, Ellen Johnson Sirleaf was sworn in as president of the Republic of Liberia, becoming Africa's first democratically elected female head of state. A remarkable feat on a continent where some countries are accused of "waging war on women."



Ellen Johnson Sirleaf is president of Liberia, a nation of 3.5 million people established by former slaves from America, and the first democratically elected female head of state in Africa.

Prior to her election, the Harvard-educated economist, nicknamed Africa's "Iron Lady," served as Liberia's first female finance minister, held various executive-level positions in local and international banking, and ran the United Nations Development Programme's (UNDP) Regional Bureau for Africa.

At 2 p.m April 10, Sirleaf will be featured as the [2009 Distinguished Carlson Lecturer](#) in a conversation with [J. Brian Atwood](#), dean of the U's Humphrey Institute. Also during the event at Northrop Auditorium, the University will give Sirleaf its highest award, an honorary Doctor of Laws degree for public service. All tickets for the event, which is free, have been given out, but a rush line will form at Northrop box office at 1:00 p.m. No recording devices, cameras, or backpacks will be allowed in the auditorium.

In her new book, *This Child Will Be Great: Memoir of a Remarkable Life by Africa's First Woman President*, Sirleaf shares intimate details about her rise to power and openly discusses the abuse she faced at the hands of her ex-husband.

Up from the depths

Sirleaf has always been one to speak her mind, highlighting the failures and shortcomings of government, and has experienced house arrest, imprisonment, self-imposed exile, and the threat of execution. Now halfway through her term, Sirleaf has revived national hope and restored Liberia's international reputation and credibility.

Nearly 85 percent unemployment contributes to an unstable economy [in Liberia], one that, like many other African countries, relies heavily on funds sent home to relatives by family members working abroad.

"This is a woman who has an idealistic and optimistic vision for her country," says Atwood. "She personifies the hope that people have that their lives will be better." But, Atwood warns in a recent Minneapolis [StarTribune op-ed](#), the global economic crisis now threatens all African heads of state. "If democratically elected governments with impressive leaders like Sirleaf are allowed to fail because of a global problem we helped create, we can expect a strong backlash from their less responsible successors," he wrote.

Sirleaf acknowledges an obligation to the women of Liberia, like the nearly 37,000 "market women" who have been the backbone of Liberian society, serving as heads of households while educating their children on money made as street vendors and traders. Not only did these women help get her elected, they demonstrated for peace during the 14-year-long civil war that killed more than 250,000 people and displaced another 1.5 million. The award-winning film [Pray the Devil Back to Hell](#) tells the story of their efforts.

In 2006, looking for a way to repay these women, Johnson Sirleaf launched the [Sirleaf Market Women's Fund](#). It raises money to rebuild the war-ravaged markets that serve as multipurpose social centers, providing day care facilities, schools, and clinics.

Sirleaf is well respected and admired by colleagues around the world, including Atwood, who helped lead an international campaign to release her from prison in 1986 during Samuel Doe's military regime.

In 2007, in recognition for her tireless efforts to make Liberia a post-conflict success story, President Bush awarded Sirleaf the Presidential Medal of Freedom, the highest civilian honor an American president can bestow.

A precarious future

Although Sirleaf's administration has made considerable progress toward cancelling the national debt by rebuilding many facilities and roads and alleviating corruption, the country still faces significant challenges. Nearly 85 percent unemployment contributes to an unstable economy, one that, like many other African countries, relies heavily on funds sent home to relatives by family members working abroad.

The imminent deportation this year of thousands of Liberians residing legally in the United States under Deferred Enforced Departure (DED) status, which was scheduled to expire on March 31, threatened that arrangement. Minnesota is home to nearly 30,000 Liberians, and an estimated 1,000 currently live under this temporary status as refugees.

On March 20, President Obama extended DED status to eligible Liberians, granting them a 12-month reprieve.

The Liberian community could not be more delighted to welcome President Sirleaf to Minnesota, especially the women. "We are so proud," says Doris K. Parker, executive director of Liberian Women's Initiatives-MN, a Brooklyn Park-based organization that provides services to the Liberian community. "It will be an honor and encouragement to hear her story firsthand. Her visit to Minnesota will empower young women and girls to strive for success."

Books for Africa

In advance of the President Sirleaf's visit to the University of Minnesota, the Humphrey Institute and [Books for Africa](#) are hosting a book drive to send donated textbooks to Liberia.

Books for Africa is the largest shipper of donated text and library books to the African continent.

A drop box is available in front of Northrop Auditorium from 11 a.m. to 2 p.m., April 6 - 10.



Garden revival

April 9, 2009

U's Arboretum offers resources for vegetable gardeners

By Barb DeGroot

Looking for ways to save money in this tough economy? Search no farther than your own backyard.

From the White House to the corner bungalow, it seems like everyone these days is grabbing a hoe and planting a home vegetable garden to help stretch family food dollars and have some delicious fun outdoors.

According to the National Gardening Association, about 43 million U.S. households plan to grow vegetables or fruit this summer, a 19 percent increase over 2008. For a modest initial investment, a home vegetable garden can reap significant savings at the family dinner table.

If you lack a "green thumb," the Minnesota Landscape Arboretum in Chanhassen can be a great resource for gardening ideas and assistance. As part of the University of Minnesota, the Arboretum serves as a community and national resource for horticultural and environmental information, research, and public education.

April is a great month for planning your vegetable and flower gardens, according to Peter Moe, horticulturalist and operations director at the Arboretum. Seed catalogs, seed packets, gardening books, and plant tags all provide information on planting dates, seed or plant spacing, and special cultural information. Vegetables are divided into cool-season crops and warm-season crops. Cool-season crops, including lettuce, radish, spinach, and peas, may be grown from seed planted outdoors in well-prepared soil from mid-April to early May.

You can also start some vegetable seeds indoors. Seeds for warm-season plants, such as peppers, eggplants, cucumbers, and tomatoes, usually require an 8- to 10-week indoor head start—with plenty of bright light—before being transplanted outdoors, says Moe. Once the danger of frost is gone and the soil is warm, these plants can be transplanted into the ground—usually the last week in May or the first week in June. (A convenient but somewhat more costly alternative is to purchase these plants as seedlings and simply transplant them into your garden when the weather warms.)

For optimal growth, it's wise to prepare your garden soils well. Remove perennial weeds and incorporate 4 to 6 inches of compost, peat moss, or well-rotted manure. This organic matter improves both clay and sandy soils and helps hold moisture, provides plant nutrients, and makes the soil easier to dig and plant.

Applying mulch around your vegetable plants will help to reduce weeds and retain moisture. "Vegetables are mostly water and will improve in size, flavor, and quantity with uniform, regular watering," says Moe.

For more pointers, the Arboretum offers the following classes and events geared toward gardeners. To register, call 952-443-1422 or visit the [Arboretum Web site](#).

- Plant Information Fair, Saturday, April 18, 10 a.m. to 3 p.m., Great Hall, Oswald Visitor Center. Free with gate admission. This educational fair will feature more than 20 plant societies and garden clubs.
- "Container Gardening," Saturday, May 2, 10 a.m. to 12:30 p.m. \$30 member; \$40 non-member.
- "Integrated Pest Management: Controlling Plant Pests Safely," Saturday, May 9, 10 a.m. to 12:30 p.m. \$30 member; \$40 non-member.
- "Gardening with Herbs," Saturday, June 6, 10 a.m. to 12:30 p.m. \$30 member; \$40 non-member.
- Herb Symposium, Saturday, June 13, 9 a.m. to 3 p.m. Learn all about growing and using herbs. \$55 member; \$65 non-member.

Not only does the Arboretum maintain demonstration gardens teeming with ideas you can replicate on your own, it also offers gardening and horticulture classes for all ages; in fact, children can learn the joys of growing their own food and flowers through Arboretum summer camps and preschool programs. Another valuable resource is the Arboretum's Yard & Garden Help Desk, located in the Oswald Visitor Center and manned by master gardeners on Saturdays from 10 a.m. to 2 p.m. and Sundays from 11 a.m. to 3 p.m. Gardeners can call the Yard & Garden information line with questions (952-443-1426).

A final invaluable resource for gardeners is the U of M Extension's [gardening information Web site](#). It's loaded with the latest horticultural information.



It's estimated that about 43 million households plan to grow gardens with vegetables or fruit this summer, an increase of 19 percent over 2008. Community gardens, like the one pictured above, are also popular.

Photo: Patrick O'Leary

The Germinator

Adjunct assistant professor of English Michael Tortorello recently began writing [a recurring column](#) for the *New York Times* about his foray into urban vegetable gardening.

His first step was to have the U's Extension test his soil for pH, organic matter, phosphorus, and potassium content. Ten days after sending in a sample he found that his dirt was "nitrogen-poor and only a little less sandy than Jones Beach."

You can follow his adventures, from the impossibility of outdoor avocados in Minnesota to the tough love of artichokes, at the [New York Times blog](#).



Middle man

April 10, 2009

As scientists search for answers, philosopher Alan Love focuses on the questions

By Deane Morrison

Rarely do students choose a graduate school just to work with an assistant professor. Yet two of five in the University of Minnesota's latest entering class of philosophy graduate students wanted to come here to study with [Alan Love](#).



Alan Love, an assistant professor of philosophy, is making his mark as a philosopher of biology.
Photo: Kelly MacWilliams

Barely four years out of graduate school himself, Love has carved out a niche as a philosopher of science, especially biology. He aims to work with biologists in widely diverse specialties to find a common language for their common subject: life.

Love concentrates on how questions and concepts cut across disciplines, seeking to understand how researchers in every field, from molecular biology to behavior, can relate to them—and each other.

Bridging gaps

For example, consider two researchers studying how an organism goes from embryo to adult. Working with zebrafish, the first one studies differentiation, the process by which embryonic cells begin to take on individual identities as, say, future intestinal, reproductive, or brain cells.

The second, working with frogs, studies morphogenesis, the movement of cells and tissues that generates 3-D shape. This can be seen, for example, in time-lapse photography of frog eggs. A frog egg divides over and over until it turns into a hollow ball of cells. Then cells in one area push inward, forming an indentation that deepens into a tube that becomes the gut.

Alan Love is one of 11 [McKnight Land-Grant Professors](#) for 2009-11 named by the University Graduate School.

Differentiation and morphogenesis: two processes, two specialties, two model organisms, and two researchers who may never connect.

"Both are asking questions about how organisms develop," Love observes. "But we need to understand in greater detail how the questions about differentiation relate to the questions about morphogenesis."

This may lead the two researchers to jointly examine whether differentiation and morphogenesis are related by cause and effect. That is, when embryonic cells acquire some specific identity, does that cause them to migrate to specific locations in the embryo? Or does migration to a certain part of the embryo lead them to acquire their identities? And does one get the same answers in frogs and zebrafish?

"Science is often presented as a set of facts. ... It shows there's a lot more work to be done and gets students thinking about what's not known and what they can contribute."

Questions like these are of more than academic interest because it is thought that cells that fail to differentiate have an increased likelihood of turning cancerous. Also, if cells fail to migrate properly, that could lead to physical defects in the resulting organism. Understanding these processes will help in the medical fight against such conditions.

Or take another thorny problem, this time in evolution. Evolutionary theory holds that natural selection favors individuals with certain traits such as superior speed or strength. Those traits allow them to survive and leave more offspring than other individuals in particular environments, thereby spreading the traits in the population.

But how do new traits appear in the first place? How, for example, did feathers evolve from reptilian scales in ancestors of birds?

A question like that goes to the heart of how life is structured to adapt to new circumstances. And it is the topic of hot debate among evolutionary biologists, who generally agree that genes are involved in evolutionary change. But some think that the main mechanism behind the origin of new traits is genetic mutation, whereas others argue it's gene regulation.

In genetic mutation, genes change, like typos appearing in text. Mutations can have far-reaching effects, such as causing sickle-cell anemia in humans or conferring resistance to herbicides in plants.

In gene regulation, genes stay the same but their activity changes. For example, a gene that helps shape a forelimb suddenly gets switched on in the tail, producing a new trait. No typos in the text, just a matter of whether, and where, the gene gets "read."

Where's the common ground between these two points of view?

"What you have here is a question about how variation is generated," says Love. "Scientists have competing explanations for how it happens."

He sees his job as not "to be a prophet about how it'll turn out," but to shape the conversation by analyzing the question of how new traits originate and what approaches the researchers should take to answer it. By doing so he hopes to throw new light on the issue and help scientists talk to each other. And in this case, there's certainly room for both mechanisms to be at work in evolution.

Bigger questions

By adding context that helps researchers synthesize distinct fields of biological inquiry, Love opens a door to asking and answering big questions about what life is and how it works.

"Science is often presented as a set of facts," says Love. "I think you might recruit more people into science, math, and engineering if undergraduates saw more of these dimensions and connections, their potential, to answer bigger questions, and, most importantly, how their own contributions can fit into a larger whole. It shows there's a lot more work to be done and gets students thinking about what's not known and what they can contribute."



Busting the myth of eternal progress

April 14, 2009

David Noble dissected the American dream

By Deane Morrison

As a boy, [David Noble](#) delivered milk to Albert Einstein's house in Princeton, so perhaps it's no wonder he grew up fascinated by time and space. And Noble's ideas, like Einstein's, ran counter to conventional wisdom.

But for Noble, a University professor of American studies and history, the concepts of time and space apply to human history, rather than the cosmos. He has labored to bring ideas about the future down to earth by countering the notion of perpetual economic progress.



David Noble, a University professor of American studies and history, retires in May after 56 years of stirring up history.

Photo: Diana Watters

He has also done a wicked job of impersonating historical figures, much to the benefit and delight of his students. After 56 years of teaching, he still adores it, but this May he will finally retire.

"I'm going to miss teaching immensely," says Noble. "I'm enjoying my two classes this spring, one called "Culture Wars" and the other an honors class on Mark Twain."

Noble and his many friends will celebrate his career at 1 p.m. Saturday, April 18, in the McNamara Alumni Center on the Minneapolis campus. The event includes a panel discussion of his work by four former students.

Timeless ideas

The kernel of Noble's message is that Western culture implicitly espouses an idea that economic progress is inevitable and that, in a sense, history will end when the period of war and other strife culminates in an era of stability dominated by American-style free market capitalism.

Such an outlook on the world may have started as far back as 400 B.C., in the urban middle-class Greeks of Plato's generation, Noble says.

"A lot of figures after the 1989 Soviet collapse declared we're at the end of history. They thought American-style free-market capitalism would be the world system, with nothing beyond. That it would take over the world."

"They imagined a dramatic distinction between 'timeful culture' and 'timeless nature,'" he says. "Timeful culture" means the messy era, and "timeless nature" refers to an era of stability that follows after everything gets sorted out. Therefore, if society could escape the one era and enter the other, the people living in that world would essentially have it made.

But is humanity actually headed toward any ultimate state? Noble is skeptical.

He wrote his dissertation on the Progressive Period (1890 through the end of World War I), and noted how many intellectuals of the time despaired when a war that was supposed to lead to a period of order and simplicity failed so utterly to do so.

"I had no idea it was part of a 2,000-year-old narrative," he says. "It got lost in the Dark Ages, but during the Renaissance, urban middle-class Europeans rediscovered the world of Plato, and there were prophecies that 'this generation' will leave timeful culture and get to timeless nature." And, he says, people continue to make prophecies about such a coming state of order.

"People think the global marketplace will be a timeless space," he says, explaining that a timeless space is one with no limits. "The concept of timeless space implies that the United States is eternal. Or, if you live in England, that England is eternal. Or France. That we're at the end of history.

"A lot of figures after the 1989 Soviet collapse declared we're at the end of history. They thought American-style free-market capitalism would be the world system, with nothing beyond. That it would take over the world."

That is wishful thinking, Noble says.

"The irony is, modern [Western] people see themselves as rational and contrast themselves with traditional cultures that have no belief in inevitable progress. We describe them as living in a fantasy world.

"But current American Indian writers are critical of the fantasies of the modern white world." In other words, the tables are turning.

If anyone doubts that such a dream of inevitable economic progress—call it the American Dream or even the world dream, Noble says—exists, he points out that the "dominant culture" reacts with anger to ecologists or anyone else who questions the commitment to perpetual progress.

"It crosses party lines," Noble says. "You can't be the leader of either major party if you don't believe the next generation will always do better."

What we need now is to work out another major narrative of humanity, Noble says. But he sees many undergraduates who recognize the world's problems, "but can't imagine their lives will have any meaning if they cease believing in the American and world dream of each new generation being better off. I see our commitment to rapid changes keeping the world terribly unstable."

History of everybody

Noble also helped wrest U.S. history from the grip of "the dominant Anglo-Protestant culture."

He notes that in the 1950s, U.S. history said nothing about Catholics, Jews, women, American Indians, African Americans, and so on, and there was "a gentleman's agreement" that no one from these groups could teach U.S. history because it was too sacred. Even into the mid-1960s, battles over teaching U.S. history from those perspectives raged in academia, including the University of Minnesota, he says.

It wasn't until 1977 that *The Free and the Unfree*, the first multicultural history of the United States, was published. Written by Noble and Peter Carroll, it was rejected by several publishers before being picked up by Penguin.

"They got it into markets in Europe and Africa, where it did quite well," Noble notes.

And in case you're wondering what Einstein was really like, Noble got a glimpse when his German-born mother came along on a milk run.

"Einstein came out, and she talked to him in German," Noble recalls. "He was very polite, and sustained a rather extended conversation."



Smell at the Bell

April 14, 2009

Olfactory expert Avery Gilbert speaks about the science of scent

By Deane Morrison

During a talk with smell scientist Avery Gilbert, a *New York Daily News* reporter reminded him how far some city dwellers have strayed from their agrarian roots.

"She was talking about how horses in Central Park stink," says Gilbert. "I said, 'What are you talking about?' After too long in the big city, you kind of lose your anchor."

Gilbert, author of *What the Nose Knows*, a whirlwind tour of how scents influence everyday life, will talk about "The Seduction of Scent" at 7 p.m. April 18 in the University of Minnesota's Bell Museum of Natural History, 10 Church St. S.E., Minneapolis.

The seduction part goes beyond the claims of the latest perfume ads. For one thing, it aptly describes the lure of certain orchids that mimic the form and smell of female bees, the better to draw in hapless males to pollinate them.

And, as Gilbert recounts in his book, store owners can manipulate scents to subtly encourage male and female shoppers to buy more. (We tried perfuming this Web page to keep you reading, but failed miserably.)

The natural world is awash in scents that signal items like food, danger, and mates.

"When we're smelling these, sometimes the message is intended for us and sometimes we're eavesdropping on communications between plants and animals, for example, by flowers," says Gilbert.

"I think humans have created their own smell environment through spices and the act of cooking, which creates new smells. We've been led by our noses."

Asked if there are universally liked smells, he says "there's always one Uncle Fester who likes skunks, but floral smells often signal a food source, especially blossoms of fruit trees. [Plants] often use similar metabolic pathways to make both flavors and scents."

The human penchant for savoring food may come from the way we smell it, Gilbert says.

"The action of swallowing sends scented air up the back of the nose. It's the reverse of usual smelling," he explains. "That's the way we get the aroma of food and wine, and it's that savoring that sets us apart from other mammals, who gulp. For example, carnivores rip and gulp their food." Any dog owner can attest to that.

"I think humans have created their own smell environment through spices and the act of cooking, which creates new smells. We've been led by our noses. Our noses have evolved to please our mouths. We have smaller faces and jaws [than our fossil ancestors], but a more agile tongue. I think this whole apparatus for savoring food has come up as we've been cooking and flavoring food."

In his book, Gilbert relates how people can develop strong aversions to pleasant smells associated with unpleasant tasks. A case in point: soldiers on body retrieval duty who used cologne to mask the rotting smell and ended up unable to bear the cologne.

People may also be able to learn to like bad odors. Gilbert tells how a resident of Monroe, Wis., once complained to the mayor about life in the Limberger cheese capital of the nation.

"The mayor said, 'It smells like money,'" Gilbert chuckles.

A fragrance developer who has designed scents ranging from perfume to kitty litter, Gilbert started out with a fascination for animal scent-related behavior. His book has several examples of how, contrary to popular belief, human olfactory prowess compares favorably with that of other animals, even dogs.

Gilbert's own contributions to this knowledge include an experiment to see if people could distinguish the odors of two strains of mouse, just as female mice could in choosing mates. His book describes the experiment:

"I had blindfolded people sniff live mice in Tupperware containers with holes cut in the sides. Occasionally a mouse tail would get up someone's nose; this seemed to bother some people more than others. ... [The] results were clear: untrained humans could distinguish between the mouse strains based on smell alone. The uncanny scent powers of mice were well within human reach."

Reaction to this research propelled Gilbert to a career in the perfume industry and to a booking at the Bell Museum. University entomology professor and bee expert Marla Spivak, who will introduce Gilbert, will also speak about the role of pollinators in our love affair with scents. Tickets are \$30 in advance, \$35 at the door; Bell Museum members receive a \$10 discount. For tickets and more information, call (612) 624-9050.



Smell scientist Avery Gilbert, who speaks at the Bell Museum April 18, says that contrary to popular belief, human olfactory prowess compares favorably with that of other animals, even dogs.



A feast of findings

April 15, 2009

Doctoral candidates show off their discoveries at a research fair

By Deane Morrison

Walking around the research fair, a visitor could learn about new ways to make efficient solar cells, factors that predict lion attacks in Tanzania, and how German nurses helped transform their profession into a respectable one for women.

Those were just a few of the findings on display April 7 at the University of Minnesota Graduate School's annual Doctoral Dissertation Fellowship (DDF) Research Showcase. With 65 fellowship winners eager to expound on their contributions to human knowledge in roughly 40 different fields, the event was a research junkie's paradise.



Doctoral candidate Pamela Wesely (curriculum and instruction) explained her work on second language acquisition at a research fair April 7.
Photo: Patrick O'Leary

Following are two examples of graduate research from the fair.

Something fishy

Lake Superior is the deepest Great Lake, and Minnesotans want to keep its fish populations healthy. But, says Allison Gamble, little is known about the food web that exists deeper than 100 meters.

Sampling the stomach contents of numerous fish species, Gamble, a graduate student in water resources science, found that two tiny crustaceans are central to the food web. Changes in the population of either "would have a significant impact on the Lake Superior food web," she says.

One crustacean, a shrimplike creature called Mysis, is a relict of the glacial lakes formed at the end of the last ice age and is adapted to cold water.

"It's eaten by every fish in the lake," says Gamble. But as global warming progresses, that chilly habitat becomes more threatened, and Gamble says Mysis populations ought to be monitored.

On the bright side, fish such as the cisco (the fish formerly known as herring) turned out to be very flexible in their diets and could probably adapt to major shifts in the food web, Gamble says.

Wars: why they go awry

Aaron Rapport takes issue with commentators who believe the Iraq War was planned by people who didn't care what happened to the country in the long run.

"[P]eople focused on long-term military goals think more about the desirability than the feasibility."

"I say they cared very much in the long term. They valued future goals," says Rapport, a political science graduate student. But through research in psychology, he found evidence that people focusing on distant objectives may become "risk blind."

"Psychology says that when people think about the near present, they think concretely and in terms of feasibility," says Rapport. "They are more detail-oriented. When they think about the distant future, they think more abstractly and more in terms of ends, and how desirable they are, than of means.

"Thus, people focused on long-term military goals think more about the desirability than the feasibility." And so risks go unnoticed.

As secretary of defense, Donald Rumsfeld was involved in details of the war but failed to be so detail-oriented in the long run, when the occupation of Iraq was to occur, says Rapport. But odd thinking about wars isn't limited to any particular war or political party.

Franklin Roosevelt "was very strategic in decisions about fighting the war [World War II]," Rapport reports. But his ideas about how the Allies would occupy Germany weren't well thought out. He had to be convinced, for example, that a plan to de-industrialize Germany's northwestern zone and return it to agrarian life by, among other means, dismantling the entire industrial complex of the Ruhr Valley, wasn't a very realistic goal.

"It's sort of like the dieter phenomenon," says Rapport. "You fight with the near-term self, who wants to eat a doughnut, and the far-term self, who wants to look good on the beach. Maybe people commit to a diet plan because they don't think about all the sacrifices."

The DDF Research Showcase is supported by the biomedical laboratory supplier Beckman Coulter.



A big kudos for University Libraries

April 20, 2009

Getting 'in the flow of the user' brings national award

By Deane Morrison

It used to be that people went to the library to get books. Now, they go to get books, learn how to use multimedia, attend tutoring sessions in writing or other subjects, learn how to organize paper and virtual materials—just about anything one ever needs to know about information.

At least, they do at the [University of Minnesota Libraries](#).

In the last several years, University Libraries have become a center for intellectual activity that helps users deal with information in virtually every way imaginable. They have been, as communications director Marlo Welshons puts it, "at the forefront of getting libraries in the flow of the user."

The transformation has not gone unnoticed. University Libraries receives the national Excellence in Academic Libraries award at a 3 p.m. ceremony Wednesday, April 22, in Walter Library, 117 Pleasant St. S., Minneapolis.

Given by the Association of College and Research Libraries (ACRL, a division of the American Library Association) and Blackwell's Book Services, the \$3,000 award and a plaque will be presented by ACRL President Erika Linke to Provost Tom Sullivan and University Librarian Wendy Pradt Lougee.

"To have our staff's innovative work recognized by the ACRL community is quite simply wonderful," says Lougee of the honor.

Library users like [Juliette Cherbuliez](#), an associate professor of French, have recognized the transformation, too.

"When I came to the University in 1999, I was surprised that the libraries didn't feel like a hub or center," says Cherbuliez. "For me, they're a hub for research.

"[But] over the past three or four years in particular, with the new initiatives, I've noted my undergraduates using library resources more frequently and with greater expertise. I've noticed more people in libraries. They've become a center for education in ways they never were before."

Students can drop in on a [SMART Learning Commons](#), a one-stop study/research/learning spot offering help in finding material, honing writing skills, learning to edit video, getting help with math, or whatever they need. Located in University Libraries, SMART is part of the Office of the Vice-provost for Academic Affairs and Dean of Undergraduate Education.

Students can also defeat the term paper writer's bugboo—procrastination—with a popular online feature called the [Assignment Calculator](#). It helps students structure their research projects and sends "friendly e-mail reminders" of deadlines. Now adopted by more than a dozen universities, the Calculator has been modified for junior high and high school use across the state.

Librarians have also been sharing their expertise with medical residents. Through the Morning Report program, librarians listen to case studies along with the residents and help them find answers to their questions in the medical literature.

Every department has a "library liaison" to help with information navigation, and Cherbuliez says hers has, for example, shown her an online tool that allows her to organize papers and virtual references.

"My desk is a lot cleaner now," she observes.

As director of graduate studies in the Department of French and Italian, Cherbuliez appreciates her liaison's work in orienting graduate students in the department and helping them "make the big leap from undergraduates to graduate students."

Faculty have a special interest in copyright issues, and Cherbuliez praises University Libraries' sessions on the subject. They included information not only on avoiding copyright infringement when using materials in class, but what faculty should think about and negotiate for when publishing their own work.

And, as befits its role in fostering the free exchange of ideas, University Libraries also sponsor [UThink](#), one of the largest institutional blog services in the country. It is open to any faculty, staff member, or student.



Smart Learning Commons, located in University Libraries, offers professional and peer-assisted learning in a variety of topics.
Photo: Patrick O'Leary



Meet the neighbors

April 21, 2009

...and peek inside their homes

By Adam Overland

If you've been putting off that bathroom or kitchen remodel out of a gnawing fear that you could end up with a toilet where the oven should be, it might be time to take steps to remedy your insecurity. You may want to try a low-commitment jaunt down inspiration lane this weekend, April 25 and 26, during the [Minneapolis/Saint Paul Home Tour](#) of "real homes, real people, and real ideas."

Fearless local residents who've taken the remodeling plunge, will open their doors to show creative and practical ideas for additions, kitchens, bathrooms, and more. Visitors will be able to chat with homeowners about their experiences, and in many cases the homeowners' contractors, architects, and other trades people will be on hand to answer questions. At the very least, it's an opportunity to get out of your home and into someone else's.

You can approach the tour in a variety of ways, but if you're interested in seeing homes that are, say, in a certain community or have had a bathroom remodel, you can search the Web site for [specific categories](#)

Begun in 1988, the MSP Home Tour is billed as "a celebration of city living," featuring homes in both Minneapolis and Saint Paul. While some of the homes are for sale most are examples of restorations or renovations.

Several of those homes are in the [University district](#), an area made up of five neighborhoods: S.E. Como, Marcy-Holmes, Prospect Park, Cedar-Riverside/West Bank, and the University campus itself.

One of the homes on this year's tour (#14 at 518 7th St. SE) belongs to Jan Morse, director of the U's Office of Student Conflict Resolution. Located in the Marcy-Holmes neighborhood, [the house](#) was originally the home of John Tate, former physics professor and dean of the College of Science, Literature, and the Arts (the precursor to CLA). Morse is also a former president of the Marcy-Holmes Neighborhood Association.

"Living in Marcy-Holmes is very much like the experience I had while growing up in a small town in western Minnesota," says Morse. According to Morse, the University District Alliance has helped to maintain not only the history of her neighborhood, but its diverse and vibrant nature, as well.

University District Alliance

The University has participated for some time in a larger effort to ensure the quality and character of its surrounding neighborhoods. In 2007, the U and its partners established the [University District Alliance](#) to develop a shared vision for the University district.

Through the its Homeownership Preservation Program, the alliance purchases options on homes with funding from the Minnesota Legislature, makes necessary repairs, and re-sells the homes to new owner occupants.

One such home (#15 at 1022 16th Ave. SE) is midway through its renovation (with gutted kitchen), and will have architectural drawings of the improvement options for [the house](#), including a number of energy-saving options. It is for sale.

With so many changes coming, including the soon-to-open TCF Bank Stadium, the planned Central Corridor LRT, and the Biomedical Research and East Gateway facility, to name only a few, the alliance has plenty to keep it busy. So have a look at their work, and enjoy. Perhaps you'll even be inspired to take the remodeling plunge yourself.

More information:

A [University District Home Buyers Incentive Program](#) has been designed for University employees seeking to purchase a home in one of the University District neighborhoods.

The University District Alliance maintains a [Live Near Your Work](#) Web site that describes the advantages of living near the U and includes listings of available homes.



This house at 1022 16th Ave. SE is midway through its renovation (with gutted kitchen) and is open during the home tour. The University District Alliance bought the option on this home and it is for sale to an owner occupant.



Off switch for itch

April 23, 2009

A new finding shows how scratching relieves itching

By Deane Morrison

Every dog and cat knows that scratching relieves an itch. But for ages, not even neuroscientists knew why.

Now, a University study shows that scratching turns off activity in spinal cord nerves that transmit the itching sensation to the brain. The researchers hope eventually to learn just how the inhibition works.



Got an itch? A new U study shows how scratching may relieve it.

That in turn could lead to new ways of duplicating the benefits of scratching without the drawbacks, which would greatly benefit people with chronic itching.

"We want to know if we can get inhibition by less dangerous means than scratching," explains neuroscience professor [Glenn Giesler, Jr.](#), who led the study with graduate student Steve Davidson. "This [study] gives hope, though not certainty, that we've found the primary place where scratching works."

Scratching an ordinary itch usually does no harm. But chronic itching may respond to scratching only very temporarily or not at all. This can rob people of sleep, throw them into a depression, or cause even worse damage, Giesler says. For example, inflammation from herpes can leave a bad itch called post-herpetic pruritis in its wake.

"There is a reliable report of a woman who had post-herpetic pruritis," he recalls. At night "she scratched through her skull, right down to her brain."

More than 50 other conditions also produce chronic itching, including eczema (which affects 2.6 percent of the U.S. population, according to Giesler), AIDS, and Hodgkin's disease. Over half of patients with renal failure or liver disease also suffer from it.

In nature, itching and scratching help animals get rids of parasites, plant material, or other unwanted baggage.

"But what value could it have in AIDS patients?" asks Giesler. "Some psychiatric patients also get chronic itch. It's amazing how little research there's been on itch over the years."

And if some of you have been scratching the whole time while reading this, he also notes that itching can also be psychogenic.

Anatomy of an itch

In a common itch like a mosquito bite, cells in the skin release a chemical called histamine. Certain sensory neurons respond to the histamine and carry the "itch" message up to the spinal cord. There the message is relayed to other neurons that run to a part of the brain called the thalamus. These neurons are part of a bundle of spinal neurons called the spinothalamic tract, or STT.

From the thalamus, the "itch" message is passed to the cerebral cortex, which interprets the signals and produces the sensation of itch.

Working with primates, Giesler and his colleagues studied neurons in the STT that fired after histamine was applied to the skin of a foot. But their response was dampened, or inhibited, when the researchers subsequently scratched the itchy skin. Scratching by itself—that is, in the absence of an itch—had no such effect.

"Before, we didn't know if the inhibition occurred in the spinal cord, the thalamus, or the cortex," Giesler notes. "We've shown that it occurs in the spinal cord and lasts for a period of time similar to the relief one gets while scratching."

All STT neurons, including those that respond to itch, also respond to pain signals, Giesler says. But the itch-sensitive neurons' response to a mildly painful stimulus—capsaicin, the burning agent in hot peppers—was not dampened by scratching. Therefore, evidence points to them as the key players in the relief of itch by scratching, says Giesler.

The study appears in the advance online edition of [Nature Neuroscience](#).



High marks

April 24, 2009

University hires Team USA coach to lead diving programs

Two years ago, the University of Minnesota made some big waves in the sporting world when it hired Tubby Smith as its head basketball coach.

Wenbo Chen doesn't have the name recognition of Tubby Smith, but in the swimming and diving world, his hire has perhaps made an even bigger splash.

Chen will be coming to the U as the diving coach for the Gopher women's and men's teams, athletics director Joel Maturi announced on April 16. One of the most respected and accomplished coaches in the world, Chen has served as the head coach and associate director of USA Diving's National Training Center since 2005, and will start at the U on August 3.

Chen succeeds Jason Baumann, who resigned his position last month after four years as diving coach.

"We are so fortunate to hire someone of Wenbo's caliber and we welcome him to the Golden Gopher family," Maturi said. "He has earned an outstanding reputation internationally, in the United States, and Big Ten, and ... has worked with some of the greatest divers in the world, and we know that our student-athletes will benefit from his talent."

During his time with USA Diving, Chen has coached 15 senior national champions, 12 junior national champions, two world cup medalists, and three Olympians. He was named assistant coach for the 2008 U.S. Olympic Team for diving after three of his divers were named to the squad—Haley Ishimatsu on 10-meter and synchronized 10-meter, and Kelci Bryant and Ariel Rittenhouse in synchronized 3-meter.

Prior to his Team USA stint, Chen served in several key coaching roles, including a four-year tenure as the head coach at Purdue (2001-05) and seven years as a coach with the Chinese National Team and the Chinese Olympic Training Camp (1985-92).

He joins a Gopher swimming and diving program that is already one of the elite programs in the nation. The women's swimming and diving team won the 2008 Big Ten championships and finished second in 2009. The men's team was third in the Big Ten this year and has finished among the top 15 teams nationally for 18 straight years. And the University's Aquatic Center is one of the premier facilities in the country.

"Minnesota is well-known as the best Big Ten program and one of the best in the nation," Chen said. "Minnesota has everything that a coach is looking for with the facility, the administration, and the swimming coaches. In addition, the community support at Minnesota for swimming and diving is excellent. These are the things that my family and I were looking for."

"I am really excited about returning to college coaching," he added. "I miss the teamwork between the swimmers and divers and the support network that you have in an athletic department. I am also excited about the combination of recruiting and coaching. Minnesota offers me the situation that I have been looking for."

The announcement of Chen's hire was well received by the coaches of the women's and men's swimming teams.

"It's a great catch for the U of M," head men's coach Dennis Dale said. "When the job opened up, he was the person that we thought if he was available, he would be a dream coach for us. He has done it all already. He has coached Big Ten champions, NCAA champions, and Olympians. He has coached at all levels."

"Today, we are hiring one of the best coaches in the world," women's co-head coach Kelly Kremer said. "I am looking forward to working with a coach of Wenbo's caliber. ... It's certainly a great time for Minnesota swimming and diving."

Chen immigrated to the U.S. from China in 1992. Before leaving his native country, he served as a national team coach from 1983-1991 and coached six Olympic medalists, including two-time gold medalists Ni Xiong and Ming Gao, and many national champions.

As a diver, he won a junior national title on 3-meter in 1976 and from 1977-1982, he was a finalist at the senior national level. Chen earned a bachelor's degree in physical education at Beijing Sports University in 1987.



Wenbo Chen will be returning to the Big Ten to be the diving coach for the Gopher men's and women's swimming and diving teams. Chen has served as the head coach and associate director of USA Diving's National Training Center since 2005.



Reaching out

April 26, 2009

UMC students collaborate with Red Lake Nation on sustainability projects

By Rick Moore

For the perennial champion Students in Free Enterprise (SIFE) team at the University of Minnesota, Crookston, success means taking lessons about free enterprise from the classroom and sharing them with the greater community. SIFE projects are meant to teach the public about things like free-market economics, entrepreneurship, and environmental sustainability.

This year, the enterprising students of SIFE decided to expand their notion of community to include the Red Lake Nation—the American Indian community about 90 miles due east of Crookston. The Red Lake Nation is the focus of two of the team's new projects for this year: an effort to launch a recycling program at the Red Lake high school and middle school, and an exploratory look at acquiring funding for one or more wind turbines.

The impetus for choosing collaborations with Red Lake on recycling and wind-energy projects stems from Crookston's own efforts toward sustainability, says Marshall Johnson, the president of the Crookston Student Association and the Red Lake liaison for SIFE.

In speaking with members of the tribe, "We discovered that two of the main things we were looking to work with them on were two of their main needs"—recycling and reducing energy costs through alternative energy sources, Johnson says. It made sense to pick those areas, he says, because "our campus is moving more toward sustainability and sustainable practices."

So last fall, members of SIFE and Red Lake met with Lowell Rasmussen, vice chancellor for finance and facilities at the University of Minnesota, Morris, which has been at the forefront of the green-campus movement. The 367-foot-tall wind turbine in Morris currently generates more than half the electricity used on campus, and Morris has received authorization for three Clean Renewable Energy Bonds (CREBs), which puts the campus on a path to achieve energy self-sufficiency by 2010. According to Johnson, Rasmussen shared a wealth of information of what Morris has done in pursuit of alternative energy, and suggested the prospect of SIFE applying for CREBs in conjunction with Red Lake.

Johnson says the group hopes to meet with Rasmussen again this spring, and it plans to apply for CREB bonds by the next funding cycle in March 2010.

The recycling collaboration came as a result of the wind turbine discussions. "From that, we learned that they had no recycling initiative, so we jumped on board with that idea real quick," Johnson says.

SIFE members have the blueprints for the joint high school and middle school at Red Lake, and are looking at the best way to implement a recycling initiative. A "boilerplate" method of simply putting recycling containers next to trashcans may not work as well, Johnson notes, given that recycling has not been the norm at Red Lake. "It has to be behavioral modification—something that's with you in every aspect of your life," he says.

To that end, students involved in the project have been discussing possible themes for the initiative. One idea, says Johnson: "Our Mother the Earth: Protecting Mother Nature." He says the recycling initiative will go into effect in the fall.

Bringing home the hardware

"Students in Free Enterprise holds [its members] accountable to teach the world about free enterprise," says Eric Burgess, business management and marketing instructor at UMC and advisor for SIFE. There are six areas of focus: free-market economics, entrepreneurship, financial literacy, business ethics, business success skills, and environmental sustainability. "The teams are charged to put together projects that will teach people about those six criteria," he says.

Crookston's SIFE team has been exemplary in that regard. The UMC team won a 10th consecutive championship trophy at the SIFE regional competition in Minneapolis last month. According to Burgess, there are close to 30 colleges in the region and approximately five are chosen as champions each year, which means UMC's team has been among the elite, year in and year out. (The SIFE team will now advance to the national competition in Philadelphia May 10-12.)

For students, being a member of SIFE can have rewards beyond the competitions. SIFE is sponsored by Fortune 500 companies like Best Buy, Target, J.C. Penney, and Frito Lay, Burgess says, and corporate executives serve as judges at the competitions. Which puts students in direct contact with... well, great contacts.

Being in SIFE is "resume-building," Burgess says. "It's a link to guaranteed employment with very reputable, high-profile organizations. Not to mention that students have a lot of fun and make great friends and connections among themselves."

"They're able to see success within themselves and build power and drive for their future," says Tom Melhorn, the SIFE president who is also a member of the Crookston Student Association. He adds that SIFE is a great tool for UMC students to learn how to apply what they've learned in the classroom to real-life situations.

"And you get to help people in the process," he says.

Johnson is excited about potential new wind turbines, regardless of where they might be located. One idea would be to have UMC and Red Lake share the energy from one or more turbines, but he would be happy if only one turbine was approved and it entirely served Red Lake.

"Even though Red Lake is 80 to 90 miles away, it's still our community," Johnson says.

For more information about the UMC SIFE team's success in the regional competition, see [the UMC release](#).



This year, the University of Minnesota, Crookston, chapter of SIFE is collaborating on two new projects with the Red Lake Nation--an effort to launch a recycling program at the Red Lake high school and middle school, and an exploratory look at acquiring funding for one or more wind turbines.



Researchers derive cancer-killers from human embryonic stem cells

April 27, 2009

Experiments in mice open new avenue for cell-based cancer therapy research

By Deane Morrison

In a study of human tumors growing in mice, University of Minnesota researchers have found that immune cells derived from human embryonic stem cells (hESCs) completely eliminated the tumors in 100 percent—13 of 13—of mice tested.

In contrast, similar immune cells derived from human umbilical cord blood cells cleared away tumors in only five of 13 mice.

"This is the first demonstration of anti-cancer activity in a living organism by cells derived from human embryonic stem cells," says study leader [Dan Kaufman](#), an associate professor of medicine and associate director of the University's Stem Cell Institute. "The superior performance by cells with an hESC lineage points to a crucial role for hESCs in developing new cell-based cancer therapies."

Kaufman and his colleagues also found that mice injected with hESC-derived cells had fewer metastases. And hESC-derived cells did a better job of killing laboratory cultures of human leukemia and solid tumors of breast, prostate, and testicular cancer. The study is published in [Blood](#).

Natural-born killers

The cancer-killing immune cells are called natural killer (NK) cells. They are endowed with an ability to home in on cancer cells and destroy them, but the body's supply of them too often proves inadequate. For this reason, cancer researchers want to grow large numbers of highly potent NK cells, or cells with similar abilities, that can efficiently kill tumors while escaping destruction by a patient's immune system.

One step toward achieving that goal is to identify the best source from which to produce NK cells. hESCs may become an important supplier in future clinical therapies that have previously used NK cells isolated from normal adult blood or umbilical cord blood.

The key to the effectiveness of the hESC-derived NK cells lies in their maturity, the researchers say. Populations of those cells contained nearly all mature, fully competent NK cells, whereas populations of cells derived from umbilical cord blood contained large numbers of immature NK cells.

Nevertheless, hESCs present problems as a source of NK cells for clinical use, the researchers say. For one thing, any cells derived from an unrelated donor's hESCs could be eliminated by the patient's immune system. Also, says Kaufman, scaling up the production of hESCs to supply enough to treat a person, rather than a mouse, will require a concerted effort by physicians and researchers.

However, a recently developed technique holds potential for generating NK cells from a patient's own cells. It involves genetically reprogramming adult cells into cells very similar to hESCs. These cells—called induced pluripotent stem (iPS) cells—have already been used to derive blood cell-forming stem cells, so using them to produce natural killer cells is a strong possibility, the researchers say.

Work along those lines would only intensify research on hESCs, says Kaufman, because in order to coax iPS cells into differentiating into mature NK cells, researchers will need to know much more about how "the real McCoy" does it. Further work must include studies of many hESC cell lines in addition to the single cell line used in the current research.

"hESCs provide a gold standard to compare iPS cells to," Kaufman says. "We want to use all available avenues to determine the optimal source of cells to treat cancer."



Researcher Dan Kaufman has produced potent cancer-fighting immune cells from human embryonic stem cells.

Photo: Emily Jensen

Home page image: James Dutton



Capitol-ization

April 28, 2009

U undergraduates display their research projects for lawmakers

By Rick Moore

In fiscal year 2008, University of Minnesota faculty brought in \$675 million in research awards. What that means is that funding agencies like the National Science Foundation and the National Institutes of Health had such trust in the potential of U research that they were willing to take chances to the tune of millions of dollars in support.

But it's not only faculty that drive the University's research. Every year, hundreds of University of Minnesota students are conducting their own research on topics like finding gene therapies for deadly fungal infections, improving child literacy screening, and controlling Eurasian water milfoil.

On April 27, the University brought more than 30 of the year's best undergraduate research projects to the North Corridor of the Minnesota state capitol for a week.

This year's cadre of student researchers includes 2009 Goldwater Scholarship winner Mitch Biermann, a sophomore in the College of Biological Sciences (CBS) who cites early access to an undergraduate research opportunity as a factor that helped him gain the Goldwater award.

The titles of the student research projects are anything but pedestrian; in fact, they often need some significant translation. To wit: "FOXO1-Mediated Androgen Receptor Inactivation in Human Prostate Cancer Cells," the intriguing "Do Lupines Impose Sanctions on Cheating Rhizobia?," and "Examining the Role of Mast Cells in Hyperalgesia."

The latter project is the work of Keta Desai, a senior neuroscience major in CBS. For three years, she's been involved in her research which, simply put, is about studying factors related to pain.

"We're trying to find out why some people are more sensitive to pain than other people," Desai says. "By 'some people,' I mean people with chronic pain conditions like fibromyalgia. We looked at a particular type of cell—mast cells (immune system cells)—and we tried to figure out whether there's a correlation between the amount of pain sensitivity that people have and the number of mast cells that they have [in and around their spinal cord], and whether these cells are more active."

"I think this is really important for students to be able to come to the capitol and talk to someone outside of the University community about the research that we've been doing," Desai says. "A lot of the research that students do may go unnoticed sometimes, because we do research and then we move on; we don't usually stay with the lab."

She says that when she started at the U, she had no idea that undergraduate research even existed, let alone that it would be a big part of her educational experience.

"I didn't really get into [research] as a choice—it was mandatory [at CBS]—but then when I started it I realized that I really, really liked it," she says. "I'll be starting dental school in the fall but I know that after I graduate and after I start practicing I do want to do my own research and try to find some new answers within the dental field."

Amanda Ross is another CBS student who is majoring in microbiology. She joined Desai and other students on April 27 for a trip to the capitol to meet with their legislators to talk about the importance of undergraduate research and how that opportunity sets the U apart from most other colleges.

Ross, who is from Crookston, started working in a lab in October 2007 as a volunteer, then undertook her direct research project studying a vaccine for the cytomegalovirus (CMV), which causes problems in transplant patients and in many pregnancies.

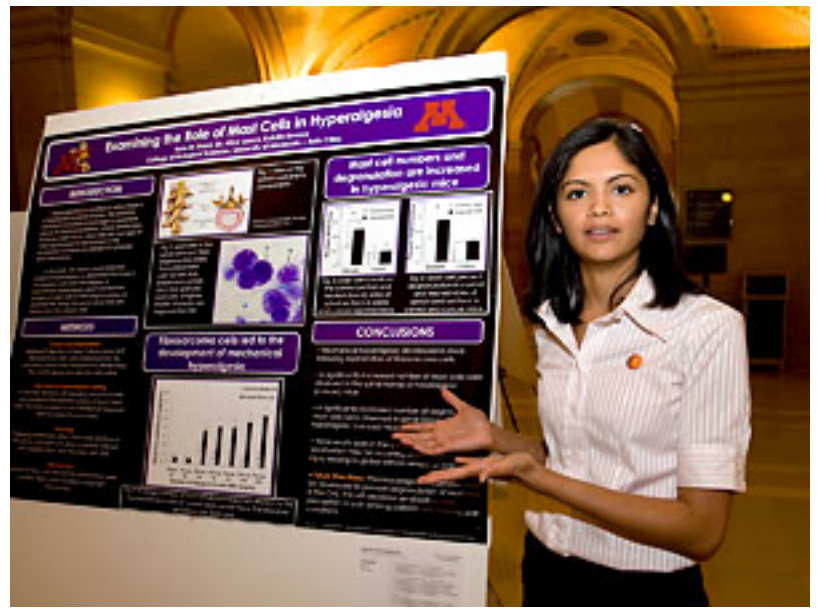
"We're looking especially at preventing it from crossing the placenta during pregnancy by vaccinating the mothers," Ross says, "because it causes about the same rate of birth defects as Fetal Alcohol Syndrome or Down's Syndrome in the United States. It's a big public health problem, and it's actually the most common infection in infants."

"It's a great resume builder for students," she says of her research experience. "It's really nice to have something that you can present at a show, to a selection committee, or to a future employer and [be able to] say, 'This is what I've done; I have experience in the lab, I have skills.'"

Both Ross and Desai also appreciate the opportunity to showcase their work to legislators.

"I think this is really important for students to be able to come to the capitol and talk to someone outside of the University community about the research that we've been doing," Desai says. "A lot of the research that students do may go unnoticed sometimes, because we do research and then we move on; we don't usually stay with the lab."

Undergraduate research at the University (most notably the Undergraduate Research Opportunities Program, or UROP, now in its 24th year), gives more than 350 students each year the opportunity to tackle important topics under the guidance of faculty researchers. For more information on the U's undergraduate research programs, visit [undergraduate research](#).



Keta Desai explains her research on the role of mast cells in hypersensitivity to pain. Desai worked on her project for about three years.

Photo: Patrick O'Leary



Genetic modification, modified

April 29, 2009

A new technique allows precision gene modification in plants

By Deane Morrison

The controversy surrounding genetic modification of plants stems partly from the way it's done: Genes are introduced in scattergun fashion, with little control over where they integrate into the genome and what effects that may have.

But a new, precise method promises to restore much of that lost control. Developed by University of Minnesota and Massachusetts General Hospital researchers, it uses an enzyme that reads DNA like Braille and makes pinpoint changes in the gene targeted for modification.



University and Massachusetts General Hospital researchers used a new method of genetic modification to alter a single gene in tobacco plants.

In a paper published April 29 online in *Nature*, a team led by University of Minnesota researcher [Daniel Voytas](#) describes how they used the method to engineer tobacco plants for resistance to herbicide. Only one gene was changed, and no genes were added to the plant's chromosomes.

The method has potential for changing the way researchers approach a host of tasks, such as making crops more nutritious or resistant to adverse conditions, coaxing algae to produce more biofuel, or even curing diseases in humans and other animals.

"My colleagues and I demonstrated the first use of the technology in plants, and we and others have shown it to work in human cell lines and other animal models, such as fruit flies and roundworms," says Voytas, a professor of genetics, cell biology and development and director of the University's new Center for Genome Engineering.

"The method offers enormous potential for gene therapy, and its advantage is its precision."

The enzymes at the heart of the technology are known as zinc finger nucleases, or ZFNs. In doing their job, ZFNs explore the DNA in a cell nucleus, probing with extensions—"zinc fingers"—until they find the particular DNA sequences they have been designed to ferret out. They then chop those sequences out of the chromosome, replacing them with new sequences—provided by the researchers—that confer herbicide resistance or other traits.

In the case of the tobacco plant, "the modified gene is a widely used target for herbicides," says Voytas. When functioning normally, the gene instructs the cell to make a protein that's crucial for life but that can be disabled if a herbicide molecule attaches to it.

But the modified gene instructs the cell to make a slightly altered version of the protein, one that can still perform its cellular duty but offers no foothold for a herbicide. And so the plant becomes herbicide-resistant.

Voytas is now testing the method in rice, the world's most important crop; a member of the mustard family called *Arabidopsis*, a widely studied model plant; and algae with the potential to produce biofuel. If successful, ZFNs could become the tool of choice for getting more bang for the agricultural buck.

Or, as Voytas puts it, "The technology is ready for prime time."



Taking stock

May 5, 2009

U researcher hones tool for unemployed job seekers

By Rick Moore

For the tens of thousands of Minnesotans who have joined the ranks of the unemployed, finding a new job can boil down to using the various tools at their disposal, whether that be browsing job postings in the newspaper, using the Internet to post a resume and search for listings, or networking with friends and acquaintances.



Connie Wanberg

The latest work by University of Minnesota researcher Connie Wanberg is leading to the refinement of one of those tools—a self-assessment inventory called "Getting Ready for Your Next Job" (YNJ, for short).

The inventory, which takes only about 15 minutes to complete, is designed to provide unemployed job seekers with insight into various aspects of their job search—even illuminating areas in which they might be falling short of the mark—so that they're able to modify their search techniques accordingly.

Wanberg, the director of the U's Center for Human Resources and Labor Studies at the Carlson School of Management, is getting ready to unveil a new edition of her prototype inventory that's been used for by the State of Minnesota for about five years.

The updated inventory is described in a paper that's been submitted to the journal *Personnel Psychology*, and Wanberg hopes to have it published this summer. Already, others are anxious to use her work. The state of Kansas has expressed interest in using the new inventory, she says, and the U.S. Department of Labor is eager to pass it on to other states.

"I feel it is a time saver, as we have much of the information we need before sitting down with them," says one counselor. "It is also nice to say to the applicant, 'I see that you checked (whatever) and I was wondering how we can help with that.' It breaks the ice, so to speak, with the applicant."

Wanberg says she's happy to have created and updated the YNJ inventory, but notes that's it's just the start of a sometimes arduous process for job seekers.

"What we've heard from job seekers is that it's helped put everything in one spot for them and it's helped [highlight] some areas that they weren't necessarily thinking about," she says. "It helps inventory for them the different things that they can do in their job search and different levels of effort they might put in."

"The completion of this project is particularly timely given our current economic climate," says Jim Hegman, the Minnesota Unemployment Insurance Program performance and outreach director. "Aside from providing a clearer road map for what to do next, applicants report that the self-directed nature of the assessment also helps them feel that they are taking back control of their lives after the shock of being laid off."

One section asks users how confident they feel about being able to do "a good job" on 11 different job-seeking tasks, including writing a good cover letter, presenting yourself well in an interview, using networking or personal contacts in your job search, and negotiating salary or other terms of employment. The answer options are "Not at All Confident," "Somewhat Confident," or "Highly Confident." As with other sections in the inventory, there is a tip for job seekers at the bottom of the section; in this case: "Did you answer 'Not at All Confident' to any of these items? Your local WorkForce Center may have classes that can help...."

And the page ends with a note of encouragement: "Keep working on your job search each day!"

In the testing phase, a group of job seekers from a nearby state were asked to evaluate the usefulness of the inventory, and responded with very favorable ratings. Said one, "I may not be as prepared to do a great job search and land a job as I thought. It forced me to think about my resume, my skill level, classes I could take or just ... are my feelings normal?"

Minnesota's WorkForce Center counselors appear to be happy with the new inventory, too, in terms of its shorter length, more accessible reading level, and usefulness to their work with job seekers.

"I feel it is a time saver, as we have much of the information we need before sitting down with them," says one counselor. "It is also nice to say to the applicant, 'I see that you checked (whatever) and I was wondering how we can help with that.' It breaks the ice, so to speak, with the applicant."

"It allows them a place to start a conversation with people," Wanberg adds. "They can just look at a profile right there, and then start by saying, 'Oh here's an area, let's talk about it.'"

Wanberg's research project—undertaken with Zhen Zhang of Arizona State University and U graduate research assistant Erica Diehn—was funded by a grant from the [Minnesota Department of Employment and Economic Development](#). Wanberg has completed a variety of other projects related to the psychological experience of unemployment, the prediction of speed of reemployment, and the dynamics of job search.



The honor of a lifetime

May 6, 2009

Faculty members Don Truhlar and David Kohlstedt join National Academy of Sciences

By Deane Morrison

If the U.S. Senate is, as it has been called, "the most exclusive club in the world," the National Academy of Sciences must be the second. It elects members from the cream of the the country's scientific crop, and this year it added two from the University of Minnesota: [Don Truhlar](#), chemistry, and [David Kohlstedt](#), geology and geophysics.

In receiving an honor many scientists consider next to the Nobel Prize, neither Truhlar nor Kohlstedt would take full credit. Instead, both insisted that their accomplishments were possible only because of the caliber of the graduate students they worked with.

Whatever the secret of their success, here's a glimpse at their contributions to science.

Doping the Earth

In making ceramic materials, adding trace amounts of impurities—a process called doping—can vastly improve a material's performance. The Earth, says Kohlstedt, does the same thing with the rock lying far below the surface. The impurity it adds to the rock? Plain old water.

The hydrogen in water "has a huge influence, especially on the strength of the rock and how easily it can be made to flow, even while it remains solid," states Kohlstedt, an I.T. Distinguished Professor and head of the University's Winchell School of Earth Sciences. "The hydrogen weakens the rock."

Lying above weakened rock, plates of the Earth's crust and uppermost mantle can move around relatively freely. Called plate tectonics, movements of these surface plates open up seams where heat from the mantle can escape, usually through the formation of volcanoes or fissures. While volcanoes can cause a lot of damage, plate tectonics allows the Earth to reshape its crust a little at a time, avoiding global disaster.

Not so on Venus. Kohlstedt has argued that no plate tectonic movements occur on our sister planet because it is too hot to keep water in either its rocks or its atmosphere. Consequently, heat from the interior builds up in the strong, dry surface rocks until they break up and catastrophically flip over.

And it's largely atoms of hydrogen—the tiniest of atoms—that stand between Earth and a similar fate, Kohlstedt has found.

Consider what's happening in the Mid-Atlantic Ridge, a chain of undersea mountains being pushed up from underneath by upwardly mobile molten rock. For a long time, geophysicists wondered how deep melted rock could rise the 60-90 miles to Earth's surface quickly enough to forestall the catastrophic overturn of crust seen on Venus.

In his laboratory, Kohlstedt subjected rocks to the high temperatures and pressures of Earth's mantle. He discovered that as these extreme conditions deform the upper mantle, upward-pointing ribbons, or channels, of partially melted rock form in it.

"They act like superhighways," he says. "Molten rock is less dense than solid rock, so melt moves rapidly through these channels."

The channels form in part due to the presence of hydrogen, which lowers the melting point of the rock by several hundred degrees, Kohlstedt notes. Once melt begins to form in the deforming mantle rock, it segregates into melt-rich channels that become fluid avenues for transporting heat.

Kohlstedt is this year's winner of the Murchison Medal of the Geological Society of London, which lauds him and his research group as, among other things, "without doubt ... the world leaders in framing our modern understanding of the spectacular effects that water and melt have on the [ease of flow] of rocks in the lower crust and upper mantle."

It all computes

At first glance, Truhlar's work may seem inaccessibly complex: finding practical methods of using quantum mechanics to compute the rates at which chemical reactions occur. But the importance of his work becomes clear from a consideration of what happens when a drug enters a person's body.

"A drug must arrive at the site of biological action to perform its intended task," says Truhlar, a Regents Professor. "But a drug may react with other things in the body and get destroyed, and so become unable to do its job. Or, it may react in such a way as to produce toxic side effects." Being able to predict such chemical reactions beforehand can help scientists design drugs to maximize their effectiveness while minimizing side effects.

The beauty of Truhlar's work is that his methods work for scientists studying all kinds of chemical reactions, including those that can't be run in a laboratory. For example, chemical reactions between pollutants and ozone high in the atmosphere occur at temperatures too low to work with directly. But by applying Truhlar's theories, scientists can extrapolate to conditions in the upper atmosphere and calculate the reaction rates.

"Don is developing methods that can be applied to problems we don't even know about today," says Jeffrey Roberts, chemistry department chair. "He is one of the most cited chemists in the world."

As director of the University's Supercomputing Institute from 1988 to 2006, Truhlar made its resources available to a broad group of faculty, including those who use high-performance computing as an adjunct to their work rather than as its focus. An associate editor of the world's premier chemical journal, he has won the American Chemical Society awards for computational chemistry and physical chemistry and the Schroedinger Medal of the World Association of Theoretical and Computational Chemistry.



University professors David Kohlstedt (left) and Don Truhlar have just been elected to the National Academy of Sciences.

Photo: Patrick O'Leary



On the run

May 6, 2009

Senior kinesiology student looks at exercise and rehabilitation from every angle

By Rick Moore

Jennifer Ojiaku does precious little to suggest she's anything other than a model student and citizen. She's dedicated, exuberant, gracious, and extremely involved in co-curricular and extra-curricular activities.



A three-sport athlete in high school, Jennifer Ojiaku has retrained her focus on distance running. She has already run two marathons, and has plans to run at least 44 over her lifetime.

Photos by Rodrigo Zamith

So when there's a chink in the armor, however insignificant, it seems fair to pounce. Ojiaku, it turns out, has an occasional flash of vanity. "I like to run, and I always wanted a run to be named after me," she says, laughing. Recognizing that something like that may not occur until after she dies one day, she "figured I had to create my own event."

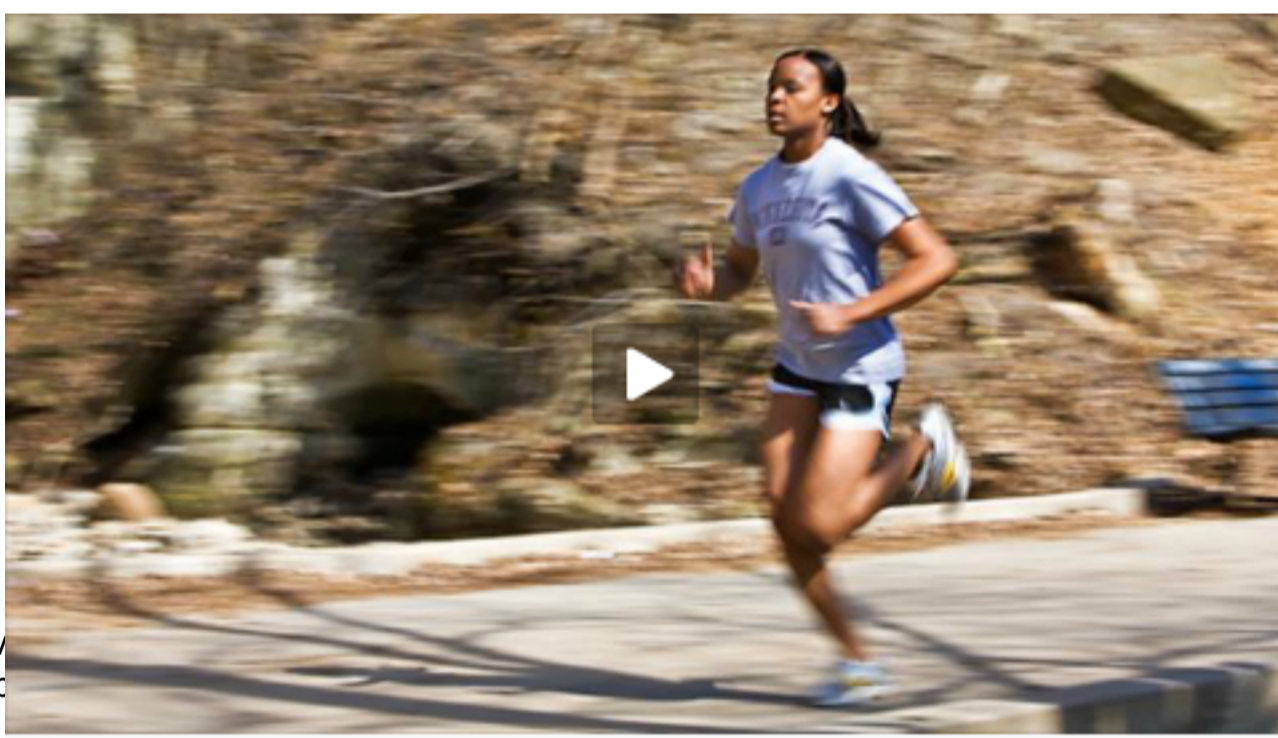
While the laughter suggests she isn't all that concerned about the naming rights, she was indeed serious about starting a charity run, which led to the debut of the "Trot for Tots 5K" on campus April 18.

Organizing the run with fellow members of the Pre-Physical Therapy Club gave Ojiaku (pronounced Oh-JAH-koo) an opportunity to leave a mark at the U in her senior year. But it's not as if she's been sitting around for the previous three years. Instead, she's taken every opportunity to immerse herself in activities related to physical therapy while she finishes her degree in kinesiology.

She has volunteered at Children's Hospital and at North Memorial's Joint Replacement Center, and for the past two and a half years has been a student trainer for the Golden Gopher football team. Those opportunities have given her a look at issues surrounding three vastly different populations.

At Children's, she's been shadowing a physical therapist for the past seven months. "I didn't really think I'd like working with kids but I really like what [the therapist] does," Ojiaku says. "Working with that age group is really interesting, [especially] the things that you can do with an infant as supposed to the things you can do with adults and athletes."

She's also seen the other end of the spectrum in her work at North Memorial. There, she helped senior citizens. "It's different for them. I mean, you've got people who fall asleep during rehab," she says with a smile. "You have to say their name twice because they don't hear you. So that's interesting, too."



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She's appreciative of the value of her internship with the football team. "It's cool for all the students who want to get into some type of therapy setting, because we get to learn how to evaluate these injuries," she says. "And we get to learn how to come up with programs to make them better. We actually get to see them improve as the weeks go by."

Two down, 42 to go...

Ojiaku has been on the other side of rehab, too. She was an all-around athlete at Park Center High School in Brooklyn Park, Minnesota, competing in track, tennis, and basketball. Track was her best sport, and basketball dealt her a blow that changed her focus; as a junior, she tore her ACL, MCL, and LCL ligaments—the grand trifecta for knee trauma. Although she recovered enough to return to running hurdles in track, she figured the shock on her knees was enough to keep her from trying to become a walk-on for the U's track team.

Now her eyes are trained on running marathons. Already, she has the Twin Cities Marathon and Grandma's under her belt. But she's not stopping there.

"In my lifetime, I would like to run 44 marathons," she says, laughing. But she's serious about the goal. "It's not really a random number. Number 4 is my favorite number, and I figured 4 was easy to get to, so 44 would be a little more difficult and probably [take me more than] 20 years."

A man she met before Grandma's Marathon last year inspired Ojiaku. "He said he ran 45 marathons, and I was just amazed," she says. "I didn't think that could be possible. But he looked great and he had so much fun doing it. It's not even about the times. It's just about doing something that you love and being committed to it. And looking forward to doing it every year, or a couple of times a year."

While she's counting up to 44 (which would give her almost 1,153 miles logged in marathons), Ojiaku hopes to see a bit of the world, and find a job in physical therapy that suits her tastes, most likely in a clinic.

She was recently accepted to an AmeriCorps position in the Admission Possible program, which works to increase the number of high school students from low-income families that get accepted to college. After that, she grins, she will "come back and be focused and get my final degree [in physical therapy] and then work for the rest of my life."



Big fish, big pond

May 13, 2009

Eight-time All-American Heather Dorniden tacks on awards for leadership and service

By Rick Moore

It's a good thing for fans of Gopher track and field that Heather Dorniden is as fond of running as she is of playing the flute. (For that matter, the Big Ten Network should be grateful, too. More on that later.)

Dorniden was on track for a potential music scholarship when she discovered that she could parlay her running talent into a scholarship at the University of Minnesota. At Rosemount High School, she was a five-time all-state performer, and she won Class AA state titles in the 400 meters as a junior and 800 meters as a senior.



Heather Dorniden has frequently been at the head of the pack in her prolific track career at the U. She was the NCAA indoor champion in the 800 meters as a freshman, and has gone on to become an eight-time All-American, establishing herself as the most decorated Gopher women's track and field athlete in history.

Photo courtesy University Athletics

That was just a prelude for Dorniden, who, in a four-year span, has rewritten the record books at the U. She was the NCAA indoor champion in the 800 meters as a freshman, and has gone on to become an eight-time All-American, establishing herself as the most decorated Gopher women's track and field athlete in history. She was a finalist for the U's Female Athlete of the Year this year, and won the award in 2008.

Moreover, she has been a big fish—although she would argue otherwise—in a sea change for women's track. During Dorniden's tenure, the Gophers have won six Big Ten championships in track and cross country. They'll shoot for a seventh this weekend at the Big Ten Outdoor Championships at Ohio State.

For Dorniden, a senior kinesiology major with a 3.9 GPA, the awards keep coming. On May 4 at the President's Awards Banquet, she was presented a President's Student Leadership and Service Award along with a University of Minnesota Alumni Association Leadership Award. She is also one of just 87 women to be awarded an NCAA Postgraduate Scholarship (along with Gopher swimmer Jenny Shaughnessy).

Placing a high value on service

Dorniden seems to relish the off-the-track awards as much as her All-American honors. "Coming to the end of my career here, I think it's [great] to be recognized for all the other things that I've tried to do beyond athletics," she says. "I think a lot of people assume that athletes at the University of Minnesota are just here to play the game, and there's a lot more involved with it."

She says someone in athletics sends out an e-mail every week with volunteer opportunities. "If there's ever anything that doesn't conflict with my practice or class schedule and I know I don't have like five tests, I say 'Sign me up,'" she says.

Her teammates share that ethos. For the second straight year, the women's track team was honored with a Community Service Award at the Golden Goldys Awards Banquet. The more than 100 student-athletes on the team combined to volunteer over 1,500 hours in 2008-09 for organizations such as Special Olympics, Feed Our Starving Children, and Big Brothers and Sisters.

Dorniden, who naturally wears a smile and is quick to laugh, positively lights up when she talks about volunteering with elementary school kids. "They treat you like you're a superstar. They want your autograph and they think you're *amazing*," she says. "It's so fun to be able to do things that you know will impact their lives. You're given such a great platform from which to speak when you *are* an athlete that they listen to you and they care what you have to say."

That race where she fell down

Ranking her many accomplishments over four years can be a difficult task, but there are certainly some that rise to the top. Like being a part of a half dozen Big Ten championship teams—the first ever titles in women's track or cross country history. "It's been fun to be a part of that program ... like I contributed to something that will be a lasting legacy for our team," she says, sporting a gold 2009 Big Ten indoor championship T-shirt. "Especially our first [cross country title], because it meant a lot to some of our seniors on the team that year to be able to do that."

Her first and only national title, in the 800 meters in her first year, was also special. Prior to the race she was reminded that the team's long-time equipment manager had passed away that year. "And my coach said to me before the race, 'Sometimes you don't know if you have a next year or even a tomorrow, so just go out there and run it the best that you can.'"

But Dorniden will forever be remembered for one race in particular—a final heat in the 600-meter race at the Big Ten Indoor Championships in March of 2008. Minnesota hosted the event, so Dorniden was running in front of a friendly crowd, including scores of U fans and her parents. "When I watch [the tape], my heart rate still goes up like crazy and I almost shake," she says. "You get nervous all over again for races when you watch them."

Especially when you know what happens on the last lap.

With 200 meters to go and in the lead pack of four runners, Dorniden's feet got tangled up with those of a Penn State runner, and she fell in a heap on the unforgiving floor of the Field House.

In her mind, she bounced back up in a nanosecond, like Ozzie Smith after fielding a grounder in the hole in his heyday for the Cardinals. In reality, as played out on her dad's videotape, the fall was more dramatic.

"I literally thought that I just skinned my knees and put my hands down and got back up," she says. "I never realized that I skidded on my stomach on the ground. I was bouncing on the track."

By the time she got back up, she trailed the lead pack by about 30 meters with less than 200 meters to go. In a race that's essentially a sprint. No chance, right?

At first, Dorniden just vowed to finish the race. Then she was bolstered by the enthusiasm of the fans, who saw her making her move. "It got so loud, and then I heard the announcer saying, 'And watch out for Heather Dorniden!' I was like, 'I'm actually still in the race. Sweet.'"

She exploded past Fawn Dorr, the Penn State runner, at the start of the last turn. On the final straightaway she left an Indiana runner in her wake and at the tape she nudged past teammate Jamie Dittmar. "That last 50 meters, I hit a gear that I never knew I had," Dorniden says.

She finished second in the 600 meters to a runner from the previous heat, but the performance left a mark beyond any divots in the Field House track. The Big Ten Network named Dorniden the first-ever recipient of its Most Courageous Performance award last June.

"It's probably one of my greatest running memories of all time. It's something that is completely unexplainable to me besides through a higher power. I feel like the Lord just filled me up and gave me the opportunity to show what amazing things can happen through Him."

More steps ahead

Dorniden will graduate in December after a final season of cross-country eligibility in the fall. After that, her options are open. She plans to attend physical therapy school—ideally at the University of Minnesota—but she'd also like to continue training in the hopes of making a bid for the 2012 Olympics in London. She competed in the Olympic trials last summer, pre-Beijing, but feels that racing all year long through the cross country, indoor, and outdoor track seasons had left her burned out.

"It'd be really cool to at least go to another trials and see what I can do," she says. Plus I really don't know what I'd do if I just stopped running all of a sudden."

But first things first. Dorniden and the Gophers are poised for a serious run at a "triple crown" by winning the Big Ten Outdoor Championship, following their cross country and indoor titles in the fall and winter.

There's no shortage of inspiration for Dorniden. She'll be taking her marks in Columbus knowing her teammate and roommate Gabriele Anderson can only be there in spirit. Anderson, whom Dorniden describes as a great runner and an "energy leader", as well as a team captain, had a cancerous tumor removed earlier this spring and will be sidelined for the meet.

"I've been trying to do everything [in tribute to] her this year. So it'd be really cool to win it for Gabe," she says. "It just makes me realize again, you never really know how many more steps you have in you."

Update:

The Gophers came close but were unable to attain to attain the triple crown, finishing third at Columbus. Penn State took the title with with 139 points, Michigan finished second with 138.75, and Minnesota tallied 131.5 points.



Tapping talent

May 14, 2009

MnTAP and its interns help businesses realize energy savings

By Judy Woodward

If you had asked Laura Fletcher a few years back what she would be doing the summer after her senior year, chances are she wouldn't have said, "solving problems and saving thousands of dollars for a wastewater treatment plant." Yet, that's exactly what she did.

Now, as an Institute of Technology chemical engineering graduate, Fletcher works full-time as an engineer for the Metropolitan Council Environmental Services where she considers her work vital to the community.

Fletcher's foray into the somewhat unglamorous subject of sewage was through a summer internship at St. Paul's Metro Wastewater Treatment Plant, the Twin Cities' main sewage treatment facility. She got her internship through the University's Minnesota Technical Assistance Program (MnTAP), where she was one of eight college juniors and seniors chosen to spend the summer of 2008 working with Minnesota companies on specific waste-reduction and energy savings projects.

Each year, MnTAP receives more than a thousand requests from Minnesota businesses looking to reduce waste and improve energy efficiency. Last year, the program helped companies realize energy savings of more than \$3 million. MnTAP staff often visit participating companies to make on-site evaluation of their concerns, and when they do, says Krysta Larson, MnTAP Intern Program coordinator, they often identify projects where summer interns could be useful.

Companies are carefully matched with student interns who have appropriate academic backgrounds. "Of the roughly 70 students who apply for positions each summer, the best candidates 'float to the top' through the interview process," Larson says. "They must have excelled in the technical coursework, but they also must have initiative and creativity. No one is going to hold their hand, and they must be comfortable in a manufacturing setting."

Each student is paid a stipend and assigned both a staff mentor at MnTAP and a supervisor at the company. Advisers and supervisors act as resources and backup support; however, interns have full control over the day-to-day details of their projects.

"We're getting, very inexpensively, someone who is dedicated full-time to just one project," says Mike Costello, who has supervised interns at a medical device firm, Aritech, Inc. in Plymouth, Minnesota, and at a previous employer. "The students get an idea of how their education will apply in the real world. That connection fuels their enthusiasm."

Here's a look at three U students who had internships through MnTAP.

Laura Fletcher

Both her MnTAP mentor, Karl DeWahl, and her supervisor at Wastewater Board Services, Brad Gehring, agree that Laura Fletcher was academically prepared for the tricky job of calculating the optimal air flow for the giant blowers that provide oxygen for the decomposition process at St. Paul's Metro Wastewater Treatment Plant.

The plant treats 185 million gallons of wastewater daily and the aeration process accounts for more than half of the plant's daily electricity usage—a cost of approximately \$450,000 per month. If Fletcher were able to calculate the most efficient way to utilize the giant blowers, the cost savings could be substantial.

DeWahl, who describes his support role as steering a middle course "between letting interns learn, yet keeping them from falling into the abyss," characterizes Fletcher as "fairly advanced," even considering her status as a recent Institute of Technology graduate.

Fletcher was adept at bringing a theoretical understanding to her project, but she may have been even more pleased by some of the practical knowledge she acquired during the course of the summer.

"The project was so different from class work," she says, explaining that lab exercises—however well-designed—invariably have a predetermined, 'right' answer. "When you intern, you know that no one has tackled this project before."

By luck, one of her laboratory problems from a course gave her precisely the right preparation for her project. "I had a lab on blowers and air flow meters," Fletcher says. "It was a small-scale version of what I did as an intern."

Thanks to her mastery of the relevant calculations, Fletcher was ultimately able to suggest reconfigurations of the blowers that would save the plant upwards of \$60,000 in annual electricity costs.

Maureen Holler

When Maureen Holler, a senior majoring in biomedical engineering, learned she would be interning with Aritech, Inc., she couldn't have been more pleased. Her assignment was to reduce waste in the packaging and preparation of the delivery system for an implantable device called the Watchman, which helps prevent potentially life-threatening blood clots from forming in the heart.

"I was going to work on something that was keeping people from having strokes," she realized. "How cool is that?"

Holler quickly zeroed in on three areas that could improve the packaging system. From her perspective, one advantage of her internship was the opportunity to take ownership of the project. "Before this, I've worked on other people's projects, but this one was mine," she explains. "I came in not knowing anything about plastics, and I had to work with outside vendors, do research. I learned how to ask the right questions. It was trial by fire, but I loved being thrown in."

Holler's supervisor Mike Costello, director of operations for Aritech, quickly recognized her efforts. "There was a real alignment of the planets on this one," he jokes. Although some of her ideas were tabled for a later date, Holler's suggestions for packaging modifications were "instantly implemented," he says. "She had the support of the entire company on this one."

Mat Waddell

For Mat Waddell, a junior majoring in mechanical engineering, one of the most valuable parts of his experience as a summer intern at Twin City Die Castings was what he learned about himself. After his internship, the Minneapolis company, a producer of metal parts, offered him a permanent job after graduation.

Although he is only an undergraduate, Waddell knew he had made a significant impact on the company's bottom line. Yet, he decided he will aim for graduate studies in mechanical engineering instead.

"I loved the experience at Twin City," he says. "But ... I can use the skills I've gained in a different way."

Waddell's project was to identify ways to save energy at the manufacturing facility. Energy efficiency engineer Dao Yang, his supervisor, found Waddell to be a quick study on the job.

"He's a self-starter. Very determined and focused," Yang says. "I'm very busy at work, so I gave him a quick overview, and Mat was able to pick up from where I left off."

Waddell turned out to have natural ability as a project manager. He started out by conducting a thorough energy audit of Twin City's facility and an assessment of which areas could realize the biggest energy savings. Some of his proposed solutions were as simple as replacing an ill-fitting door on the main furnace and posting signs reminding workers to replace covers on dip wells.

Other improvements Waddell suggested were designed to reduce high temperature and increase airflow in the compressor room, where the large machines that power the manufacturing processes are kept.

In his final project presentation, Waddell estimated Twin City could save more than \$100,000 on its furnace and compressor operations if his suggestions were fully implemented.

"Mat found at least 15 projects that would give us possibly hundreds of thousands of dollars in energy savings," Yang said. "His ideas and work paid for his time here."

From Inventing Tomorrow, a publication of the Institute of Technology



Mat Waddell was an intern last summer at Twin City Die Castings. He conducted a thorough energy audit of Twin City's facility, and in his final presentation, estimated it could save more than \$100,000 if his suggestions were fully implemented.

Photos: Jayme Halbritter



Breaking barriers

May 14, 2009

U alumna crossed gender and color lines in stellar career

By Kristin Cleveland

When Clara Adams-Ender was 12, her mother sat her down and told her she had to stop pretending to be a paratrooper and jumping out of haylofts. Little did they know how far beyond paratrooper she'd go.

The fourth of 10 children born to North Carolina sharecroppers, Adams-Ender went on to become chief of the Army Nurse Corps (ANC) and the first African American woman and nurse to command a major U.S. Army installation, attaining the rank of brigadier general. An alumna of the University of Minnesota School of Nursing's master's program, she delivered the commencement address on May 15 as the school celebrates its [centennial year](#).



School of Nursing alumna General Clara Adams-Ender, with Bishop Desmond Tutu, above, spoke at the school's commencement on May 15 and received an honorary doctor of humane letters from the U. (Photo courtesy of the Women Veterans Historical Project, University of North Carolina at Greensboro.)

The University awarded Adams-Ender an honorary doctor of humane letters on that day.

"General Adams-Ender's determination and hard work led her to break barriers throughout her career," says Connie White Delaney, dean of the Nursing School. "She has consistently been a vocal advocate for our profession, from driving minority enrollment in nursing programs to initiating new nursing care models."

In February 1960, she took part in the famous Woolworth's lunch counter sit-ins with the Greensboro Four.

Since retiring from the Army in 1993, Adams-Ender has been the president and CEO of Caring About People with Enthusiasm (CAPE) Associates, Inc., a management consulting firm specializing in health care management and reform, leadership issues and development, cultural diversity, women in the workplace, and conflict management and resolution.

Adams-Ender's life and career have been peppered with obstacles she turned into opportunities. She graduated from high school at age 16, despite missing 30 out of 180 school days a year to harvest tobacco. She had friends send assignments home to her on the bus, then returned them, completed, back the next day with the bus driver.

While her parents insisted that she and her siblings pursue higher education, her father quashed a legal career and told her to apply instead for the nursing program at North Carolina Agricultural and Technical State University in Greensboro. She ran with it and even realized her dream of travel while completing some of her nursing affiliations. African Americans were barred from practicing in many North Carolina hospitals at the time, so Adams-Ender spent several semesters at New York hospitals completing her requirements.

In February 1960, she took part in the famous Woolworth's lunch counter sit-ins with the Greensboro Four.

To help pay for her final years of college, Adams-Ender enlisted in the Student Nurse Program of the Women's Army Corps Reserve. After graduating, she rose through the ranks of the ANC, crossing many gender and color lines along the way.

She completed a master's degree in surgical nursing at the University of Minnesota, went on to teach at the Walter Reed Army Institute of Nursing, and served as director of the Department of Nursing for Army Medical Activity at Fort Mead, Maryland, before becoming the first woman and first nurse to earn a master of military art and science degree from the U.S. Army Command and General Staff College at Fort Leavenworth, Kansas.

The only nurse and one of only seven women in a class of 1,100 officers, she recalls being surprised that the men saw the female officers as competition.

"I wasn't competing against them...I've always said to people, 'You should never hold things against folks, in terms of the work world, that they can do absolutely nothing about,'" Adams-Ender told the Women Veterans Historical Project at University of North Carolina at Greensboro. "I can do nothing about having been born a female...All I want is the opportunity to be able to do the best with what I've got ..."

Just shy of her 40th birthday, Adams-Ender became one of the youngest officers promoted to colonel while serving as chief of nursing at the 97th General Hospital in Frankfurt, Germany. There she met her second husband, Heinz Ender, a retired dental surgeon and World War I veteran.

In 1982 she became the first African American ANC graduate of the Army War College, and two years later, the first African American named chief of the Department of Nursing at Walter Reed Army Medical Center. In 1987 she took command of 22,000 nurses when she was promoted to brigadier general and named chief of the ANC. At the time, only four women in the Army actively held that rank.

"...taking care of a bunch of nurses is about one of the most challenging things you can ever do in this life..." she told the project. "In the first place, they're all kind of independent people, and they know everything about everything, and you've got to get them together and try to get things going..."

In 1991 Adams-Ender took on a role equivalent to city manager, magistrate *and* mayor of a small city when she became commanding general at Fort Belvoir, Virginia, a position she held for three years before retiring.

Former colleagues credit Adams-Ender's approachability, humanity, and "repository of good sense" for her astonishing career and the number of protégés she has around the globe. Perhaps she says it best when she described to the veteran's project what the 24-hour business of nursing taught her.

"I learned very quickly that the largest group of health professionals within any health care system is nurses and nursing personnel of one kind or another," she said. "They're the folks who lay the hands all of the time, and they have to do things according to certain standards, or else the whole system comes apart."



News of the weir

May 18, 2009

Researchers use remote-controlled sensors to track pollutant loads from storms

Deane Morrison

The next cup of stale coffee you pour down the drain may end up as evidence. Not in a courtroom, but in a study of how well Twin Cities sewers and waterways handle the loads of pollutants washed into them by storms.



William Arnold (left) and Chris Wennen, a graduate student in water resources science, examine water monitors at a weir on a stormwater pond.
Photo: Patrick O'Leary

Armed with a network of five wireless sensors stationed near the Twin Cities' Minnehaha Creek, researchers from the University's Water Resources Center are monitoring—in real time—when and where storms wash road salt, lawn chemicals, and other pollutants into area waterways.

Study leaders [William Arnold](#) and [Miki Hondzo](#), both professors of civil engineering, hope to have 100 stations in the next five to 10 years. An expanded system could feed up-to-the-minute data to a Web site that recreational users of lakes and streams could use to plan their outings. It could also help urban designers tailor their plans to minimize the runoff of chemicals in local watersheds during a rain, or allow farmers to decide the best times to apply fertilizers.

Flush with data

Levels of nitrate from fertilizers and chloride from road salt tend to be low until rain washes them into waterways. The effects of rain can be dramatic, as shown by data from Minnehaha Creek and another metro-area stream, Shingle Creek, both of which empty into the Mississippi River.

"Concentrations of nitrate go up from about 200 micrograms per liter of water up to about 400 in Shingle Creek and from about 100 to 250 micrograms per liter in Minnehaha Creek," Arnold says.

But with the much larger volumes of water sweeping through the creeks, these concentrations add up to even more dramatic increases in the load, or amount of a pollutant passing a point on the stream bank every second.

The nitrate load is two to five milligrams per second in dry periods and increases to 50 to 200 milligrams per second when it rains," Arnold states. And "a student found that during a one-month period, two-thirds of the nitrate that entered Shingle Creek entered over just four days."

"There should not be caffeine in the water at all, as storm and sanitary sewers are supposed to be separated."

In contrast to the situation with nitrate, "concentrations of chloride actually drop when it rains," Arnold says, "but loads increase from about one gram per second in dry periods to 10 to 50 grams per second during rainfall."

Of the five stations now monitoring water that drains into Minnehaha Creek, two are in "stormwater ponds" that collect street runoff and feed into the creek. Another monitors a channel connecting a small lake—Lake Pamela—to the creek. The last two monitor water above and below the point where the channel empties into the creek.

Mounted on tripods, the stations draw power from solar panels. Besides nitrate and salt, they monitor pH, the amount of oxygen dissolved in the water (high is good), temperature, turbidity, and depth. Four of the sensors radio their data to a base station, which compiles the data and sends it overnight by cell phone to the U's St. Anthony Falls Laboratory for analysis.

"When a storm breaks, students can program the system remotely to take readings as often as once a minute to be sure to catch the movement of pollutants at its peak.

"The sensors give better estimates of pollutant loads than traditional sampling," says Arnold. "We now have data every one to 30 minutes instead of twice a month."

In addition to the sensors, automatic samplers collect water as often as every 30 minutes during storms. Researchers take the samples back to the lab to analyze them for fecal coliforms, pesticides, and caffeine.

Which brings us to that coffee you tossed down the drain.

"There should not be caffeine in the water at all, as storm and sanitary sewers are supposed to be separated," says Arnold. "The presence of caffeine means there are either cross connections between the storm and sewer systems or leaky sewer pipes—and when it rains, the sewage makes it into creeks along with the stormwater."

Unfortunately, caffeine does get into the creeks. Levels jump from less than 20 nanograms per liter in dry periods to 70 (Minnehaha) or 500 (Shingle) nanograms per liter during a rainfall, Arnold reports.

On the bright side, the researchers have found that stormwater ponds in the Shingle Creek watershed remove pollutants from the water.

"This project is a great example of research that will move environmental monitoring to the next level and improve our understanding and management of water resources," says [Deb Swackhamer](#), director of the Water Resources Center.

The research team also includes civil engineering associate professors [Paige Novak](#) and [Raymond Hozalski](#).

Read about a [University study](#) of road salt.



Showing their mettle

May 18, 2009

Student-produced magazine examines impact of recession on millennial generation

By Rick Moore

For Emily Stickler, a graduating senior in the School of Journalism and Mass Communication, there have been two pressing questions this spring.

The big-picture question involves her chosen field: Where is journalism heading, with newspapers going bankrupt and other media outlets cutting their staffs? The second question was more immediate. As editor-in-chief of the magazine her class—Magazine Editing and Production—would produce, what should be the featured topic for the publication?



Mettle's stories include a look at how local musicians like Channy and Alexei Moon Casselle (pictured) are important to cash-strapped young fans.

Photo illustration by Erika Gratz

There may be no easy answer for the first question, but Stickler and her fellow classmates arrived at a very appropriate answer to the second. They produced an impressive magazine (and a companion online site) called *Mettle* that takes an in-depth look at the current recession and its effect on the millennial generation.

"It was the most substantial topic, and I think it's really something that's necessary [to talk about] right now," Stickler says.

"In brainstorming for this magazine and its online counterpart, I realized that I am surrounded by [the] future face of journalism," she notes in her Letter from the Editor. "We, as graduates, need to take hold of this changing profession and find an outlet to successfully deliver high-quality editorial and artistic content to the public during these tumultuous times."

How they do that after graduation is to be determined. But the end product of the students' "capstone" course is impressive. The print version of *Mettle* is a glossy 40-page magazine (not counting a financial-themed crossword puzzle on the inside back cover), complete with timely and interesting stories, compelling photographs and photo illustrations, and a very appealing design.

The content addresses the recession from A to Z, and does so "through a Generation-Y-specific lens," notes Stickler. Stories include advice on how to handle student debt loads and a look at how the federal stimulus package will—or won't—help new graduates find jobs. There is also a feature on how more young people are "investing" in their spirituality, and a first-person account of the mental bliss available through a Bikram yoga—a.k.a. "hot yoga"—class. There's even an eight-page Vogue-esque pictorial, "High Fashion in Low Times: How the economy and fashion are stitched together."

Mettle online

One of the obvious shifts in journalism over the last few years is the move to more online, multimedia content. And the online version of *Mettle* is a robust example of just what that can entail.

On the Web site, you'll find all the stories from the printed *Mettle*, plus a bevy of bonus features: slide shows, numerous blog entries related to the economy and the recession (dating back to early in the semester), and even a two-part cooking video under the name "Thrifty Kitchen" that shows viewers how to make a French lentil salad.

The whole package—magazine plus online content—boils to down to students telling stories about the recession for fellow students.

"We often read about how the recession impacts people in the middle of their career, but we don't hear about the realities of moving into the workforce," says Elizabeth Larsen, who, along with Jeanne Schacht, co-taught the course. "*Mettle* offers an insider's look into what young people are going through right now."

It also offered the 20 students in the class—who assumed various production roles from managing and senior editors to Web editors and writers—an inside look at what it takes to produce a substantial product in just a few short months. And Stickler says the feedback has been positive. "People are enjoying, esthetically, how things blend together and carry over from page to page.

Even though the outlook for journalism graduates entering the workforce may not be quite as bright as in years past, the talents of Stickler and her peers may eventually be more in demand. "Being able to transfer our skills to an online format is going to be especially essential," she says.

"I believe in the value of journalism and the value of telling stories," she adds. And those stories become more all the more important when they're relevant, as the recession certainly is for today's graduates.

Get a copy of *Mettle*

There are still a limited number of copies of the print version of *Mettle*. For information on obtaining one, contact managing editor Erika Gratz at grat0035@umn.edu

The tagline for *Mettle* may sum it up best. "Tough times don't last. Tough people do." Adds Stickler: "And we're here to tell their stories."



A title in track

May 20, 2009

Gopher men win Big Ten track title; women finish third

The Minnesota men's track team used a 21-point performance, including a title run by Hassan Mead, in the 5,000-meter run to secure the team crown at the 2009 Big Ten Outdoor Track & Field Championships Sunday at Jesse Owens Memorial Stadium in Columbus, Ohio. The Gophers, who also won the Big Ten indoor team title, compiled 130 points, 27 better than runner-up and host Ohio State.



Mead added his fifth Big Ten individual title to his spectacular sophomore season. The Minneapolis native won the individual cross country crown last fall, the 3,000 and 5,000-meter races at the indoor Big Ten track championships, and then the 5,000 and 10,000-meter events this weekend.

The Gopher men's track and field team left its mark in Columbus, capturing the team title by 27 points over runner-up Ohio State. The Gophers also won the Big Ten indoor meet earlier this year.

Photo courtesy University Athletics

Mead was the headliner in the 5,000 meters, crossing the finish line in 14 minutes, 20.75 seconds, but the Gophers once again displayed the team depth that made the difference in so many events. Junior Chris Rombough finished third in a time of 14:25.98, while Ben Blankenship placed fourth in 14:26.15.

"I can't say enough good things about Hassan," said Gopher head coach Steve Plasencia. "But he certainly wasn't the only guy to step it up this weekend. We got points from the people who we expected we would and more from a lot of other events across the board."

Junior Aaron Studt delivered in the shot put. Studt landed the winning throw, 61-6 1/4, on his fifth attempt after firing a long throw just outside the sector on the first throw of finals.

Senior Ibrahim Kabia sprinted to runner-up honors in the 100-meter dash with a time of 10.44 seconds. Kabia added a sixth-place showing in the 200 meters in 21.44 seconds.

The Gophers scored two runners in the 1,500-meter run. Blankenship finished fourth in a time of 3:58.48, while Andy Richardson placed seventh in 4:00.68. Joe McFarland chipped in a sixth-place effort in the 800 meters with a time of 1:51.44.

Minnesota scored in both hurdles events. Mike Linnemann finished sixth in the 400-meter hurdles in 53.61 seconds and Sean Duling placed eighth in the 110-meter hurdles in 14.62 seconds.

The Gophers scored in two of the three other field events contested on Sunday. Joe Plencner finished fourth in the pole vault, clearing 16-10 3/4, while Raymond Blackledge placed seventh in the triple jump with a leap of 48-9 1/2.

The Gophers will next compete at the NCAA Midwest Region Championships on May 29-30 in Norman, Oklahoma.

Gopher women narrowly miss out on "triple crown"; settle for third

The Gopher women's team came up short, placing third, in one of the closest team races in Big Ten history at the 2009 Big Ten Conference Outdoor Track & Field Championships, also in Columbus. The Golden Gophers finished with 131.5 points, trailing Penn State's 139 points and Michigan's total of 138.75. The team title was decided in the final event of the meet, the 4x400-meter relay, where the Nittany Lions won to grab the team title.

"We had some very good performances today, but unfortunately it wasn't enough to overcome some of the hits we took in certain other events," said Minnesota head coach Matt Bingle. "We came close and we will always look back and think we should have won this meet. It certainly wasn't from lack of heart or effort. We needed a few more breaks and just didn't get them."

The Gophers' top finish of the day was turned in by senior Heather Dorniden, who placed second in the 800-meter run, and paced a surge of 23 team points in the event. Nikki Swenson finished third in 2:07.19, while Jamie Dittmar was fourth in 2:07.79. Dorniden also contributed a fifth-place showing in the 1,500-meter run in a time of 4:23.04.

Minnesota scored in eight of the 10 events on the track, highlighted by three Gophers tallying points in the 100-meter dash. Freshman Kylie Peterson placed third in a time of 11.81 seconds, Nyoka Giles was sixth in 11.87 seconds, and Chioma Omeoga was seventh (11.93). Giles also finished seventh in the 200 meters in a time of 24.26 seconds.

Rikita Butler added her name to the list of regional qualifiers by running a school-record time of 53.88 seconds in the 400 meters to place third. Butler is the 26th individual Gopher to notch a qualifying mark for the NCAA Midwest Region Championships.

The discus was the Gophers' headlining field event on Sunday as Minnesota collected three scoring performances. Sophomore Nikki Tzanakis led the way with a third-place finish in the discus with a throw of 152-8. Amanda Solberg tallied a fifth-place finish with a throw of 148-4, while Hannah Studt was seventh at 145-7.

The women's team will next compete at the NCAA Midwest Region Championships on May 29-30 in Norman.

1,001 and counting

The Minnesota baseball team (35-15, 17-6) dropped a 10-8 decision at Penn State (25-26, 8-16) in its regular-season finale on Saturday, May 16. With the loss and an Ohio State win, the Golden Gophers lost out on a chance to clinch the Big Ten regular-season championship. Minnesota will enter the Big Ten Tournament as a No. 2 seed, which will give the Golden Gophers a first-round bye.

Two days earlier, Gopher head coach John Anderson became the 39th head coach in Division I history to claim 1,000 career victories when the Gophers beat Penn State 7-6.

Anderson is the 20th head coach in Division I history to win 1,000 games with the same team, and the first in the history of the Big Ten to win 1,000 games at the same school. He is also the 10th youngest head coach in Division I history to reach 1,000 victories, and is the fifth active head coach to reach the mark with the same school.

"This has been a really special season," Anderson said. "These kids have done a great job of bouncing back from last year, and really authored a new start. I am extremely proud of what they have done this year, and it is enjoyable to share this moment with this group of players."



New milk model

May 28, 2009

U's unique research will fill growing demand for information

By Becky Beyers

Stocky red-and-whites, tall and bony black-and-whites, solidly built all-black. Dozens of dairy calves of every color and body type—separated into small groups by age and size—loiter and play in the straw-lined wooden pens and shelters at the West Central Research and Outreach Center (WCROC) near the U's campus at Morris.

Once a month, each calf is weighed and measured, with the results meticulously recorded. As they grow, they graduate up to larger pens and eventually, some of the heifers will be moved out to the center's grazing fields, where the cows will become part of the research center's herd. The rest of the calves will move to other research projects or be sold.

This generation of calves is being raised organically, part of the WCROC's conversion of about half its herd, or 70 cows, to organic production. When the transition is complete, the center will be one of only three organic dairy research facilities in the nation and the only one in the Midwest, says Dennis Johnson, a professor of animal science and leader of the transition.



At the West Central Research and Outreach Center in Morris, the U is moving half its dairy herd—made up of pure Holsteins as well as cross-bred Jerseys, Montbeliardes, and Scandinavian Reds—into organic production.



The research and outreach center will be the only land-grant university facility in the United States that includes both organic and traditional dairy research. What's more, when other universities began organic dairy facilities, they started with organic heifers; at Morris, the actual transition process

from conventional dairying to organic is part of the research.

Why organic? Why here?

Organic milk is the fastest growing and one of the most profitable products in the dairy industry. While non-organic milk prices paid to farmers are set monthly—and have plunged in recent months—organic prices are set once a year and typically bring in more money for farmers.

All of Minnesota's organic production is growing fast, says Jim Riddle, organic outreach coordinator for the University of Minnesota. In every measure—number of farms, total acres, and so on—Minnesota is among the top 10 in the nation. Riddle expects that the U.S. Department of Agriculture's latest organic census will show even more rapid growth.

"It was a natural progression for the dairy research project to be located at the WCROC, says Riddle, because of the research already being done there. "A lot of the fundamentals were already in place, but it did take leadership to get this going, along with public support and resources from the Minnesota Legislature," he says.

In 2007, the legislature designated \$1.1 million in research funding at the University to be used specifically for organics. Before that, "a lot of the research agenda has been driven by the input companies," which leans toward conventional agriculture, Riddle says. "That's where universities had to look for funding."

Along with the dairy research at Morris, the University is a leader in organic cropping research at the Southwest Research and Outreach Center in Lamberton, and is uniquely positioned for research into human nutrition and organics because of its research specialties, according to Riddle. "There's huge interest right now in organic fruits and vegetables," he says. "There's an excellent opportunity there to do more [research]."

Moving toward organics

"We've been moving [toward organics] for the last 13 years," Johnson says, with research projects involving reduced-input dairying and sustainable-ag practices, like letting the cattle graze on grass and overwintering outdoors. But becoming certified as an organic dairy requires more intense documentation, record keeping, and inspections. "We're in a position to do research during the transition, which is more like what Minnesota farmers would experience if they chose to go organic," he says.

Transitioning to organic certification of cropland on which the cows graze is a complex process; the center is about a third of the way finished. Cows that have been raised conventionally and are giving milk need a year of transition into organic management. New heifers during transition must be under organic management for the last trimester of their mothers' gestation.

By November of this year, Johnson says, the whole herd will meet organic standards. The rest of the certification process involves ensuring that grazing lands have met organic standards for at least three years.

Organic management means not using antibiotics or synthetic drugs or hormones, Johnson says, along with restrictions on what the cows eat and their living conditions. The center's longstanding dairy breeding program will be incorporated into the program, so that scientists can document which breeds respond best to organic management.

"We expect to end up with three genetic groups," Johnson says. Each group will have some cows raised under both organic and traditional methods. Dairy research at the center has long involved pure Holsteins as well as cross-bred Jerseys, Montbeliardes, and Scandinavian Reds.

"The idea is that depending on your situation, you might want a Jaguar or a Jeep," says Johnson. "A pure Holstein is a Jaguar—it's been selected for its high milk yield, but it might not have the characteristics that make it adaptable to lower input situations. For more rugged conditions, you want the Jeep, "one of the crossbreeds that don't yield as much milk but might be better suited for spending the winter outdoors.

Research comparing the breeds and their responses to organic management will continue after the center is certified organic, Johnson says.

Driven by consumers

Johnson notes that demand for organic products mostly has been driven by consumers' growing interest in food safety and knowing the origins of their food.

At public presentations about the dairy herd transition, he shows a slide that details his own evolving perspective—from concentrating on increased production in the 1950s through a focus on genetics and diet in the '60s and '70s to an interest in more sustainable dairy systems today. He says he thinks the industry has gone through a similar progression. "People are starting to look at the entire food system, and there's also a desire to have more of a landscape vision... people want to know where their food is coming from."

Johnson sees the opportunity for the Morris research center to lead further research into the broader impact of organic agriculture, because of its size, location, and combination of research topics. "There are a lot of other issues to be considered: cost, the rural lifestyle, what people expect their landscape to be like... we're trying to show how organic production works in the context of a farm.": he says.

More on organics:

A University site, [Organic Ecology](#) has information, education, and announcements about organic ecology research and outreach, including [Organic Field Day](#) planned for July 9 at the Southwest Research and Outreach Center in Lamberton.



Going with the whole grain

June 1, 2009

How to add whole grains to school menus? A University study examines the issues.

By Deane Morrison

School food service directors from around Minnesota agree that they want to get more whole-grain food into their cafeterias. But the big question is how.

A [study](#) led by University researcher [Len Marquart](#) points up the difficulties; among them are a variety of definitions for a "whole grain" product, packaging and distribution problems, and the dilemma of how to get kids to eat whole-grain bread.



Whole grain breads may be better for students' health, but adding them to school cafeteria menus may not be easy, a University study finds.

The study stems from a 2007 meeting of the Minnesota School Nutrition Association, 36 food service directors and managers from urban, suburban, and rural school districts sounded off on the hurdles they face in trying to add whole grains to school lunches.

The obstacles could have an impact on student health. Whole grains have been linked to a smaller risk of heart disease, type II diabetes, and some types of cancer, plus better weight management. But on average, Americans only eat about one serving a day of whole grains instead of the three recommended servings, the researchers say.

To start with, the food service professionals wanted a standard measure for the amount of whole grain in food items.

The confusion lies not in defining whole grain flour—it is ground from unrefined kernels of wheat, oats, rye, etc.—but in defining a whole grain product. Whole grain products are made with whole grain flour, plus other ingredients, and sorting out the whole grain content of a food product is what's hard.

The researchers write that one definition, from the Food and Drug Administration, is based on the amount of whole grain in the total weight of the product. Another, from the U.S. Department of Agriculture, defines a whole grain product as one in which whole grains account for 51 percent of the total flour content.

"Just the appearance alone is enough to scare kids away, but that's what we're here for is to teach them to learn to eat better."

"The major issue associated with this definition, as supported by our findings, is that most school food service people do not know whether the 51 percent represents the amount of whole grain flour by the total percent of flour in the product or by the amount of whole grain flour in the total weight of the product," says Marquart, an associate professor of food science and nutrition.

This kind of confusion makes it hard to determine how many servings—another term with more than one definition—of whole grains a product supplies.

But the food service professionals had plenty of other gripes, too. Take buns, for example. An eight-pack may be fine for a family, but they make for a lot of extra labor in a school cafeteria.

"We use whole grain hamburger buns and hot dog buns, but you're right—they're in the consumer-sized packages," said one person in the study. "You know, we're talking eight hot dog buns to a package. Well, when you're doing 500 hot dogs, that's a lot of bags you're ripping up."

The issues of availability and cost also came up at the discussion. Larger districts appeared to enjoy more options, higher product consistency, and, in general, superior service from distributors than did smaller districts. But representatives of smaller schools raised the possibility of forming bargaining or co-op groups to strengthen their position, decrease costs, and relieve vendors of the burden of dealing with many schools individually.

The researchers concluded that schools, vendors, manufacturers and governmental agencies need to communicate better in order to remove confusion about definitions and which standards to follow when ordering whole grain products. But they also saw a golden opportunity to educate students and staff about whole grains in the schools.

Which brings us to the issue of how to create consumer demand; in other words, how to get kids to eat food that's good for them. Timing was one strategy.

"I think if you start early enough in elementary, just like anything else in the schools, if you present [whole grain] to them on a daily basis, they're going to become accustomed to it," said one discussant.

Blending, camouflage, multiple options, and no choice all popped up as ways to help youngsters adapt to whole grains. However it's done, one food service person summed up the challenge perfectly: "Just the appearance alone is enough to scare kids away, but that's what we're here for is to teach them to learn to eat better."



Romancing the U

June 5, 2009

In 30-plus years as head of campus planning, Clint Hewitt has helped shape the U

By Rick Moore

When you stroll around the Twin Cities campus with Clint Hewitt, the walk down Pleasant Street becomes a trip down Memory Lane.

There's his story about the mostly underground Williamson Hall and how it was designed to yield to views of its neighbor to the north—the majestic Folwell Hall. Or the one about the person who suggested building a 5,000-car parking ramp in the middle of Northrop Mall.

When it comes to handing down stories of how and why the campus looks the way it does, few are better qualified than Hewitt, one of its modern-day architects.

He arrived at the University of Minnesota in 1972, and for almost three decades served as the U's associate vice president for campus master planning, which means he has helped shape the Twin Cities, Crookston, Duluth, and Morris campuses. He is also an associate professor in landscape architecture. He will be retiring from the University in September.

Hewitt is quiet and unassuming upon an initial handshake, but take him out into his element—the campus landscape—and he quickly beams with pride for the place that recruited him when he was an assistant campus planner at the University of Michigan.

Despite arriving in the Twin Cities for the first time on a 20-below winter day, Hewitt immediately took to the look and feel of the campus and accepted the offer. "That's when the romance began," he says.

Sitting in the historic Knoll, his favorite place on campus, he is quick to point out his admiration for the U's visionaries of yesteryear, including the famous architect Cass Gilbert (who originally conceptualized Northrop Mall), Anthony Morell and Arthur Nichols (the landscape architects who brought it to life), and landscape architect H. W. S. Cleveland, who believed that the physical landscape of a campus was of critical importance for students—a vision Hewitt seems to have channeled.

"People hear me say over and over again, [that this] campus is all about relationships. Achievements are wonderful, but if you have a relationship with another person who can be helpful or supportive, and you can be supportive [to that person], that's what it really boils down to."

He came to the U at the tail end of what he calls the golden era of campus planning in the United States. "There was this boom in campus development and the recognition that we've got to place [the buildings] and site them in a way that maintains some of the character of the campus," he says.

Hewitt says he was fortunate to be working at the University of Minnesota, where the campus planning and development office comprised professionals from virtually every related field, such as interior design, space management, engineering, landscape engineering, and project management.

"At the time that we were at our peak, I had the envy of literally any college or university staff in the country, mainly because we had all of the professional people in one group," he says. "What it allowed us to do was take an idea and see it all the way through to completion."

A path through campus, the link to the river

Hewitt is hesitant to take much credit for any of the campus features he has helped usher into existence, but he has his favorites, including the Scholars Walk and Lilly Plaza, the beautifully landscaped tract of land bounded by Northrop Auditorium, Pillsbury Hall, Morrill Hall, and Church Street—an area he calls a "reclaimed" space.

He's also proud of the 1996 campus master plan that outlined a vision and guiding principles for all of the University of Minnesota's campuses. It led to the linking of the campus mall to the Mississippi River behind Coffman Union, part of Gilbert's 1907 vision.

We can be grateful he helped nix the idea of the mega ramp in the middle of the mall. The idea's owner thought that if the ramp were connected to Walter Library, the physics building, the chemistry building, etc., that commuters could leave their coats in the car in the winter and comfortably walk to class. Hewitt's reaction? "That was a joke, wasn't it?"

Above all, Hewitt cherishes people, and that's evident by his involvement with a host of organizations, including the Minneapolis/University Rotary Club, the University YMCA, and Hope Community, Inc. in south Minneapolis. He has served as president of the Society for College and University Planning and worked extensively to bring other minorities to the profession of landscape architecture. And it's people that anchor some of his fondest memories of the U.

"People hear me say over and over again, [that this] campus is all about relationships. Achievements are wonderful, but if you have a relationship with another person who can be helpful or supportive, and you can be supportive [to that person], that's what it really boils down to.

"There's a joy for me walking across this campus, and maybe meeting one of the custodians that I've known for the last 25 years and he'll stop and we'll talk about what's going on. And that's the value of this place."

Nearly three hours after commencing a conversation on a writer's favorite bench in Hewitt's favorite place on campus, it was time to head back to "work;" in this case, one of the final chapters of Hewitt's storied career at the U.

"A person is fortunate, and I say blessed, when they find something they really like to do," he says. "It's been a romance with the University and its people for over 30 years. My wife will tell you that, because she would always say, 'Do you have to stay over there so long. What in the world are you doing?'

"I've always said that when I go to bed on Sunday night I get excited about what might be going on at the University on Monday. There are certainly bumps in the road. That's what most romances are. The fun part about a romance is smoothing out the bumps."



Clint Hewitt came to the University of Minnesota in 1972, at the end of what he calls the "golden era" of campus planning in the United States. For almost three decades he served as the U's associate vice president for campus master planning.

Photo: Patrick O'Leary



Out in the open

June 9, 2009

U makes sure neighbors weigh in on stadium concerns

By Rick Moore

The opening kickoff at [TCF Bank Stadium](#) is just the length of a football season away, and for fans of outdoor football on campus—who will have waited 1,447 weeks between opportunities to experience it—September 12 can't arrive soon enough.

One element of the new facility that has attracted little fanfare is the U's commitment to working through the ramifications of the new stadium with the people who live and work in the surrounding area.

To that end, the University created the Stadium Area Advisory Group (SAAG) in 2004 and invited every adjacent neighborhood, business association, municipality, and government entity to get involved in regular meetings. Over the years, meetings have drawn an average of 25 to 35 participants, "depending on how hot the issue is," says Jan Morlock, the U's director of [community relations](#), who was instrumental in establishing the group.

Morlock says the meetings have often produced spirited discussions, especially with regard to the three "T"s: traffic, trash, and tailgating. Neighbors have long been concerned about uncivil behavior that, when sustained, has a significant impact on quality of life in the neighborhoods.

They want to make sure that celebrations related to events at the stadium remain safe and civil. Addressing these and other issues that may arise will require ongoing monitoring and discussions, and SAAG will meet following the first three games in the new stadium to assess how the game-day experience went for neighborhood residents.

"The problem with the University of Minnesota is it's a big beast, and when it moves, it breaks things, perhaps not intentionally, but that's the result," he says. If that's the nature of the beast, Banks thinks the SAAG discussions have been an effective means of taming it. "I think the efforts have been genuine and that the University has been responsive," he says. "So I think the process has been good."

"The stadium is a reality whether the people support it or not," says Joan Menken, a member of SAAG, a long-time member of the [Southeast Como Improvement Association](#) and a resident of the Southeast Como neighborhood for about half a century. "It can have pluses; it can also have significant minuses, depending on how we deal with a number of issues."

She cites traffic, parking, and the concerns that fall under the umbrella of "livability"—drinking, parties, litter, and the like. Those are precisely the issues that SAAG has sought to both discuss and develop solutions for. "I'm happy that we have SAAG," Menken says. "That was a monumental start. It's a group and a process we've never had before."

"One thing that has made it more potent is at times we've been discussing things that have policy implications," Morlock notes. It helps, she adds, that University leaders like Vice President of University Services [Kathleen O'Brien](#), Director of Athletics [Joel Maturi](#), and Vice President and CFO [Richard Pfutzenreuter](#) have sat at the table with community members. "The people who are really calling the shots here at the U at the executive level have been accessible to this Stadium Area Advisory Group," Morlock says.

Steve Banks sees the new stadium from a number of perspectives: as a 20-year resident of the Prospect Park neighborhood, which rises to the east of the stadium; as the former president of the Prospect Park East River Road Improvement Alliance; and as a University alumnus. "So I've got that little allegiance thing going on," he jokes.

Still, he senses the occasional uneasiness neighborhood residents have toward the U, even if they're glad to live in close proximity to it. "The problem with the University of Minnesota is it's a big beast, and when it moves, it breaks things, perhaps not intentionally, but that's the result," he says. If that's the nature of the beast, Banks thinks the SAAG discussions have been an effective means of taming it. "I think the efforts have been genuine and that the University has been responsive," he says. "So I think the process has been good."

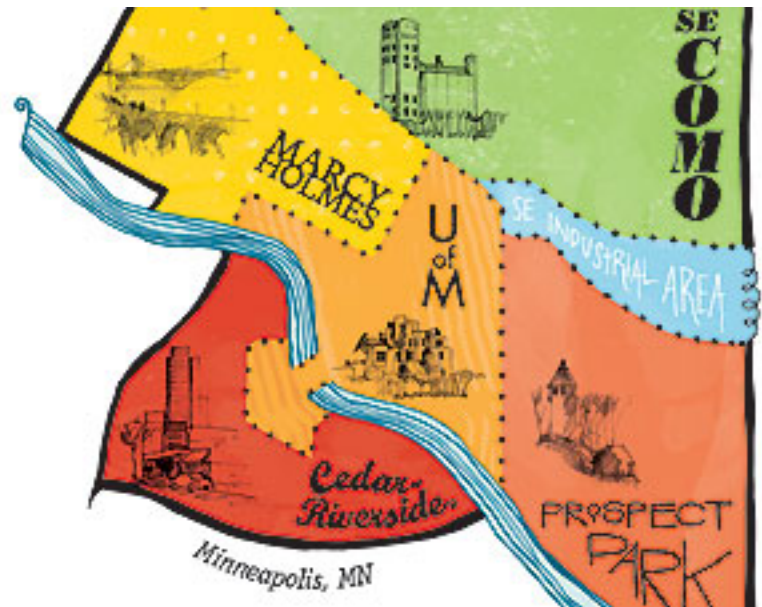
It doesn't take long to figure out where Skott Johnson stands on the stadium. A visit to his Autographics Printing storefront on 4th Street and 13th Avenue offers the first hint. On the east wall—about a half mile due west of the stadium—is a cardboard cut-out of Goldy holding a football in a Heisman Trophy pose. Johnson lived on fraternity row and had season tickets in the Cal Stoll era, when the Gophers fluttered around the .500 mark. He's now the president of the Dinkytown Business Association.

"A good number of the merchants here remember when [Memorial Stadium] was on campus and what those Saturdays were like, and they're anxious to get back to those days," says Johnson. "It was very family oriented and you could see lots of reunions going on—friends who hadn't seen each other since college. And then just to hear the game. Because it was an open-air stadium, even if you didn't have a ticket you could hear when there was a touchdown; you could hear the band. It was pretty exciting all around campus."

Johnson says he's not concerned about game-day traffic hindering Dinkytown commerce, and points out that when Memorial Stadium was around, merchants used to plan special events for game days. "Maybe at the first game there will be a couple of gridlocks, but they're going to figure it out," he says. "The U has certainly planned well for it. [And] they have meetings scheduled after the games to discuss, 'How do we improve on the next one?' I just don't see it being a problem."

For Banks, any concerns he has about parking and traffic are tempered by his knowledge of history. "Overall, when you boil it all down, we have had a 60,000-seat stadium (Memorial Stadium) at the University of Minnesota in the past. We lived with it successfully." Thanks to the diligent work of SAAG, prospects are excellent that the same will be said of the new era of on-campus football.

From the May-June issue of Minnesota, the magazine of the [University of Minnesota Alumni Association](#).



The new football stadium is surrounded by a half dozen neighborhoods and a number of commercial districts, and the University has sought to receive their ongoing input on stadium concerns.



New voyageurs

June 11, 2009

Graduate music students sing their way through schools

By Gayla Marty

Two centuries ago, voyageurs packed their canoes and paddled the waters of the Great Lakes region, portaging from waterway to waterway, trading furs and goods of all sorts.

In 2008-09, graduate students in music are Duluth's new generation of voyageurs. They packed up UMD campus vans and portaged sets and costumes to elementary schools, trading loads of fun and something more valuable than furs: information for living healthy lives.

At each school, a ship unfolded—a clever and colorful contraption to carry the *Pirates of the Carrot Bean*.

The Voyageurs donned hats and scarves to become pirates, extolling the virtues of eating not only carrots and beans but bananas (whose potassium will calm you down) and other foods loaded with nutrition, plus exercise and hygiene. After the 45-minute show, the pirates jumped ship to follow the students.

"One of my favorite parts was going into the classrooms to find out what clicked with the kids and reinforce it," said master's student Christine Hawkins, captain of the *Carrot Bean*. Hawkins is an opera student from Georgia who never thought of doing children's theater before she came to Duluth.

"It's been eye-opening for all of us to see how much music and theater can assist in learning," she said. "I love it."

Kids and teachers loved it, too. In the first year, the Voyageurs performed for more than a 6,000 K-5 students and 250 teachers in the Minnesota districts of Duluth, Proctor, Hermantown, Hibbing, and Bloomington, as well as in Maple, Wis.

Kathleen Neff, director of the UMD Fine Arts Academy, said, "*Pirates of the Carrot Bean* has received nothing but positive feedback and will continue to perform the show next year." Plans for future shows include adjustments to make it appropriate for Middle School and High School students. "It's an interactive process," said Neff. "Themes and messages of the new shows depend on focus group feedback. Tackling issues such as bullying and depression may be added to the messages about healthy choices."

"This is a different way to use graduate talent," said Judith Kritzmire, professor and director of UMD graduate studies in music. Typically, when students perform in an opera or show, the script and score are in final form.

"For most of us Voyageurs, this was the first really interactive creative process we've been involved in," said Jennifer Graupmann, who plays the Sea Monster. "With *Pirates of the Carrot Bean*, we were given a script at the end of August and were making changes up until our first shows in November. It was great."

Graupmann left a well-paying job in Minneapolis to enroll. The quality of UMD's music program impressed her, the Voyageurs opportunity sounded exciting, and an assistantship made it possible.

A new partnership with Duluth health care organizations—SMDC Foundation, SMDC Health System and Duluth Children's, and HealthPartners—provided funding for the Voyageurs' assistantships and health benefits, which attracted talent from top music programs across the country. Duluth Public Schools have also played a critical role in creating the partnership by involving teachers, principals, and school leaders.

The idea came from UMD School of Fine Arts Dean Jack Bowman and Development Officer Rob Hofmann.

"It's a win-win-win," said Bowman. "It's a win for the public schools and our community. It's a win for our health care partners—here's a way to spend on prevention rather than treatment. And it's a win for our students and university—it has doubled the size of our master's program in music."

Learn more about the master of music program and graduate education at UMD at [graduate education](#).

With updates by Cheryl Reitan



UMD graduate music students acted as modern-day voyageurs, taking their *Pirates of the Carrot Bean* show to elementary schools to educate children on living healthy lives.

Photo: Brett Groehler



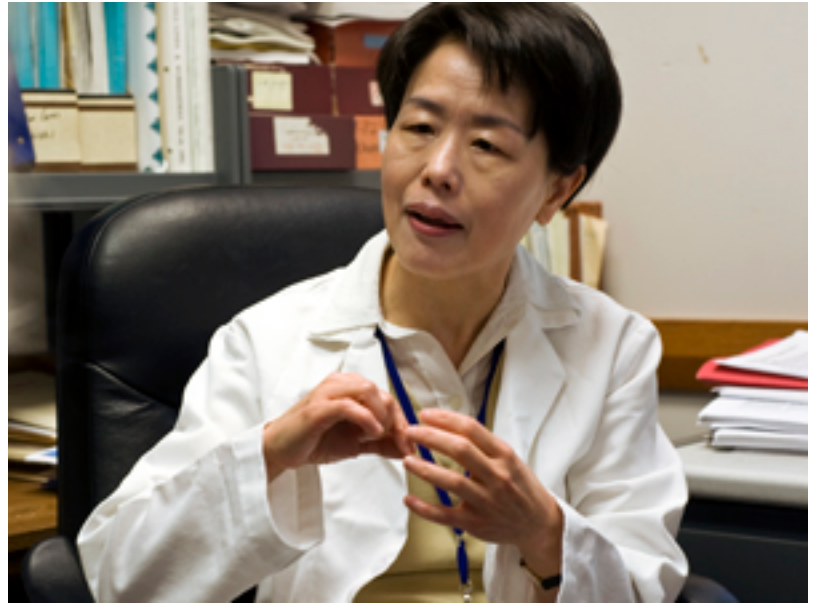
Dogma derailer

June 11, 2009

Upsetting long-held scientific ideas has made pharmacology professor Li-Na Wei stand out

By Deane Morrison

In the world of science, challenging an idea that has become enshrined as "the rule" is no cake walk. Researchers who discover exceptions, even with solid data on their side, often find it takes moxie to swim against the current.



A dynamo in the field of pharmacology, Li-Na Wei has made profound discoveries about how cells work.

Photo: Patrick O'Leary

Meet [Li-Na Wei](#), pharmacology professor and upstream freestyler extraordinaire. Still in mid-career, she has already upset enough established ideas about cells in general and neurons in particular to fill several professional lifetimes.

Recognizing her formidable contributions, the University's Graduate School recently named Wei one of four new [Distinguished McKnight University Professors](#) (see sidebar). In nominating her, Wei's department head, [Horace Loh](#), characterized her impact on science as a "persistent and bold challenge in defying dogmas to reshape the course of studies in her field. ... [M]ost of her findings turn out to be fundamentally and generally significant."

Vital vitamin work

In a major discovery, Wei upset a long-held notion that hormones always act on genes by turning them on—not off.

"The dogma was that hormones always activate the genome," she says. "Of course, I went along with what everybody said. When you get a result that goes along with the mainstream, you talk about it, but if it's against the mainstream, you hide it."

She worked with retinoic acid, a form of vitamin A that acts as a hormone. In the old view, when a hormone like retinoic acid or estrogen gets into a cell, it flicks a biochemical "on" switch for a gene or genes. The cell then reads and carries out the instructions encoded in the genes.

Retinoic acid was thought always to turn on a certain gene that plays a role in all essential life processes, including embryonic development. In studying a particular line of embryonic cells, Wei found the same thing—until the cells began differentiating into adult cells.

"What people missed was that when [the cell] goes into differentiation, if you treat it with the same compound [retinoic acid], the [gene] activity can be opposite—that is, it goes down," Wei says. Shutting off gene activity is called repression, and Wei was the first to find that the same hormone could both activate and repress a gene.

This came as a bit of a shock to many researchers. But since Wei's 1998 report, many other hormones have been found to do the same thing. The implications are profound.

"A lot of drugs are developed based on a compound that can alter gene activity," explains Wei. Knowing that a hormone-based drug could sometimes repress a gene is vital for developing an effective drug and treatment regimen.

Factory pharms

In studying neurons that respond to opiate drugs, Wei scored a second major discovery that really ruffled scientific feathers.

Neurons have a spidery appearance, with a roundish cell "body" that contains the nucleus and many long extensions for receiving or passing on information. One such extension is called an axon, and those that run from cell bodies in the spinal cord to the tip of a toe, for example, can easily exceed two feet in length.

"I was called 'provocative' when I first proposed this"—and no one meant in the nice sense.

That makes for a long line of communication from genes in the nucleus to structures on the "front line" in a toe.

Sitting on the outer cell membrane of an axon are proteins that allow it to receive information. Like proteins in general, these "receptors" are made in cellular factories that store the machinery for "reading" messages from genes and translating them into proteins. In most cells, it's a short distance for proteins to travel from these factories to their final destiny.

The old dogma held that in neurons, translation of messages into protein occurs only in their cell bodies, not way out in the boonies at the tips of axons. If that were so, proteins destined to become receptors had to be made in the cell body and then transported down the axon as cargo, a process that could take a day or more.

But what if a neuron has to respond to a sudden flood of opiate drugs or other stimuli? In responding, neurons typically add (or remove) receptors to amplify (or dampen) these signals; this kind of activity plays a key role in neuron activities, including drug addiction and numerous other responses to the environment. Must the highly active but remote parts of axons sit around waiting for the next shipment of receptors?

Wei realized the answer was no. The translation factories that churn out receptors had to be closer to the places where the receptors were used.

"I proposed mobile factories," she explains. "In early 2000, I put forth a theory that you need to have certain messages from genes [about what proteins to make] ready to go to the assembly line [the factory] and produce proteins at a moment's notice. This means a neuron can be flexible in response to anything in the environment, and at any distance [from the cell body]."

"I was called 'provocative' when I first proposed this"—and no one meant in the nice sense.

Since then, however, evidence has vindicated Wei: Neurons do run minuscule "railroads" that transport messages from genes to the remote areas of axons. There the messages set up shop, ready to churn out receptors or other proteins on cue.

Also, she says, blockage of such transport can be implicated in several diseases, including Alzheimer's disease. She cautions that this transport system may not operate in all neurons; however, it certainly does in neurons that respond to opiates, and it's important to know in what other neurons it does, too.

As she continues her quest for knowledge, Wei is driven by insatiable curiosity about how the myriad biochemical processes in cells are regulated.

"That's most of life," she comments. "I want to understand how cells with the same [genetic information] behave so differently."

In good company

Besides Li-Na Wei, these faculty members are new Distinguished McKnight University Professors: [Marla Spivak](#), entomology; [Bin He](#), biomedical engineering; and [Joseph Konstan](#), computer science and engineering.



Ever greener campus

June 15, 2009

From verdant lawns to used coffee filters, the U manages its grounds 'greenly'

By Deane Morrison

It's no accident that the University's Twin Cities campus draws so many remarks about its beauty (in summer, anyway). Besides its regular groundskeepers and recyclers, the U employs a small army of about 100 students to keep both appearances and practices green.

Those practices begin with making the most of the plant material on the campus's more than 6.5 million square feet of grass, trees, shrubs, and flowers.

"All our herbaceous organic waste is composted and reused," says Les Potts, grounds superintendent. "We mix it up into what we call our campus soil mix. It's used when we do relandscaping—that means digging up and installing new plants."

Woody material is ground up and mulched in shrub beds or around trees, where it forms a barrier between trunks and power mowers.

Even though Minnesota is the land of 10,000 lakes (out-of-staters: check our license plates), the U conserves water wherever possible. A central system controls sprinkling, which is done mostly overnight, and uses rain sensors to shut down after a certain amount of rainfall. Water runoff is minimized by rain gardens, by passage through sandy "filtration basins" and into storm sewers, or by seeping through soil via "infiltration basins" en route to replenishing an aquifer.

Crews continually experiment with species of grass, such as fescues, which tolerate drought better than bluegrass. Also, in areas like high-traffic patches where bluegrass does best, they try out new bluegrass varieties that get along with less water and fertilizer. Students pitch in on most tasks, including mowing, aerating, planting, and picking up litter.

"They help on tree removal, too, but they don't run chainsaws and rarely climb," says Potts.

In the winter, a forecast of snow sends groundskeepers reaching for salt to pretreat hard walking and driving surfaces and keep snow from bonding to them. They apply the salt in a brine rather than crystals.

"With brine, it hits the target and stays in place," says Potts. "You use less of it, and it doesn't blow off." As a result of pretreating and the use of brine, the U has cut its road salt use 41 percent.

Recycling mops up

While celebrating its silver anniversary this year, the [University's Recycling Program](#) is hardly resting on its laurels. Instead, it is running a pilot program in three campus buildings (Morrill, Hanson and Pattee halls) to [recycle food waste and organic material](#).

"When we've learned from that, we will expand throughout campus," says recycling coordinator Dana Donatucci.

The project involves, first, collecting all used paper towels (and animal bedding, when animal care buildings are brought into the system), then all food waste in the building. Second, buildings will convert from disposable to compostable containers, as the Minneapolis and St. Paul student unions already have begun to do. Third, buildings will be set up to collect compostable food waste and compostable utensils.

The fourth and final step will be hardest: ensuring that takeout food brought onto campus will travel in compostable containers.

"We would work with [businesses near campus] to set up compostable takeout containers or have them available for U folks," says Donatucci. "You have to get businesses in the area to be willing to do that. That's down the road."

In all, he says, 25 percent of the U's waste stream is organic material that could be captured for composting. That amounts to about 2,000 tons a year.

Among other projects, Donatucci says his office is ratcheting up the supply of reusable office castoffs. People send office furniture and furnishings to the Como Recycling Facility, which operates in conjunction with the nearby Reuse Program warehouse.

Recyclers have been taking items with reuse potential, such as chairs, tables, and scrap metal, but now they are adding smaller things like hanging folders and three-ring notebooks.

"We pull those out and make them available for U departments," says Donatucci. "We're trying to build that inventory before rollout. We hope to start it by the end of this year."

Related links

[It All Adds Up \(energy conservation\)](#)

[Landcare](#)

[Recycling programs](#)



The University of Minnesota Twin Cities campus keeps green through a variety of efforts.

Photo: Patrick O'Leary



Study reveals hidden vulnerability of big cats

June 17, 2009

Hunting male cougars or lions can imperil whole populations

By Deane Morrison

By targeting adult males, sport hunting is depleting populations of cougars and African lions because their cubs need fathers as well as mothers, a University-led study indicates.

In a [paper](#) published in the Public Library of Science, University of Minnesota lion researcher [Craig Packer](#) and his colleagues report that the vulnerability of big cat species stems from the tendency of adult males to kill cubs belonging to other males in order to bring the mothers into "season." Since fathers normally defend their families against transgressors, killing the father can lead to the death of the cubs.



Cougars are among the big cat species most vulnerable to hunting, a University-led study shows.

The researchers studied trends in numbers of cougars and lions taken by hunters in African countries and western U.S. states. Sport hunting generates revenue that encourages conservation, but infanticidal species are vulnerable to over-harvest when wildlife managers raise quotas in response to predation of livestock, pets, or people.

"Over the past 25 years, the steepest declines in cougar and lion harvests occurred in jurisdictions with the highest harvest intensities," the researchers write. "Simulation models predict population declines from even moderate levels of hunting in infanticidal species."

In contrast, no evidence for overhunting turned up among American black bears, males of which do not routinely kill other males' cubs.

The difficulty of estimating populations of cougars and lions makes it hard to determine the number of trophies hunters can take before the populations start shrinking toward extinction, the researchers say. Their analysis suggests that wildlife management agencies often adjust quotas to control, rather than preserve, the big cats in areas where they have threatened humans or their animals.

"Unsustainable levels of trophy hunting of lions and cougars appear to be driven by conflicts with humans and livestock: the intensity of lion hunting was highest in countries with the most intensive cattle production, and wildlife managers are under similar pressure from U.S. ranchers to raise cougar offtakes," the researchers write.

The study points up the need for new ways of protecting people and livestock and preserving sport hunting without endangering vulnerable predators. Limiting hunting to males old enough to have mature offspring is one possible means. Another could be banning or limiting the use of bait and hounds, but enforcement in remote hunting areas would be difficult.

"We have an opportunity to develop new strategies that will benefit hunters, livestock owners, and conservationists," Packer says. "It's important to educate the public about the risks that these large predators pose to rural communities and to help hunters and wildlife managers develop methods to sustain healthy populations of these animals."

Packer is a Distinguished McKnight University Professor in the Department of Ecology, Evolution and Behavior, which is part of the College of Biological Sciences. He worked with an international team that included Luke Hunter from Panthera, Kristin Nowell from the International Union for the Conservation of Nature/Species Survival Commission (IUCN/SSC) Cat Specialist Group, and Dave Garshelis of the Minnesota Department of Natural Resources, who chairs the IUCN/SSC Bear Specialist Group.



A new lens on Alzheimer's

June 18, 2009

Innovative production at the Guthrie draws on expertise from U researchers

By Rick Moore

The latest production from Live Action Set, a Twin Cities-based performance company, tackles the weighty topic of Alzheimer's disease in a unique manner. Its "tragic comedy" *My Father's Bookshelf*, which opened at the Guthrie Theater June 18, examines the life of a man suffering from Alzheimer's and the collective response to the disease from his family and society.

But *My Father's Bookshelf* goes beyond strictly artistic interpretation. The company worked with the local Alzheimer's community, including researchers from the University of Minnesota, to develop a performance piece that educates as much as it entertains.

"All of the work that we do is collaborative," says Galen Treuer, co-director of *My Father's Bookshelf* and a founding member of Live Action Set. "We've been able to get information in an in-depth way from a number of different communities and perspectives."

That includes the University of Minnesota. As Treuer was diving into his research on the topic, he contacted researchers at the University, who have been pioneers in research on the disease that affects about 5 million Americans.

Treuer initially spoke with [Karen Ashe](#), who gave him an overview of Alzheimer's. In 2006 Ashe received a Potamkin Prize (often called the "Nobel Prize in neurology") for research in Alzheimer's from the American Academy of Neurology. He then met with U researcher [Kathleen Zahs](#), who shared lectures she had given "and talked me through the science," he says. The U researchers "pointed me to resources and explained their thoughts on the disease," he adds. "I used their experience in explaining the disease to people."

Ashe also steered Treuer to the [Wayne Caron Family Caregiving Center](#) on campus, where he was able to learn more about Alzheimer's from the family standpoint, even attending weekly Saturday meetings for caregivers. "They were really open, and we learned a lot of information from them," including how to treat the disease on a family level, Treuer says. "That was extremely helpful."

From there, Live Action Set developed a production that promises to be educational, emotional, and thought provoking. *My Father's Bookshelf* follows the reality of an affable man (played by Theatre de la Jeune Lune co-founder Bob Rosen) who negotiates life with the disease. "It's primarily from his perspective—from what we're imagining he would see," Treuer says.

"This show isn't just about Alzheimer's; it's about aging," says Treuer. And "Alzheimer's is really acute aging.... It's also something that a lot of people deal with."

Interspersed with the storyline is a lecture on Alzheimer's delivered in segments by a neuroscientist (played by Live Action Set artistic director Megan Odell), with background PowerPoint slides conveying supporting images. "I feel like the lecture is important to convey information and the way that we deal with the disease," Treuer says.

The set is centered around 10 moving refrigerators, which are both literal—the kitchen is a central part of the family, Treuer notes—and a vehicle into the imagination. "It allows us to move around abstractly, but we're using really concrete, recognizable objects," he says.

Fellow Live Action Set artistic director Noah Bremer co-directs the show with Treuer, and the cast includes Jeune Lune co-founder Barbara Berlovitz, Four Humors artistic director Jason Ballweber, and Argentinean actor Dario Tangelson. The script was developed by Duluth writers Margi Preus and Jean Sramek.

"This show isn't just about Alzheimer's; it's about aging," says Treuer. And "Alzheimer's is really acute aging.... It's also something that a lot of people deal with."

To help audience members address their own thoughts and emotions about the topic, discussions will be offered after most of the performances with the actors and/or members of the Alzheimer's community. Visit the Guthrie Theater site to learn more about the [post-show discussions](#).

My Father's Bookshelf runs from June 18 to 28 at the Guthrie's Dowling Studio. Tickets are \$18 to \$34. For more information, visit the [Guthrie Theater](#).



"My Father's Bookshelf" follows the story of a man (played by Bob Rosen) who is trying to negotiate the latter stages of Alzheimer's disease.

Photo by Mike Neuharth, courtesy Guthrie Theater



Serves her right

June 22, 2009

Anissa Lightner receives President's Award for Outstanding Service

By Rick Moore

"Service" has been a major component in Anissa Lightner's job description for as long as she's been at the University of Minnesota. As assistant director of student-athlete welfare, Lightner works to serve student-athletes at the U, helping them with personal and career development. She also coordinates a volunteer program that sends athletes out to serve the community at more than 300 events annually.

And in case there was any doubt, Lightner has been served notice that she's doing her job quite well. She recently won a 2009 University of Minnesota President's Award for Outstanding Service.

The award, established in 1997, is presented each spring to active or retired faculty or staff members who have gone well beyond their regular duties and have demonstrated an unusual commitment to the University community.

"I'm so honored to be the recipient of this award," Lightner says. "Especially since I didn't even know I was nominated. I think I'm still a little bit in shock."

She says she was especially humbled when she saw the names and contributions of the dozen other recipients of the award, most of whom have worked at the U for many more years than her. "To be put in a category with them is such an honor," she says.

Lightner came to the U by design, but her entry was a bit unconventional. A friend of hers from college who was in grad school at the University of Minnesota suggested Lightner work through the temp agency Adecco to get her foot in the door at the U.

She started as a backup receptionist in 2001 in the student-athlete development office. After asking her boss repeatedly if she should return the next day, Lightner was finally told, "You're fitting in well; just keep coming back until I tell you not to," she says. "I have a passion for community outreach, and so they felt that was a natural fit."

Part of Lightner's job is administering the CHAMPS/Life Skills program at the U—an NCAA-sponsored program that focuses on the total development of the student-athlete. "We try to provide them with the skills to be successful during college, but also with the skills to be successful after graduation," she says.

"I get to see the side when [athletes are] out giving back and serving as positive role models for young children," she says. "It's fun to see them on TV, but I get to know how they are as a person."

In addition to promoting academic and athletic excellence, the program aims to enrich personal development, career development, and a commitment to service.

Lightner works with each men's and women's team at the U to determine two personal development programs the team will participate in each year, such as nutrition, financial management, or networking. She also works with career-development professionals throughout the University to tap into their discipline-specific expertise.

She is dedicated to finding community service opportunities for student-athletes, which she disseminates through a weekly e-mail. The athletes come up with some of the ideas themselves, she says, but there are also "more requests than we can even fill from the community."

"I think there's so much support for the University of Minnesota throughout the state that it's great to be able to give back to the people responsible for us being here," she adds. And "it's important for our student-athletes to get out into the community to be able to work with community members that are maybe less fortunate."

Lightner is proud of the fact that so many athletes respond in kind, and are unequivocally generous with their time. One of her greatest rewards comes from watching students change and grow before her eyes over the span of four or five years. It's a facet of student-athletes' lives that isn't always portrayed in the media.

"I get to see the side when they're out giving back and serving as positive role models for young children," she says. "It's fun to see them on TV, but I get to know how they are as a person."

Sitting in her warm and tidy office a week or so after she was presented with the award, which was proudly displayed on her desk, Lightner reflected on her place at the U. "I love my job," she says. "Every day I get to come and be re-energized. Every day is different ... and every day is fun. I love the student-athletes; they're just a joy to work with."

And she's quick to point out the talents and hard work of her colleagues, including student-athlete welfare coordinator Rachel McKessock, associate director Peyton Owens III, and director Mark D. Nelson. Without them and the other staff at the McNamara Academic Center, she says, the recognition would not have come her way.

"Those are the things you think about when it's a week past [your award]," Lightner says. "You really want to be able to say thank you to all those people for the support they've given you over the last eight years."

Undoubtedly, there are many student-athletes who would say the same thing about her.



President Bob Bruininks congratulates Anissa Lightner on her award at a ceremony at Eastcliff, the president's residence.

Photo: Erika Gratz



Long voyage to the stars

June 22, 2009

The unlikely odyssey of Kristen McQuinn, astrophysics graduate student

By Deane Morrison

Astronomy graduate students are an intrepid bunch. They must have a good command of math and physics in order to master the science, and lord knows they pull a lot of all-nighters. From the word go, they are steeped in a graduate school culture that demands utter devotion to study and research.

Kristen McQuinn knew that as she faced the University of Minnesota's director of graduate studies (DGS) in astronomy. Since college she had spent 12 years out of academia, she had two kids in diapers, and she was asking to be admitted to doctoral study--heresy of heresies--part time.

"I was straight up about it," she recalls.

The odds against her looked astronomical. Except the DGS on that day in 2001 was [Evan Skillman](#), who, true to his chosen profession, took a farsighted view.

"He was encouraging about me applying," says McQuinn, who has just finished her fifth year of graduate study with Skillman and hopes to complete her doctorate next year.

And how has she done? Let's put it this way: During graduate school, a budding astrophysicist can reasonably expect to be the main author on perhaps two or three research papers. McQuinn has just notched three, and sometime this summer the number will ratchet up to five.

If her story shows anything, it's that enthusiasm trumps all.

Crooked path, right destination

"One theme runs through my life: I'm not just going to settle for something," says McQuinn, who began her scientific journey as a physics major at Lehigh University. But she soon switched to mechanical engineering, a major with more job potential.

After graduating in 1986, she took a job with a large firm, working in business management consulting and building computer systems.

"That felt good in a way then, because I'd defined success as a business model--you take the train to work, carry a briefcase, and so on," says McQuinn. "But when I got into it, I didn't really like it. It didn't hold a lot of meaning."

"One theme runs through my life: I'm not just going to settle for something."

Quitting that job, she traveled the world and then took a job with an environmental consulting firm, thinking it would be more meaningful to "do something altruistic."

"But the ideals of what you think you'll effect aren't necessarily reality," McQuinn notes.

She found herself reading physics books and magazines in the evening. Then, while living and working in Buenos Aires, McQuinn decided she really wanted to be an astrophysicist. She had been out of school nine years, but was accepted to a master's degree program at Boston University. Graduating after two years, she followed her husband to Dartmouth College, where he earned a business degree and she had two children, then to Minneapolis after he landed a job with General Mills.

The new location "just happened to be near a large university with a high-caliber astronomy department," McQuinn muses. On one visit to the U, she had her fateful conversation with Skillman, and soon she was back in graduate school--after three years at home with kids.

From childbirth to star birth

McQuinn owes her enduring fascination for astrophysics in part to the vastness of human ignorance about the cosmos.

"It's an impossible task to understand any field of science," she says. "Many people are chipping away, but there is always some more to explore and understand in the universe."

In her most recent paper, McQuinn used Hubble Space Telescope data to settle a point about how galaxies evolve.

She studied regions of small, nearby galaxies undergoing a "baby boom" of new star births. Called starbursts, these areas had been considered local features that die out after about 10 million years (the blink of an eye for a galaxy). But McQuinn found evidence for starbursts that sweep through entire galaxies, lasting 200 million to 400 million years.

"[The time scale of starbursts] resolved a controversy," says Skillman. "It's an important number that there wasn't enough debate about."

Starbursts are triggered when two galaxies get close enough to warp each other with their gravity, says McQuinn. Thus, they probably were more common in the early universe, when galaxies were closer to each other and hydrogen--the fuel of star formation--was more abundant.

Those ancient galaxies can't be studied, "so studying these [nearby galaxies] gives us a window into the distant past and clues as to how galaxies change and evolve," McQuinn says. She also hopes to discover whether starbursts ignite individually or in a chain reaction, like fans doing the wave at a stadium.

Meanwhile, the Milky Way may be starting to experience a starburst right now because a small galaxy is merging with our galaxy and warping its disk, she says.

[A news release](#) from the Space Telescope Science Institute describes McQuinn's work in more detail.

Not the whole enchilada, but ...

For McQuinn, the bottom line is "I'm here because I really want to be." Working mostly at her home computer, she goes to campus once a week at 6 or 6:30 a.m., then returns at 3 or 3:30 p.m. to greet her children as they come home.

"There's no one else I know of who is doing this," she notes. "But one tradeoff is that I haven't been able to travel to present my results. Not with two kids in diapers." But that will change in July, when she presents data at a conference in Italy.

She has already made many presentations to one of the toughest audiences known: kindergarteners and first-graders.

"They call me 'scientist Kristy,'" she laughs. "A lot of little girls come up and say, 'I want to be a scientist when I grow up.' That's to die for."

"The life/work balance has been very difficult, but on the positive side, I've done it. I get to work in astrophysics at a top-notch research institution and be home with my kids. I don't have the whole enchilada, but I have a taco. I don't have it all, but I have enough. It's phenomenal."



Astrophysics graduate student Kristen McQuinn had two good reasons for insisting on part-time study: Cole (left) and Carling.

Photo: Patrick O'Leary



Making a bigger splash in the gene pool

June 29, 2009

And how delaying reproduction can help

By Deane Morrison

We humans have a strong urge to reproduce, but if the environment steers us into putting off having children, we may be rewarded with both longer life and a bigger genetic footprint in future generations.

So concludes a new University of Minnesota study that reveals what may be a major force in shaping the evolution of most living things, including humans. Harnessing this natural effect could open the door to new means of delaying reproduction while promoting longer, healthier lives.



Waiting to have offspring can pay off if the population in general is shrinking, a new University study shows.

The work, led by ecology, evolution and behavior graduate student Will Ratcliff, was [published](#) online June 25 in the Public Library of Science.

The basic idea is simple. When environmental cues like food shortages signal that the population is about to shrink, individuals who can afford to wait until this has happened should do so; then their offspring, when they come, will represent a bigger fraction of the gene pool.

"When the population is declining, future kids make a greater splash in the gene pool than current kids," Ratcliff explains. "If there are tradeoffs between reproducing now versus later, delaying can be a good idea even if it reduces the number of kids you have during your lifetime."

Conversely, if hard times turn to good times and the population is about to boom, it's better to get those kids out there sooner, while the population is still small.

Rules of the waiting game

Over evolutionary history, early reproduction has reduced life expectancy due to the risk of complications in pregnancy, death in childbirth, damaging fights for mates or social status, and the demands of caring for and protecting offspring, says Ratcliff. Though lessened for modern humans, these risks shaped the evolution of our responses to stress.

For example, in some parts of Africa that suffer chronic food shortages--an environmental signal that the population will decline--girls experience their first menstrual period at later ages.

"The whole point is that if a population is headed downhill, an individual who trades early reproduction for longevity can come out ahead."

"Delaying reproduction to age 16 instead of 12 can really increase your chances, and your offspring's chances, of survival because having children very young is fraught with risk," says Ratcliff.

But in Western countries where girls have been getting richer food in recent years, the age of menarche has been receding. Rich food is an environmental signal that the population is poised to rise, and so the age of fertility has dropped. Besides food availability, the environment may signal an imminent population decline chemically. Many food plants produce toxins that tend to depress reproduction and extend the lifespan. Humans may have eaten more of such plants when meat and other rich foods were relatively scarce, a sign that a population is facing a decline.

"A lot of these toxins extend life in ways that mimic dietary restrictions and have been shown to extend life in mice, fruit flies, roundworms, and yeast," says Ratcliff. "The whole point is that if a population is headed downhill, an individual who trades early reproduction for longevity can come out ahead."

One mechanism may involve testosterone, which suppresses the immune system, says [R. Ford Denison](#), Ratcliff's faculty adviser and adjunct professor in the University's College of Biological Sciences. Thus, a toxin or other cue that reduces testosterone levels would tend to extend life as well as dampen reproductive behavior. Someday, the researchers say, harbingers of population decline may result in new drugs or lifestyle changes that lead to delayed reproduction and, potentially, longer and healthier lives.

What counts is the message organisms get from the environment, not necessarily the actual situation, the researchers say. For example, while the stress of regular fasting can delay reproduction and extend life, animal experiments have shown that the mere odor of food can reverse this effect.

Other authors of the paper were graduate student Peter Hawthorne and professor [Michael Travisano](#) of the Department of Ecology, Evolution and Behavior.



Distinguished Teaching Award recipient

July 1, 2009

Distinguished teacher Sally Kenney guides students on putting policy into practice

By Chris Coughlan-Smith

"Rather than teach students what to think, I teach them how to think. I challenge each student and welcome dissenters. Rather than teach students what to know, I teach them how to find what they need to know."

As a public affairs faculty member, Sally Kenney believes in putting her research, teaching, and advising into practice in the world. Among the courses she has created and taught is one that puts students to work on the boards of local nonprofits. Kenney also bridges learning and public policy by serving on the U.S. Supreme Court Gender Fairness Task Force and by having developed the Institute's Feminist Leadership Fellows program and the Women's Legislators Retreat. Numerous students report that they chose Minnesota because of the [Center on Women and Public Policy](#), which Kenney directs. One says that Kenney and the Center are models for "how to make contributions for the public good."

A recent [Humphrey Institute](#) Teacher of the Year, Kenney creates a classroom culture that is challenging, questioning, and supportive of risk-taking. One of her students says, "I cannot overestimate Sally's ability to boost her students' confidence in their own intellect and opinions."

As the Institute's Social Policy Area head, Kenny has developed a new teaching case program that has influenced colleagues and led to numerous student case studies being published, adding immeasurably to the literature in her discipline.

Another former student sums up Kenney's broad reach: "Professor Kenney has...taught me through example and education what it means to be a scholar of policy and practice, to effectively attend to both the development and implications of scholarly theory, and to be responsive to the individual to whom these theories must speak."



Sally Kenney is director of the Humphrey Institute's Center on Women and Public Policy.

Photo: Patrick O'Leary



Images of imagination

July 8, 2009

From the Stone Age to Hurricane Katrina, the varied visions of four Imagine Fund awardees

By Deane Morrison

Sweeping in from the Gulf of Mexico, hurricanes Katrina and Rita ravaged the Louisiana coastline in 2005. Among its victims: the coastal wetlands, already under siege from erosion and flood control structures that divert sediment- and nutrient-laden water out to sea.



Detail from "Grand Isle," by University of Minnesota, Morris, artist Michael Eble, who is among the University's new Imagine Fund awardees.

To draw attention to their plight, painter and Louisiana native [Michael Eble](#) is embarking on a series of aerial surveys of the Louisiana coastline, taking photographs he will use as source material for aerial landscape paintings. An associate professor of studio art at the University of Minnesota, Morris, Eble is among the first winners of a \$3,000 [Imagine Fund](#) award from the University.

He notes that levees, oil and gas pipelines (which "make Swiss cheese out of the entire marsh"), and other engineered structures aren't the wetlands' only nemeses.

"Wetlands are disappearing because of more frequent hurricanes pushing saltwater into freshwater areas, sinking of the land, and rising water levels," says Eble. "The more wetlands you have, the more it slows down hurricanes and protects [inland areas]."

He also hopes to drive home how the loss of wetlands continues to destroy southern Louisiana and a unique wetland-based culture that is literally washing away. His painting "Grand Isle" shows how water has intruded into the small fishing village west of the Mississippi Delta.

Eble will use his Imagine Fund award to take several chartered flights, producing more aerial photographs he can turn into paintings. The awards support a wide variety of faculty projects in the arts, humanities, and design; three more winners are profiled below.

The wall as living skin

Just like the membranes that enclose living cells and control what gets in and out, [Marc Swackhamer](#) envisions the walls of a house as an arbiter of exchange with the outside. Instead of static windows, his walls, now in the prototype stage, will feature movable elements he calls "apps" (short for applications).

The apps will be intercalated within a vertical framework of sturdy materials, says Swackhamer, an assistant professor in the College of Design's School of Architecture. Different apps would allow the passage of heat, light, air, rainwater, or pets, and may be programmed to open on a breezy day, shut on a rainy one, or otherwise shift function as a resident desires..

"Apps can be made of all kinds of materials, like wood and metal, carbon fibers, or a fabric Nike is developing with pores that expand as you get hot and shrink when you cool down," he says. "With pretty minimal training and [research], people could design them."

Stimulus package for the mind

The Imagine Fund is an annual, \$1.3 million program supporting faculty systemwide in arts, humanities, and design, regardless of rank or tenure status. It provides up to 250 awards of \$3,000, which recipients can use to enhance their research or teaching.

The fund was created from a major McKnight Foundation gift, with added support from the Graduate School and Office of the Vice President for Research. The Imagine Fund also supports endowed chairs with money from the Permanent University Fund, a public endowment. For more, see the [news release](#).



Swackhamer and Blair Satterfield, his business partner in Houston, will run a contest for designs of real walls on their [Web site](#). Swackhamer will use the Imagine Fund grant to hire someone to fabricate one or two winning designs "to get the ball rolling on the project." He and Satterfield

hope to eventually fabricate six to eight versions.

Sounds of Silence

To hear the heartbeat of a snail, to listen as mist condenses on a window. Our aural landscape teems with lost sounds, as far beyond us as the microbial world before the invention of the microscope.

The possibility of introducing us to these sonic landscapes in unexpected ways captivates [Diane Willow](#), an assistant professor of art in the College of Liberal Arts. Her idea of rendering these sounds audible "is a poetic invitation to engage in the process of listening to the everyday in new ways," she says.

Toward that goal, she will use her Imagine Fund grant to buy a high-sensitivity contact microphone. Developed by researchers in Japan, this moving-coil microphone will open up the auditory riches of the "seemingly silent." She plans to use it to create a new series of interactive art works "that re-scale our sensory perceptions and shift our experience as we encounter these sounds while traversing public spaces."

The video from her recent exhibition in Beijing shows the experiential nature of her work. "Serenade," an interactive sound installation, responds to a particular architectural space and the movement of the people within it.



With her new project, Listening to the Silent Landscape of the Everyday, Willow will "continue to explore the interplay between the sonic and the tactile and their capacity to offer us a restorative sense of being in the present."

Axes of evolution

Did Neanderthals and modern humans meet, and if so, to what extent did Neanderthals

contribute to culture or biology? [Gilbert Tostevin](#), an associate professor of anthropology in the College of Liberal Arts, tackles these questions by studying stone tools dating between 50,000 and 30,000 years ago, when moderns were replacing Neanderthals in western Eurasia.

"Some scholars say that Neanderthals and modern humans never met. We know that's not right," says Tostevin. "We know they overlapped in time and space, so they must have met." If so, they may well have exchanged techniques of making tools, such as the flint artifacts Tostevin studies. But there's no way to tell who made a stone tool. Thus, it's hard to trace how the culture of toolmaking might have passed from one group to another.

Tostevin approaches this problem by reconstructing the exact series of blows used to chip a piece of flint into a stone tool. He does it by examining both the finished piece and the sizes and shapes of flakes chipped off the original block of flint. Since the exact method of flake removal varies from one group to another, reconstructing the method gives a valuable clue to patterns of contact.

"If multiple [archaeological] sites have tools made the same way, then probably they were in cultural contact," says Tostevin. "If the groups were culturally intimate, most likely they were biologically intimate."

The video is a 3-D model of the sequence of blows in the reduction of a piece of flint into a hand axe--called a biface, because it's two-sided.



Tostevin will use his Imagine Fund grant to acquire 3-D models of actual flint flakes found in Europe for further studies.

Don't leave it to your imagination

View the [complete list](#) of 2009 Imagine Fund awardees and [read more](#) about the program, including how faculty can apply.



Brickhouse redux

July 14, 2009

New Web site offers multimedia retrospective of Memorial Stadium

By Rick Moore

Now that football is returning to campus at TCF Bank Stadium, it seems appropriate to reminisce about the new stadium's predecessor on campus, Memorial Stadium. The "Brickhouse," as fans affectionately called it, was built in 1924 and stood for nearly seven decades until its demolition in 1992.

As TCF Bank Stadium has taken shape over the past three years, the staff at University Libraries wondered how their archival resources and digital technology expertise could be used to capture and share the rich history of the Brickhouse.



The smiles, some toothy and some not as toothy, convey the story as Murray Warmath's Gopher football team hoists the Little Brown Jug after a victory over Michigan.

Photo: courtesy University Archives

They wrapped their resources into a new multimedia and interactive Web site that launched July 15, titled [Memorial Stadium: 1924-1992](#). The site contains videos of games, as well as reproductions of photographs, programs, reports, correspondence, and blueprints scanned from the University Archives' collections. (See video below.)

At last count, there are almost 600 items in the site's database that were culled from the 18,000 cubic feet of material filed under a broad range of topics at University Archives. The Web site is about a year and a half in the making, says Beth Kaplan, head of University Archives.

"We're really excited about it," Kaplan says. "It's been a really fun project to work on, in large part because people have been so excited about it." The project has brought together a host of departments and people with a range of expertise, from digitization and Web experts to U Libraries staff and student interns.

The material is organized into five main sections: [The Brickhouse](#), [The Gridiron](#), [The Pageantry](#), [The Life Inside](#), and [Your Stories](#). "The Brickhouse" provides an overview of the stadium from its inspiration and construction to its waning days as a desolate landmark. "The Gridiron" focuses on the nine head coaches and hundreds of players that roamed the stadium's field, including legendary names such as Bronko Nagurski, Bruce Smith, Paul Giel, Bob McNamara, Bobby Bell, Sandy Stephens, Tony Dungy, Bernie Bierman, and Murray Warmath. "The Pageantry" section highlights Homecoming photos and programs, the University of Minnesota Marching Band, and cheerleading.

Exhibit at Andersen

Selected materials from the new Memorial Stadium Web site will be installed in the Andersen Atrium Gallery (on the second and third floors of Elmer L. Andersen Library on the West Bank of the Twin Cities campus) from July 20 through September 26.

While Memorial Stadium was synonymous with Golden Gopher gridiron glory—especially the six national championships between 1934 and 1960—its history includes much more. Much like the new stadium will, Memorial Stadium served the marching band, cheerleaders, other students, faculty, and the greater community. Says the site:

Beyond the battles of game day, Memorial Stadium bustled with activity throughout the decades. Groundbreaking research was conducted by renowned faculty members Dr. Ancel Keys (in the Laboratory of Physiological Hygiene) and Dr. Jean Piccard (on stratospheric balloon flight). People from Minnesota and beyond filled the stands for signature events: new graduates donned their caps and gowns for commencement ceremonies, the state's 100th birthday was honored, elephants and singers transformed the field for a production of "Aida," and Shriners from far and wide came together for the 1934 Shrine Imperial Council Session, all within the Brickhouse's storied walls.

You can check out photos of Piccard's stratosphere balloon experiment in June of 1936, which occurred about five months prior to the Gophers claiming their unprecedented third straight national championship.

The videos are a treat, offering a look at decades-old game footage that has rarely been viewed. Kaplan says that U Archives has an amazing and extensive film collection, but it's mostly inaccessible because it's 16 mm., delicate, and often has not been labeled correctly. To be viewed it needs to be cleaned and reformatted at the same time. "This project was a way to kind of chip away at that a little bit," Kaplan says.



The site uses Omeka, a free, open-source and interactive web-based publishing platform that allows visitors to share their own recollections of Memorial Stadium, which are captured in the fifth section, "Your Stories." Here visitors are encouraged to add their voices,

videos, and photographs to create a more dynamic online shrine to the Brickhouse.

One fan recalls how his dad introduced him to Gopher football as a child, taking him to a game each year near his birthday in September. And another fan remembers the first game he attended at Memorial Stadium—a contest against Southern Cal in late October of 1955 that was played in snow, sleet, and a 20-mph westerly wind. His most vivid memory is of Minnesota quarterback Don Swanson's 65-yard touchdown run, "pretty much obscured by the snowflakes by the time he reached the far end zone, well after dusk. For the USC defenders it must have been like one of those bad dreams where the faster you try to run, the slower you go."

Related link

[Memorial Stadium Web site](#)



Party to Apollo

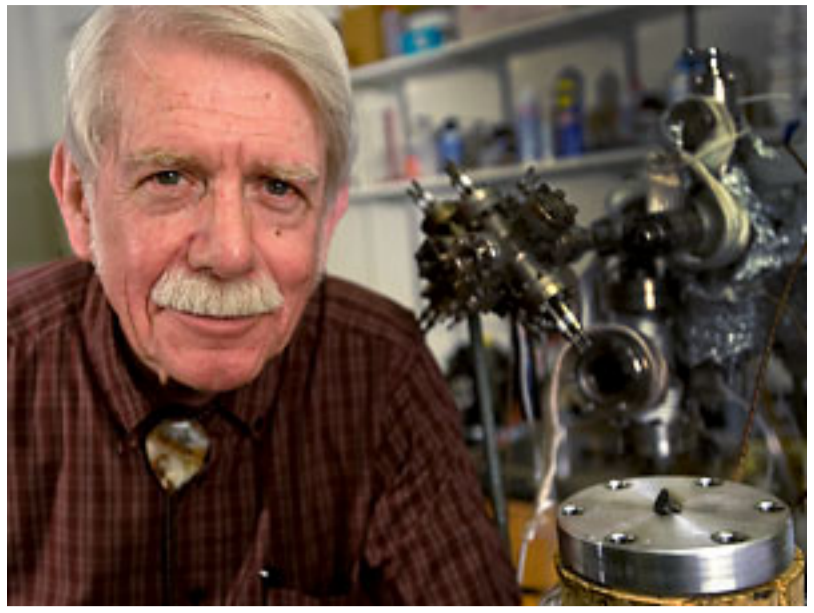
July 15, 2009

Physics professor Bob Pepin recalls his roles in NASA's moon landings

By Deane Morrison

After their flight from Houston landed in the Twin Cities one day in August 1969, two University of Minnesota professors had to stay in the rear of the plane until a couple of policemen came to escort them off.

For physicist [Bob Pepin](#), it was an awkward moment.



Physics professor Bob Pepin has studied moon rocks like this sample (in center of gray cylinder) from the historic Apollo 11 mission.

Photo: Patrick O'Leary

A laughable thought for anyone who knows the genial Pepin. That day he and his companion, now-retired geology professor Rama Murthy, were singled out because they were carrying a priceless cargo: samples of moon rocks collected by Neil Armstrong and Buzz Aldrin after their historic landing on July 20, 1969.

Forty years later, Pepin, newly retired but still active in research, remembers well the roles he played in NASA's Apollo program and says the moon landings yielded a wealth of information about the solar system. Perhaps more important, though, was its psychological impact.

"It was the first chance to look at another planet," he says. And while plenty remains to be learned about the moon, he believes the best reason for returning is our satellite's value as a stepping stone to Mars.

Superb science, dysfunctional drill

A few years before the moon landing, Pepin and Murthy were among the scientists worldwide selected to receive moon rock samples for research. Soon Pepin joined the committee that reviewed requests for samples, including requests from committee members themselves.

A bunch of foxes guarding the henhouse? Not really. "It was a great experience. We monitored each other," Pepin explains.

He was asked to join a second NASA committee, the Science Working Group, which designed lunar surface activities and trained astronauts to perform them. Pepin stayed on both committees till the end of the Apollo program and also served as science adviser to the last four Apollo missions--14 through 17--at Mission Control in Houston.

In studying the dust that lies 25-35 feet thick on the lunar surface, Pepin and investigators at other institutions learned "a lot more about the sun than the moon." They found pieces of the sun--tiny particles that stream out continually in the "solar wind"--embedded in the dust. Among the particles was the lighter form of helium, called helium-3.

"It's regarded as the perfect fusion fuel," says Pepin. "But is it a viable fusion source? It would have to be mined and shipped."

Pepin credits the moon rocks with helping to solve one of science's biggest mysteries: Where did the moon come from? Some believed it formed along with Earth, from the same cloud of primordial gas; others thought it formed elsewhere and wandered into Earth's gravitational field.

As it turns out, the moon was born in an even more dramatic event. When Earth was a few tens of millions of years old, a projectile the size of Mars collided with it. Molten rock from Earth and the "impactor" was flung into space and coalesced into the moon. Impactor material wound up in both bodies.

"As nearly as we're sure of anything, we're sure of this," says Pepin. "Many moon rocks looked just like the mantle of Earth. That showed that the moon is partly made of Earth materials."

As science adviser at Mission Control, Pepin stood by in case an astronaut on the moon had a question. It happened only once--during Apollo 15, the first mission where astronauts tried to drill out a core of lunar soil. All went well for the first three meters, then the drill got stuck.

Mission commander Dave Scott wanted to leave the drill and head for a crater he had his heart set on exploring. But the astronauts couldn't do both. Mission Control threw the decision to Pepin.

He recalls the moment: "Every eye turned to me: 'All right, Pepin, earn your keep. Do we try to get it out or leave it in?' I said, 'Let's try to get it out.' They [astronauts] weren't very happy. Scott worked so hard, his heart went into arrhythmia."

But the drill, with its core of sediment, did come out. Later, the astronauts' perseverance paid off doubly. First, X-rays of the core revealed "lovely depositional layers" of lunar soil that had settled after being ejected by meteorite hits. Second, physicians realized that a lack of dietary potassium had caused Scott's cardiac arrhythmia. In future flights, NASA upped the potassium to the benefit of astronauts' health. Their taste buds were a different story.

"On the next mission, John Young and his colleagues had orange juice laced with potassium salts," recalls Pepin. "They were sitting in the [lunar] lander after a [moon walk], talking about the orange juice, and they obviously didn't realize the microphone was on. Some of the things they said about it I couldn't repeat."

What most bugged the astronauts, though, was the moon dust.

"It was electrically charged, and it clung to everything--their spacesuits, their boots, and even their sandwiches," says Pepin. "I expect they ate a lot of it."

Springboard to Mars

The moon still guards secrets, such as whether ice has accumulated in permanently shadowed craters near the poles. A search for ice and future landing sites is now under way by the Lunar Reconnaissance Orbiter, launched by NASA June 18. Pepin, who has no doubt people will eventually return to the moon, says the main driving force isn't science, but finding out whether "another leap outward" from Earth is feasible.

"Clearly, Mars has water," he notes. "But it has a real problem with [unshielded] ultraviolet light and other things. The moon is a good test bed. I see 20 to 30 years before we have a trip to Mars. I think we'll find evidence of life if we get there."

Why go at all?

"There's always some subsection of the population that has the exploring urge," Pepin muses. "I think the real reason is they just want to find out what's there."

Read about Pepin's [recent work](#) on NASA's Stardust mission.

Icy moon?

The moon appears bone dry, but some scientists think it may contain ice. How could it get there? Maybe by special delivery, says University astronomy professor [Terry Jones](#). "Comets hit every now and then, and they contain water," he says. "Some might freeze on the surface in craters in permanent shadow near the poles, especially the south pole."

Jones also notes that the return to the moon could become a space race again because China has expressed interest. Scientists, says Jones, tend to prefer space exploration by less expensive robotic probes, but "we also understand that the public likes to see people in space."



Light and matter

July 16, 2009

Doreen Leopold has a talent for helping students see that they can find the answers

By Kristin Cleveland

Doreen Geller Leopold refers to her B.A. in philosophy as something she earned "in a previous life." But to those who know her, it's clear that the inner philosopher is still there, giving her teaching a dualistic nature not unlike the nature of light and matter she introduces in her quantum mechanics courses. One of them, Quantum Mechanics and Popular Philosophy, which a student called "a treat for the brain," is a perfect example of her unique talent for relating to students with varied skill sets.



Doreen Geller Leopold is an associate professor in the Department of Chemistry within the Institute of Technology.

Photo: Patrick O'Leary

"From day one, Doreen presented herself as a friendly, approachable teacher whose devotion to students as learners and students as people was both refreshing and inspiring," says another former student, whose children Leopold invited to a chemistry demonstration she did for the Girl Scouts. That ability to relate to students as individuals with real lives and interests is what makes her so adept at helping them integrate previously compartmentalized knowledge and realize that they can find the answers on their own.

"I love to recount...the birth of these ideas, the simple experiments whose explanations gave rise to a scientific revolution, and the discoveries of the basic equations by the leaps of imagination of a few individuals whose scientific creativity resembles that of the greatest artists, musicians, or writers."

"In the classroom, she is ever aware of the needs of the students," says one colleague. That awareness is what helped her spot that students' proficiency with calculators was actually masking a lack of basic math understanding, which correlated to their final grades. To help them improve, she developed a calculator-free assessment exam, then organized student-led problem-solving sessions designed to help students help one another. Her published findings about the problem and solution prompted discussions nationwide.

Doreen Leopold is a 2009 recipient of the Horace T. Morse-University of Minnesota Alumni Association Award for outstanding contributions to undergraduate education.



I am art!

July 16, 2009

If an artist falls in the forest, does he or she make a sound?

By Adam Overland

A new exhibit opened July 9, 2009 at the Weisman Museum, presenting the works of the inaugural set of artists sponsored by Twin Cities based arts agency Northern Lights (which bills itself as a "roving, collaborative, interactive media-oriented, arts agency from the Twin Cities for the world"), with support from the Jerome Foundation (a sponsor of Minnesota artists).

The exhibit is the result of Art(ists) on the Verge, a new fellowship and mentoring program for Minnesota-based, emerging artists working with a focus on the social, collaborative, and/or participatory.

Included among the displays are an electrifying mix of technology and art. One such display includes thermal printers emitting a constant stream of messages as they are transmitted through the social media phenomenon, Twitter. It's an endless rambling of receipts of the latest utterances unraveling from the ceiling, documenting the frustrations of untold chatterers.

U (and you) are in the exhibit

Krista Kelley Walsh, adjunct faculty in the U's Department of Art, has her work on display as part of the exhibit as well. She calls her project "Public Eye Action," and it consists of a series of public webcam performances—often by her and other volunteers, but occasionally, if you want—by you.

"All over the world," writes Walsh, "cameras are aimed at us by private, corporate, and government entities that capture our images and actions as we go about our daily lives." With this exhibit, Walsh is asking the question "Where does public space end and private space begin on the Web?" It sounds kind of like something George Orwell might have done had he worked in another medium, but Walsh's predictions are much more droll than dire.

In this most recent visual event, she's hijacked the public webcam in Walter Library showing a live view of Northrop Mall on the U's east bank. It runs directly to a monitor at the Weisman, so if you think you are not art, think again, or think differently.

If an artist falls in the forest

During the opening night of the exhibit on July 9, Walsh and a group of "performers," (from a miming clown to people standing around patting their heads), many holding postcard-masks with cutout eyes, pranced around in front of the camera and stared back. One young woman carried an umbrella, although it was not raining.

Walsh says, "Our current attitude is that these cameras are invasive. One of my propositions is that if we are the viewed, we can turn back on the camera and say, 'here is what you can see!'" Walsh also contests that the viewer is the artist as well. "I'm the artist if I'm choosing how to watch. And I'm the artist if I choose how to behave."

I couldn't say for sure whether Walsh's work posed more of a "beauty is in the eye of the beholder" question for me, or "if a tree (or an artist) falls in the forest..." But Walsh had faith in me: "I have this belief that we are all artists, it's just that sometimes we recognize it in ourselves, and sometimes we don't," says Walsh.



Walsh (front right) teaches drawing at the U, and says she likes to have a conversation with her students about "not being afraid to take a risk and try something new."



New test kit detects deadly chemical in infant formula

July 20, 2009

It tests for melamine, a chemical linked to human and pet deaths

By Deane Morrison

Last year six Chinese children died and 150,000 were hospitalized after drinking infant formula tainted with melamine, a cheap chemical that masquerades as protein when added to food products.

But now a new test kit for the chemical will help protect human and pet health. The kit utilizes an enzyme, discovered and supplied by University of Minnesota researchers, that quickly produces a color change in samples of melamine-laced milk, powdered milk, cream, and other food products. The kit will soon be field tested by BIOO Scientific, a Texas-based company specializing in food safety testing.

The test kit answers a call from the World Health Organization for a simple, inexpensive means of detecting melamine in foods, formula, and other liquids.

"If a sample has a lot of melamine, you would see a blue color in a second," says [Lawrence Wackett](#), a professor in the University's BioTechnology Institute (BTI). "If you want to [measure the quantity of melamine], you let it react for a half hour for full color development." Traditional detection required expensive equipment and a few days' turnaround.

"The test is specific for melamine, Wackett adds. It will most likely be used in China and other Asian countries, where BIOO Scientific does a lot of business.

"We helped the company by providing the enzyme and expertise," Wackett says.

Wackett and BTI professor [Michael Sadowsky](#) became involved in the project because they lead a research group that studies the biodegradation of herbicides that bear a chemical resemblance to melamine. Research associate Jennifer Seffernick found the enzyme in a soil bacterium.

"A few environmental researchers discovered something that can really protect human and pet health."

The researchers published a paper on the enzyme in 2001. It went virtually unnoticed until about a year ago, when Wackett started getting calls from companies that had found the paper in the wake of the melamine scandal. The story illustrates the importance of research that's not directed toward a particular goal, or at least not the one to which it is eventually applied, the researchers say.

"A few environmental researchers discovered something that can really protect human and pet health," Sadowsky notes. Adds Wackett, "Products like LEDs and flat-screen TVs came from fundamental research on materials and [chemistry]. We need a fundamental understanding of how things work. That leads to the next generation of ways to attack disease and make products."

The reason melamine was added to milk used for drinking and infant formula was to confound tests for the protein content of milk and milk products. No one can fool a regulator by simply shorting the amount of milk and then claiming the milk must have been low in protein; that's because, Wackett says, cows all over the world produce milk with a uniform protein content.

But the cheaters knew that the test for protein actually measures nitrogen, a key component of protein.

"Unscrupulous people were diluting milk with water and throwing in melamine, which is two-thirds nitrogen by weight," says Wackett. Sometimes so much was added that the melamine couldn't completely dissolve, and it formed a milky white suspension.

Melamine was originally used to make durable plastic for housewares and countertops. It is also widely used as an additive to concrete. When ingested, melamine leads to the deposition of crystals that clog kidney tubules and may cause kidney failure. In addition to the human toll, about a thousand cats and dogs in the United States died from melamine-laced pet food in 2007.

The BTI researchers have cloned the gene for the enzyme and developed a way to purify it. Because BIOO Scientific lacks a pilot plant to produce it, the company will purchase the enzyme from BTI as needed.

[Read more](#) about the University's BioTechnology Institute.



A new test kit based on University research detects melamine, a chemical that has killed children when added to infant formula.



Agent oo-WAM

July 21, 2009

A job title like 'registrar' might not sound exciting. It is.

By Adam Overland

Okay, so it's not exactly James Bond stuff. But Laura Muessig's job is more fun than mine, and probably more than yours too. She works (most often) at the [Weisman Art Museum](#) (WAM), that monument to geometry which has displayed everything from the Bob Dylan exhibit to Georgia O'Keeffe's work (some of which is part of WAM's permanent collection) to, recently, the DNA of a human being named Eduardo Kac running red through the [veins of a petunia](#).

Muessig, unlike Agent 007, doesn't like her martinis (or petunias for that matter) shaken or stirred. She likes artwork to be safe and sound, and she isn't fooling around on the job.

As a WAM registrar, Muessig is the day-to-day keeper of all physical records, conservation needs, value, and other information about the nearly 20,000 artworks in the Weisman's collection—far more than the museum can display (fortunately, senior registrar Karen Duncan and Muessig work together to accomplish the daunting task). Rather than let inspiration sit unseen in the depths of the Weisman, several times a year Muessig acts as an art courier, taking to the skies or hitching a ride on an 18-wheeler. After all, Georgia O'Keeffe isn't going to Europe or anywhere else on her own.

Setting sail

With the rise of the Weisman's nautically evocative facade on the Mississippi, the museum's works have frequently set sail to other notable museums. It's a common practice; the one-of-a-kind nature of art offers few options. (Although business travelers in a souring economy may choose to meet online, the subtleties of Mona Lisa's expression are not best viewed via webcam.)

When artwork requested by another museum is very valuable or fragile or has special value to the Weisman, a courier is sent along. Muessig has even taken a sort of courier's oath, vowing to be accountable for the safe arrival of the art and to "treat everything like it's a Picasso." "I don't think there has ever been a trip where there hasn't been some good reason why we were there," she says. "All sorts of unexpected things come up."

Lost luggage

Muessig recalls once arriving in Paris to meet a piece. On an overseas trip, it's typical for the courier to be on the same aircraft as the artwork. On this particular journey, however, Muessig was to meet the piece at the airport—except the piece didn't arrive. Although she doesn't like to speak about the monetary value of a particular artwork, let's just say the typical airline reimbursement for lost luggage wasn't going to cover it. (The work did later arrive safely.)

Because of airport security regulations, keeping close contact with artwork can be challenging. Muessig has likely spent more hours in the underbelly of an airport than she has overseeing the installation of the work at the borrowing museum.

Riding shotgun

It's an interesting life on the road; you've left for your destination but you've not yet arrived—on the road is in-between, and strange things happen in-between.

The preferred method of travel for artwork is by truck. It's safer for the artwork. As a rule of thumb, if a piece can be driven, it shall be driven, and Muessig will ride shotgun. At all times, either the driver or Muessig must remain with the truck (and the art). Usually it's Muessig.

While the requesting museum always pays the costs of transporting the work, costs are kept "lean and mean," Muessig says. If it's an overnight trip, she stays in the cab, and not all cabs are sleeper cabs. "I always bring some kind of camping pad, blanket, and pillow, and stretch out on the floor where people put their feet," she says. Sometimes, that involves yoga-like postures to work around the gearshift. If she's lucky, the truck will have a spare cot.

The driver and courier try to accommodate each other. "You pretty much hear everyone's life story ... and keep off certain topics like politics and religion," Muessig says, although she admits once or twice listening to several hours of political talk radio. She also recalls requesting that a driver not smoke. To accommodate that request, the driver pulled over at the nearest Wal-Mart. "He bought three nicotine patches and put them all on," she says.

There've been other adventures: like the trip from Maine to Malibu during California's mudslide season, when closed roads resulted in a truck transfer; or the time her "follow car" was in an accident while the artwork in the truck continued merrily on its way. With so much careful planning and attention to detail these trips can be stressful, but Muessig says a courier can take advantage of where they are. "When your work is done, then you can go to the Bono concert."

Because of security concerns, travel plans are kept on a need-to-know basis, but Muessig is able to say that sometime in August she'll (likely) be heading to Vienna. The trip will involve a 10-hour truck ride, getting on a cargo aircraft, and riding jumpseat with the pilots. "There are no flight attendants, and you make your own meals ... but I'm ready to fly the plane if I need to," she says. A massive freighter aircraft sounds a lot like that scene in *Raiders of the Lost Ark* with the seemingly endless warehouse that somewhere contains something very valuable to humanity. Luckily, Muessig is there for us to keep track of exactly where that something is.



Laura Muessig, Weisman art registrar and courier. Behind Muessig is Georgia O'Keeffe's "Oriental Poppies," one of the most well-traveled and frequently requested works in the Weisman's collection.

Photo: Erika Gratz



'Genetic freak'

July 21, 2009

U grad student and professor explain the secrets to Lance Armstrong's success

By Rick Moore

Calling someone a "genetic freak" generally isn't regarded as the kindest —let alone politically correct—thing to do. But when applied to Lance Armstrong and his success in the Tour de France, that tag might be right on the mark.



Greg Rhodes, pictured here in a race from a few years back, is a graduate student in kinesiology at the University of Minnesota. His focus is on sports performance, so he's especially intrigued with Lance Armstrong's run at an eighth Tour de France title and the attributes that contribute to Armstrong's success.

Photo: courtesy Greg Rhodes

According to Stacy Ingraham, a kinesiology professor at the University of Minnesota, Armstrong, who is currently shooting for an unprecedented eighth Tour title, happens to be built for bicycling, much as Michael Phelps is built for swimming.

"Let's just take it as it is that Lance is in fact a genetic freak," Ingraham says. "Part of it is, when you look at his anaerobic threshold, his threshold is somewhere between 78 and 82 percent (above 60 is excellent), which means he can work out at about 82 percent of his max capacity.... That also means that his ability to endure a high level of pain is also very remarkable, which means he can handle a higher workout than most of his competitors."

"When you can do that in practice," she adds, "obviously that transfers to performance, and when he needs to put the throttle down he can do it, and he basically will blow everybody away."

The heart of an elite athlete

Greg Rhodes is a graduate student in kinesiology who knows a thing or two about endurance and training. Rhodes was a two-time All-American in Nordic skiing at Carleton College and has been a triathlete for the last 12 years. His academic focus is on sports performance, so he's more than a casual follower of Armstrong's accomplishments.

In addition to the high anaerobic threshold, Rhodes points out that Armstrong has a larger than normal heart "in a positive volume capacity." It may not be two or three times the size of the average human heart, as some suggest, but it definitely helps with intense exercise. "His ability to pump blood through his system, because of his heart size, is one of those astronomical things," Rhodes says.

"That's what separates the best from everybody else," Ingraham notes. "He has utilized every aspect of the sports science field, from the ergo-dynamics on his bike to the exercise physiology, to the sports psychology. He has maximized everything, including his own body composition, to be the best of the best."

The larger heart likely contributes to a hump in Armstrong's back, which, ironically, makes him more aerodynamic, Rhodes says.

Having the chance to investigate topics like the aerodynamics of bicycle racing and the best ways to achieve optimum training are what excites Rhodes about his graduate work at the U. "A lot of these questions we're coming up with are just starting to be answered," he says. "That's what's pushing the field of kinesiology and this specific field of kinesiology that I'm interested in."

When you add together all of Armstrong's physical attributes—his anaerobic threshold, his heart size, his low percentage of body fat (and attention to diet)—you have a finely tuned cycling machine.


"That's what separates the best from everybody else," Ingraham notes. "He has utilized every aspect of the sports science field, from the ergo-dynamics on his bike to the exercise physiology, to the sports psychology. He has maximized everything, including his own body composition, to be the best of the best."

'The ability to suffer'

However, Rhodes also points out that Armstrong's amazing physiology isn't the only thing that's propelled him to greatness. The traits that other world-class athletes possess—hard work, determination, professionalism, being a team player—Armstrong also has in spades. Plus, there was his bout with cancer (he was diagnosed in 1997, two years before his string of seven consecutive Tour de France victories), which naturally realigned his perspectives.

"He's overcome cancer, so even on the worst day of training [or the worst day in a race], he'll say, 'This is nothing compared to lying on the bed and doing chemotherapy,'" Rhodes says. "The cancer part of it really plays into the professionalism, the mental toughness, and, as we say in training, the ability to suffer."

As of this writing, after 15 stages of the Tour de France, Armstrong was in second place overall. To hear an audio interview with Ingraham, visit [Armstrong's edge](#).

 [Download audio transcript](#)



AIDS discovered in wild chimpanzees

July 22, 2009

Magnitude of threat to Gombe chimpanzees unknown

By Deane Morrison

Chimpanzees, like other wild African primates, naturally harbor HIV-related viruses, but the infection has been thought harmless. Now, a nine-year study of chimpanzees in Tanzania's Gombe National Park challenges that view by showing that those with the virus can contract AIDS and die as a result.



Echo with her infant Emela in March 2006. Echo was infected with an HIV-related virus for at least four years before dying.

Photo: Michael Wilson

The study was published July 23, 2009, in the journal *Nature*. Virologist Beatrice Hahn of the University of Alabama at Birmingham led the study, in collaboration with researchers from the University of Minnesota and other institutions.

Study co-author [Anne Pusey](#), director of the Jane Goodall Institute's Center for Primate Studies at the University of Minnesota, says the discovery gives researchers another avenue for studying, for example, how individuals either resist or succumb to AIDS.

Some humans and chimpanzees, she says, live a long time after infection, while others get sick and die quickly. Researchers are already examining the genomes of long- and short-term HIV survivors to identify "candidate genes" for resistance to the virus. If the same genetic pattern held in chimpanzees, that could confirm or refine ideas about the genes' roles during infection in both species—key steps in developing therapies for the disease.

Complex infection pattern

More than 40 varieties of simian immunodeficiency virus, or SIV, are found in African primates. The chimpanzee-specific form, SIVcpz, is believed to have jumped to humans and become HIV-1, the AIDS virus.

In African monkeys, SIV appears to have co-evolved with host species for millions of years. Generally, long interaction with a host species weakens the harmful effects of a virus.

"Everyone is concerned about the decline in chimpanzee populations across Africa, which is due in large part to habitat destruction and the bush meat trade. We were not happy to find another thing causing mortality."

Chimpanzees, however, have a virus that is a hybrid of viruses from two different monkey species, suggesting chimpanzees acquired it more recently from hunting monkeys—much as humans appears to have acquired the virus from hunting chimpanzees. Until now, researchers had assumed that chimpanzees and SIV had nonetheless been co-evolving long enough for the virus to be harmless in chimpanzees, but this new study changes that view.

"Everyone is concerned about the decline in chimpanzee populations across Africa, which is due in large part to habitat destruction and the bush meat trade," says Pusey, who has studied the Gombe chimpanzees for decades in collaboration with Jane Goodall. "We were not happy to find another thing causing mortality."

Even so, Pusey points out that SIVcpz appears to be less damaging than HIV-1 in humans, and the main study community in Gombe has so far maintained its size despite a certain level of disease-caused mortality. The "million dollar question" is to what extent SIVcpz may be contributing to population declines.

Elsewhere in Africa, variants of the SIV virus are patchily distributed.

For example, "the Gombe virus is very different from the form of SIV in Cameroon," Pusey notes. "Cameroon is where, Beatrice [Hahn] figures, SIV jumped to humans and became HIV."

Studying the virus everywhere it is found will help researchers construct its family tree and gain insights into the timeline of its spread. This could help answer the question of how much a threat the SIVcpz virus poses.

By the numbers

The researchers studied infection patterns in a total of 94 Gombe chimpanzees. During the study, seven of 17 infected chimpanzees and 11 of 77 uninfected ones died or disappeared. Taking into account uncertainties in the data, the researchers calculated that the death hazard for infected animals lay between 10 and 16 times the hazard for uninfected ones.

Infection with SIVcpz also was associated with reduced reproductive success. Of 30 uninfected females, 22 gave birth to a total of 30 infants during the study period. Of nine infected females, four produced a total of four infants. The odds of giving birth were three times lower for infected females.

Also, of the 30 infants born to uninfected chimpanzees, six, or 27 percent, died in their first year of life. Of those born to infected mothers, all died before their first birthday.

The researchers found that SIVcpz could be transmitted both sexually and through mother's milk. They also identified the biological hallmark of AIDS—a dearth of immune cells known as CD4+ T cells—in tissues of several infected chimpanzees. In one of them, a female who died within three years of acquiring the virus, they observed weakness, lethargy, and muscle loss like that seen in acute cases of human AIDS.

Co-author [Michael Wilson](#), an assistant professor of anthropology at the University of Minnesota, says that as a scientist he is fascinated that the virus affects humans and chimpanzees so similarly.

"But at the same time, having gotten to know these chimpanzees as individuals, it is hard watching them, knowing that some of their lives may be shortened by the virus, and there's not really much we can do to help them."

The researchers stress that they collected all biological samples from living chimpanzees by noninvasive means, such as by analyzing urine and fecal samples. They expect that continued study of the virus in a natural population will provide a better picture of the impact of SIVcpz infection on mortality and fertility and will inform HIV-1 research in humans.



Distinguished teaching--the organic way

July 24, 2009

Distinguished teacher Bud Markhart isn't afraid to get his students' hands dirty

By Pauline Oo

Bud Markhart's greatest gift is that "he knows how to clearly explain complex scientific concepts in a way that is understood and recalled, synthesized and communicated," says a colleague. Students consistently rank him as one of the department's best instructors. One of his innovations is a scratch-off multiple-choice answer sheet for midterm exams, which offers students instant feedback—and partial credit for picking the answer on the second or third try.

"Bud's class engaged me...and proved to be the challenge I was looking for," says a former student. "He was the first teacher in many years [who] didn't let me get away with memorizing and regurgitating."

Markhart is equally in demand as an adviser. He's now advising 13 environmental horticulture majors and annually mentors an Undergraduate Research Opportunity Program student. He pioneered the University's organic horticulture curriculum and inspired students to create [Cornercopia](#), a one-acre plot of certified organic land on the St. Paul campus and sell their organic produce at the U's popular summer [Farmer's Market](#).

"After 28 years of teaching at the University of Minnesota, I still look forward to the beginning of a new semester with enthusiasm, energy, and butterflies."

As the department's learning abroad adviser, he also provides international experiences. In spring 2006, he taught a course that culminated in a tour of organic crop production in Iceland and Germany.

"When we were revamping our undergraduate major, he was the one who asked, 'what will this change do for students?' Keeping students' interests front and center is a hallmark of Professor Markhart," says a colleague.



Albert (Bud) H. Markhart III is a professor of organic horticulture in the College of Food, Agricultural and Natural Resource Sciences.

Photo: Patrick O'Leary

Albert (Bud) H. Markhart III is a 2009 recipient of the Horace T. Morse-University of Minnesota Alumni Association Award for outstanding contributions to undergraduate education.



Busting gridlock

July 24, 2009

New online game from University gives high school students insight into the world of traffic engineering

By Rick Moore

When you're stuck in a long line of cars at an interminably long red light, it's hard to find any amusement value. But the University of Minnesota has found a way to turn the problem of traffic gridlock into an exercise that's informative *and* entertaining.

A new online traffic control game developed by the U's Intelligent Transportation Systems (ITS) Institute is letting high school students try their hand at working in the engineering and transportation field.

"Gridlock Buster" is a game that incorporates ideas and tools that traffic control engineers use in their everyday work. Players must pass a series of levels while observing and controlling traffic in a variety of settings.

For example, a player might need to manage a high volume of traffic passing through an intersection, where long lines form if vehicles don't get enough green-light time. The more drivers are delayed, the more frustrated they get, causing the game's "frustration meter" to rise. Sound effects and animation simulate cars honking and drivers' fists shaking to illustrate the negative consequences of long traffic queues.

The game is based on work by Chen-Fu Liao, the institute's education systems engineer and staff member in the U's Department of Civil Engineering. Earlier this year, the U hired a consultant from Web Courseworks to make the game a little more flashy and fun to play.

"Kids are really into games, especially online games. We think creating a game like Gridlock Buster is a great way to engage them and get them interested in engineering and transportation," said Max Donath, director of the ITS Institute and a professor in the Department of Mechanical Engineering. "The best way to learn is by playing."

"There's things that they learn that they didn't know before," says Haag. "When they drive home they're going to be thinking about the traffic lights."

Even the instructions between rounds entertain, like when the player first gets to a downtown setting. "Welcome to the grid," says the game's commander. "You know what to do by now—just do it faster. And watch that Frustration Meter—people get uppity fast in this neighborhood."

In late July, a group of high school juniors and seniors from the Twin Cities area came to campus and tried to bust gridlock online. They divided into groups, developed hypotheses on what would happen if they manipulated certain traffic variables, and tested their guesses. According to Shawn Haag, a program coordinator at the Center for Transportation Studies, the game gets students excited about traffic engineering.

"There's things that they learn that they didn't know before," says Haag. "When they drive home they're going to be thinking about the traffic lights."

Two days later, younger students from the Leech Lake Indian Reservation visited campus for the first time as part of the U of M's Summer Transportation Institute (funded by the Federal Highway Administration). They also enjoyed taking a crack at being traffic engineers. Cheyanne, 12, found Gridlock Buster to be both fun and challenging at the same time. She also learned something from the game's honking cars that drivers in the Twin Cities know all too well: "Sometimes people can be very impatient," she says.

An observer asked another 12-year-old, Phil, what his high score had been. "I don't look at that," he says. "I just concentrate on the cars."

That should be worth bonus points.

The ITS Institute is federally funded through the Research and Innovative Technology Administration (RITA) of the United States Department of Transportation. To try your hand at the game, go to [Gridlock Buster](#).



Youth from the Leech Lake Indian Reservation got to try out Gridlock Buster earlier in July at a computer lab in the Mechanical Engineering Building.

Photo: Erika Gratz



Strike up the band

July 29, 2009

The 'Pride of Minnesota,' now in its new digs, looks forward to the upcoming season

By Rick Moore

They're the unsung heroes of the football season, not to mention a good share of the rest of the sports calendar. Their beats fill the breaks between the plays on the field; they keep fans glued to their seats at halftime; and without them, the "Rouser" would fail to rouse.

They are, of course, the members of the [University of Minnesota Marching Band](#), a.k.a., the "The Pride of Minnesota." Some 320 members strong, the band—under the direction of director Tim Diem—has a 118-year heritage, dating back to the founding of the University Cadet Band in 1892.

As part of their participation, all band members register for Music 3480—the official marching band class in the School of Music. And like most athletes, they devote countless hours to perfecting their craft.

Their season kicks off with a two-week Spat Camp at the end of August. The "camp" is intensive, with three-a-day practices interrupted only by meals and refreshments—all in an effort to hone their skills for football Saturdays. No one said that playing in an elite marching band is easy.

Or easy on your footwear. In years past, band members have had to practice their formations on a paved and lined "field" behind the track at the Bierman athletic complex. Matt Schuette, a junior trombone player, pointed down at his foot to illustrate the pitfalls of pounding the pavement. "I lost this part of my shoe just from spinning on the asphalt," he says.

Taking it to the Bank

Much has been made about the Gopher football team's move back to campus to play in TCF Bank Stadium. But the gridiron Gophers aren't the only students getting a new home. The Marching Band moved into TCF Bank Stadium on July 25, becoming one of only two bands Diem knows of to be housed at the campus football stadium.

For nearly 80 years, band members have made their home at [Northrop Auditorium](#), which meant they had to spend up to five hours each week trudging to and from that asphalt practice field. And on Saturdays, they needed nine buses to transport their show to the Metrodome (at a weekly cost of \$3,000-\$4,000).

"It's pretty nice that they would give us this kind of a space. It's definitely needed and definitely more convenient than at Northrop [and] the parking lot we used to practice on," says Schuette. "I can't wait till things actually start going down like rehearsals and band functions. It'll be exciting to see this place come alive."

The old digs were utilitarian at best. "If anyone came to town to perform in Northrop Auditorium, they would take the stage and we were outside, regardless of the weather," says Tim Diem, director of the Marching Band.

The Gopher football team can soon boast of having the largest locker room in the free world. (It would take running back Duane Bennett more than six seconds to sprint from one end to the other.) But the band's space at TCF Bank Stadium is none too shabby, either. Or small. The band will have access to 20,000 square feet of space, including a main rehearsal hall and two smaller rehearsal spaces; a music library, an archive room; uniform and equipment maintenance and storage rooms; and locker and shower facilities sufficient for the entire band.

"The new space really brings us into the 21st century," says Diem. "We'll have audio and video recording abilities there, so we can have nearly instantaneous review of our rehearsals and performances. That means that the band will tighten up new shows much faster than in the past."

Dozens of band members helped out with the move from Northrop to the stadium on July 25, carting instruments, equipment, and uniforms into the new space. They were uniformly giddy about their new home.

"It's pretty nice that they would give us this kind of a space. It's definitely needed and definitely more convenient than at Northrop [and] the parking lot we used to practice on," says Schuette. "I can't wait till things actually start going down like rehearsals and band functions. It'll be exciting to see this place come alive."

The band produces a new show for every football game (there will be seven home games at the new stadium this year). It also performs at the homecoming parade, one Vikings home game, and an occasional football game on the road, which hopefully will include a game on or after New Year's Day. There's also the annual Indoor Concert at Northrop, when the group showcases its entire repertoire.

On move-in day for the band at the new stadium, excitement was running particularly high for the season at hand. "I think the new space is the best facility in the Big Ten right now," says Becky Schmidt, a fifth-year senior flutist. "It's definitely going to help you see the power of the University of Minnesota Marching Band like you've never seen it before."

Related links

- [School of Music](#)
- [TCF Bank Stadium](#)
- [University of Minnesota Marching Band](#)



On July 25, members of the University of Minnesota Marching Band stepped out of their new space in TCF Bank Stadium and entertained the moving-day crowd with a rendition of the Minnesota Rouser.

Photo: Rick Moore



Rigor and respect

July 30, 2009

Don Alstad makes mathematically difficult concepts digestible

By Deane Morrison

Walking into the first day of a big ecology class, students hardly expect the professor to greet them by name. But Don Alstad does. He makes a point of studying student ID pictures and memorizing all 100-plus names before the first day of class. "We immediately respected Don because he had shown how much he respected us," says one student of the experience.

Known for his studies of how insects evolve resistance to pesticides, Alstad has mastered the art of making mathematically difficult concepts digestible. For example, through his computer program Populus, students can watch how populations of people or other organisms change in response to various factors. More than 600 universities on six continents use the program to teach ecology.



Donald N. Alstad is a professor in the Department of Ecology, Evolution, and Behavior within the College of Biological Sciences.

Photo: Patrick O'Leary

"We can no longer pretend that the Earth is infinite; our activities now drive the planet's metabolism.... It is my privilege to teach many superb students a science that is complex, fascinating, and readily perceived to be important."

And when he made Biology 3408 "writing-intensive," students got a taste of the research life by designing experiments, learning to analyze data statistically, and writing reports suitable for publication. Enrollment blossomed so far that Alstad had to add another section of the course.

Alstad holds weekly coffee chats for students, ending them only when every question is answered. Students flock to him for advice on careers or graduate schools, and he's built a reputation for being tough but fair. For instance, a student recalls other students telling a lab TA how difficult a course seemed. The TA replied that compared to many other professors, "Don's rigorous approach would reward us with the most thorough understanding of the subject matter," the student says.

Don Alstad is a 2009 recipient of the Horace T. Morse-University of Minnesota Alumni Association Award for outstanding contributions to undergraduate education.



Tuning out

August 6, 2009

U professor's new book highlights 'shared obliviousness' within families

By Rick Moore

As individuals and family members, we go about our business each day ignoring much of the information available to us. But while we tune out, University of Minnesota family social science professor [Paul Rosenblatt](#) pays close attention.

In *Shared Obliviousness in Family Systems*, a theoretical book that explores the intriguing topic in the title, Rosenblatt defines "shared obliviousness" as the state of being unmindful or unaware of something, and in a family setting, it means that all family members distance themselves from information they could—and maybe should—be conscious of. These could be family issues or things of importance outside the family.

"I think we have to be oblivious to most that goes on in the world," Rosenblatt says. "You just can't pay attention to all the news or all the events in your neighborhood or the dust balls under the bed or the dust balls under your neighbor's bed. ... We have to be oblivious to 99.9999 percent of what's out there.

"What I argue in the book is a lot of our obliviousness comes out of shared dynamics in the family and also in the larger world we live in. We're not on our own in becoming oblivious. And we're oblivious to lots of things in our own families. Sometimes that's great, and sometimes it's terrible because something really awful is going on."

The most obvious example is a family that ignores an incident of sexual abuse. Drug and alcohol abuse, extramarital affairs, and stealing are other topics that families conveniently ignore.

"For ordinary families, I'd really like them to pay attention to what's in the news that's relevant to their lives, and what's going on in their families that involves somebody's health or safety," he says. "[And] for them not to be shutting other people up or stopping other people from whistle blowing, or scoffing at other people who have concerns."

But families are also oblivious to much national and world news—news that is or may become relevant to their lives. Global warming shines as a prime example. "What global warming is predicting is a sea rise that will make parts of this country unlivable," Rosenblatt says. "There'll be more flooding inland as well as the coasts, so if you're living on low land, you're in trouble. And it's striking to me that when we talk about global warming, it's kind of an abstract issue. As far as I know we don't have people moving in from the coasts, and we don't have a fire sale or a flood sale on coastal property."

He theorizes that mainstream media, corporations, the government, and even educational institutions shape some families' ideas about who they are, how they should be, and what they should be oblivious to.

"The forces that gain from us being oblivious to things are much more powerful," he says. "I think there's more news control now than in the past. And corporate control of what Congress pays attention to is much more pronounced, maybe, than in the past. There's more going on to control our information processing, as well all of our own reasons to be oblivious."

What to tune in to

Rosenblatt refrains from offering any easy solutions to shared obliviousness. "This is not a self-help or family help book," he writes. "I don't know enough about family obliviousness, let alone about any specific family, to offer confidently helpful ideas."

But he wants other researchers, educators, and therapists to be aware of the phenomenon of shared obliviousness—"to pay attention to what people aren't paying attention to"—to lessen the fallout from what might be missed.

One thing families can do is simplify their intake of information, he suggests. "Just being able to record a program and run by the commercials gives you 10 or 20 more minutes in an hour, and maybe that's time you could do something else with," he says.

It's also important to evaluate what's truly important. "For ordinary families, I'd really like them to pay attention to what's in the news that's relevant to their lives, and what's going on in their families that involves somebody's health or safety," he says. "[And] for them not to be shutting other people up or stopping other people from whistle blowing, or scoffing at other people who have concerns.

"We do live in a time where the potential for learning more is great," he adds. "The World Wide Web has vast amounts of information, and if you have access to the Web, don't look at the same nine things every week or every day. ... There's a potential there to learn a lot more, and I hope people will."



Paul Rosenblatt's recent book highlights the phenomenon of "shared obliviousness" within families. He theorizes that while it's necessary to be oblivious to most of what happens in the world, what families ignore may wind up costing them.



Into the wild

August 9, 2009

It's a good thing for a wildlife biologist to be naturally enthusiastic

By Cheryl Jones

To John Loegering, teaching is a performance art. He firmly believes that students who are smiling and engaged learn far more than those who are not. Loegering augments his naturally enthusiastic and creative teaching style with state-of-the-art technology—successfully inspiring participation, understanding, and even fun.

Loegering's students describe him as passionate, dynamic, and energetic. "His enthusiasm for the wildlife field was contagious, and his positive attitude made learning fun and reinforced my love for the profession," says one.

Loegering also receives high praise for his determination to get students out into the field for real hands-on experience, and for giving them ample opportunity to be involved in his research and diverse professional activities. Students are also grateful for his open-door policy and his ever friendly, caring manner.

"I believe my role is to facilitate [students'] development, listen carefully to their ambitions, provide guidance where needed, challenge decisions when appropriate, and provide opportunities to explore career alternatives when possible."

Educational leadership is something at which Loegering also excels. He coordinated the formation of the first Crookston student chapter of The Wildlife Society, the major professional society for wildlife biologists in the world. In 2004, he was recognized as the society's Student Chapter Adviser of the Year.

"Loegering is 'on fire' in the best of ways," says a colleague. "His positivity and professionalism are infectious to both students and faculty." Says another, "He is one of our stars. He has made a real difference in the lives of his students, colleagues, professional organizations, the discipline, and the University."



John P. Loegering is an associate professor in the Department of Natural Resources at the University of Minnesota, Crookston; and in the Department of Fisheries, Wildlife, and Conservation Biology in the College of Food, Agriculture and Natural Resource Sciences at the University of Minnesota, Twin Cities.

Photo: Patrick O'Leary

John P. Loegering is a 2009 recipient of the Horace T. Morse-University of Minnesota Alumni Association Award for outstanding contributions to undergraduate education.



Tradition enhanced

August 10, 2009

Northrop's 2009-10 programming allows audiences to dig deeply into dance and music

Northrop's 2009–10 seasons for dance and music reflect its new, expanded mission to be "a place, a program, a philosophy, and an experience." Director of concerts and lectures Ben Johnson has included a broad selection of American and International ballet, and modern, folkloric, and contemporary dance, as well as jazz, classical, and indie art music.

Community partnerships and educational initiatives allow audiences to dig deeply into dance and music, and series packages and extended payment options have been designed to suit diverse preferences and budgets.



Series tickets are on sale through the Northrop Ticket Office, 612-624-2345, 105 Northrop, 84 Church Street S.E., Minneapolis, northrop.umn.edu

Dance

Northrop's 2009-10 dance season opens with Wayne McGregor—Random Dance. The UK's leading choreographer and dance theater innovator presents *Entity*, inspired by his collaborations with neuroscientists.

Following an exuberant tribute to its culture by long-time Northrop favorite Virsky Ukrainian National Dance Company, the Royal Winnipeg Ballet arrives with the world premiere of *Moulin—The Ballet*. Other highlights of the season are Martha Graham Dance Company's *Clytemnestra*; Suzanne Farrell Company's presentation of rarely seen George Balanchine works; Moscow Festival Ballet's performance of *Coppélia*; and the return of Pilobolus.

Another sensation from Britain, Akram Khan Company, joins forces with members of the National Ballet of China to explore a transient world lost in translation. And Saburo Teshigawara performs *MIROKU*, a solo piece of body transformations in a luminously lit box of evanescent light. Both productions are copresented by Northrop and Walker Art Center.

To close the season, Bessie Award–winner Nora Chipaumire performs a new piece with live music by Thomas Mapfumo and the Blacks Unlimited, exploring the migrant experience through live music, dance, and projected video animation.

Music

Northrop's 2009–10 music season opens with Larry Ochs Sax and Drumming Core, a free jazz group out of the Bay Area. The show is copresented by the intimate Whole Music Club in Coffman Union.

In November, Northrop and Walker Art Center copresent the Dafnis Prieto Sextet, headed by the up-and-coming Cuban drummer himself. The season continues with one of the world's best choirs, the 32-member Swedish Radio Choir, performing contemporary, baroque, gospel, and folk a capella choral music. Premier violinist Regina Carter's *Reverse Thread* evokes the old and new to celebrate international identities. Panamanian pianist Danilo Perez and Friends bring the tribute project, *Things to Come—21st Century Dizzy*, with a globally diverse band of leading jazz musicians.

The season closes with a coproduction with the Southern Theater—*The Happiness Project*, a "concept" album with music composition by indie rocker Charles Spearin of Broken Social Scene.

Throughout the year, Northrop will collaborate with the Minneapolis-based nonprofit Jazz is NOW! to produce special events for subscribers, donors, and guests to support the local jazz community.



Snorting stem cells

August 11, 2009

Snorting can deliver cells to the brain, research shows

By Deane Morrison

If you had a brain malady that could be treated with stem cells, how would you like them delivered—by having surgeons cut open your skull to implant the cells, or by snorting them like a nasal decongestant?

Not really a hard choice, is it?

A University of Minnesota researcher has taken the first step toward making this kind of medical delivery service a reality by showing that when stem cells suspended in fluid are snorted, they rapidly migrate into the brain.

[William Frey](#), an adjunct professor of pharmaceuticals, and his colleagues in Tuebingen, Germany, describe their work in a recent [article](#) in the *European Journal of Cell Biology*.



William Frey and his colleagues have found that "snorted" cells can bypass the blood-brain barrier and reach the brain.

Photo: Erika Gratz

The method holds promise for delivering not only stem cells, but other therapeutic cells or drugs that can't easily penetrate the blood-brain barrier.

The researchers had mice sniff tiny droplets containing adult stem cells from rats. An hour later, rat stem cells were clearly visible in the mice's brains. To make sure the ability to penetrate the brain wasn't limited just to those cells, they also had rats snort a second type of cells, from human brain tumors. These cells also penetrated the brain within an hour.

"We proved you could noninvasively deliver stem cells to the brain from the nose," says Frey, who collaborated with principal investigator Lusine Danielyan of the University Hospital of Tuebingen and others. "We've shown these cells reach the brain intact."

Frey and his co-inventors have filed a patent on their stem cell delivery technology.

Riding the rails

How did the stem cells get there? They likely traveled to the brain along the olfactory (smell) nerves through small holes in the cribriform plate, a thin horizontal part of the skull at the base of the brain. They also likely traveled inside fluid-filled spaces that surround blood vessels passing from the nose to the brain.

"Intranasal delivery of therapeutic cells could potentially benefit the treatment of head injury, stroke, Parkinson's disease, Alzheimer's disease, Huntington's disease, and so on."

Just above the cribriform plate, olfactory nerves connect to the olfactory bulbs, two round extensions of the brain that process smell. Stem cells were found in the olfactory bulbs and also in the cerebral cortex, cerebellum, and other brain regions.

The migrating stem cells got a boost if the researchers first had the rodents snort an enzyme called hyaluronidase, whose day job is to make connective tissue more permeable. Of approximately 300,000 stem cells administered, an average of 584 reached the olfactory bulbs when the enzyme was not given; when it was, the number nearly tripled. The effect was muted for cells reaching the cerebral cortex and other areas of the brain, however.

Better than boring

Besides the obvious convenience, delivering stem cells intranasally has other advantages over implanting them through a hole in the skull. For example, doctors could easily administer more than one treatment if needed.

Also, "when you cut into the brain, that leads to an inflammatory response," says Frey. "We're hoping this will help. We didn't see evidence that intranasal stem cell treatment caused inflammation."

The Food and Drug Administration has yet to approve any stem cell-based therapies for brain disorders. But when used with stem cells that are both safe and therapeutic, intranasal cell delivery may someday be used to treat a variety of brain diseases and conditions, Frey says.

"Intranasal delivery of therapeutic cells could potentially benefit the treatment of head injury, stroke, Parkinson's disease, Alzheimer's disease, Huntington's disease, and so on," says Frey. "One of the best ways to treat patients may be with their own cells. For example, the patient's own bone marrow-derived stem cells could be delivered to produce dopamine, the missing chemical messenger in Parkinson's disease."

The next order of business for Frey, Danielyan, and their colleagues is to find out how long snorted stem cells remain in the brain. They also plan to test intranasal stem cell therapy in an animal model of Parkinson's or another neurological disease to assess both safety and efficacy.

And the researchers want to make sure their technology doesn't cause any inflammation or infection, or an immune response.

"Therefore, we are also looking into the use of antibiotics, anti-inflammatories, and immunosuppressants that may further facilitate the safe delivery of therapeutic cells," says Frey.



Honoring a gift

August 12, 2009

U dedicates Minnesota Tribal Nations Plaza outside of new stadium

By Rick Moore

The University kicked off the first of its stadium-related celebrations with a dedication ceremony for the Minnesota Tribal Nations Plaza on August 17.

The plaza, which encompasses the main western entrance to TCF Bank Stadium, is named in honor of the 11 American Indian nations in Minnesota. It features 11 18-foot-tall sky markers—one for each of the nations.

The soaring structures have glass panels that display tribal flags, a map, images, and historical information

specific to each community. The marker for the Shakopee Mdewakanton Sioux Community includes the derivation of the name: *Mde* = lake; *wakan* = sacred or mystic; and *ton* = dwell at a place (short for *tonwanyan*). So Mdewakanton translates to "the dwellers from sacred or mystic lake." Similarly, you'll learn that *Pezihutazizi Kapi*, the home for the Upper Sioux Community, means "the place where they dig for yellow medicine."

The plaza was made possible by a \$10 million gift to the U from the Shakopee Mdewakanton Sioux Community (SMSC)—the largest single private gift ever to Gopher Athletics. In addition, the SMSC donated \$2.5 million toward a matching fund that will create a \$5 million endowment to provide scholarships at the University, with a preference given to American Indian students.

"We feel it is very important to tell the story of American Indians in Minnesota through this plaza," said SMSC Chairman Stanley R. Crooks. "We all know that the history books haven't always told our true story so we commend the University for their efforts to include us. We hope that the Minnesota Tribal Nations Plaza will help others better appreciate the unique historic and ongoing contributions made to the state of Minnesota by the sovereign Tribal Nations who call Minnesota home."

The public ceremony on August 17 was attended by approximately 400 people, including the leadership of all 11 tribal nations, state legislators, and members of the Board of Regents. There were remarks by a number of dignitaries including Crooks, SMSC vice chairman Glynn A. Crooks, President Robert Bruininks, Board of Regents chair Clyde Allen, and Vice President Nancy "Rusty" Barceló, as well as honor songs by the drum groups Cozad and Mazakute. Barceló also acknowledged the recipients of the first round of scholarships awarded through the endowment fund. Earlier in the day, the 11 sky markers were formally blessed.

TCF Bank Stadium is funded in part by nearly \$90 million in private gifts and sponsorships. The first game at the new stadium will take place on September 12 when the Gophers host the United States Air Force Academy.



The 11 sky markers on the plaza have glass panels that display tribal flags, a map, images, and historical information specific to each nation.

Photo: Patrick O'Leary



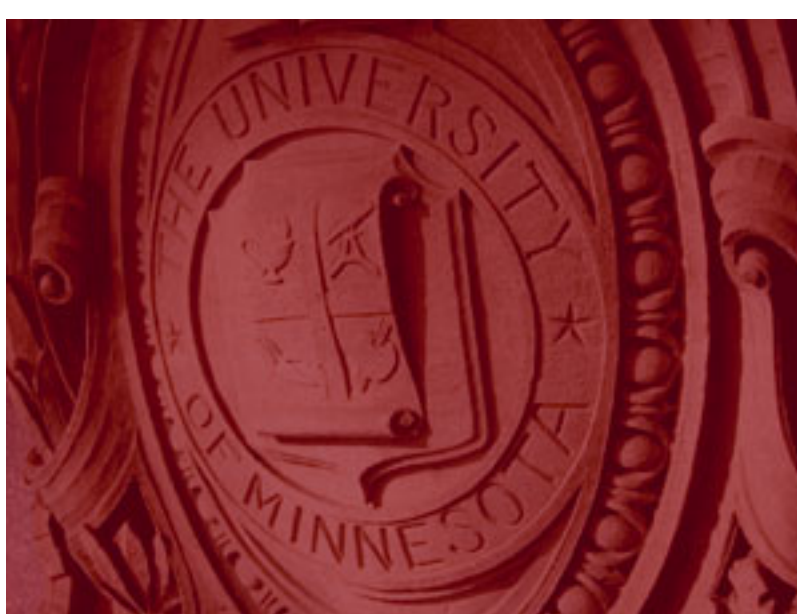
Duluth's distinguished teachers

August 14, 2009

Three Duluth faculty members are recognized for their work with undergraduates

By Kristin Cleveland, with Bill Magdalene and Rick Moore

One of the students who nominated University of Minnesota Duluth marketing professor Stephen Castleberry for a 2009 Horace T. Morse-University of Minnesota Alumni Association (Morse-Alumni) Award describes Castleberry's teaching style as one that "has a way of making sense in real world scenarios," rather than one that just presents factual material that he as a student couldn't relate to.



Seal of the Board of Regents of the University of Minnesota

You could say the same for Carmen Latterell and Justin Henry Rubin, two other Duluth faculty members who also were honored with Morse-Alumni Awards this year. Latterell, an associate professor of mathematics, is known for teaching not just mathematical facts, but modeling for her students how to be scholar-mathematicians.

Rubin, an associate professor of music, has made it his mission to give his students something he missed as an undergraduate composer—venues for orchestrating their musical works and seeing and hearing them performed by nationally prominent musicians

The three were among eight University of Minnesota faculty who were honored for outstanding contributions to undergraduate education at the annual Distinguished Teaching Awards ceremony April 27. While their disciplines differ, Castleberry, Latterell, and Rubin share a remarkable gift for empowering students by helping them recognize and try out their own inherent talents.

A colleague of Rubin's describes this gift as an "ability to relate to, and guide the student in such a way that the student continues to make progress in the direction of his or her interests." In Latterell's classroom, says a former student, it manifests itself as an environment of "mutual respect between instructor and students, woven by a scholarly thread."

A former student of Castleberry's points to an amalgamation of skills: "being a content expert in his field, finding the best in individuals, giving them a chance to shine, acknowledging their successes, coaching for opportunities to improve, mentoring students to achieve their goals, and supporting their ongoing successes as their lives extend far beyond the classroom."

Stephen Castleberry...

"I expect my students to take personal responsibility for lifelong learning, and part of my responsibility is to help them understand and internalize that fact.... I want them to know that I've been there too, and I will work with them to help them to succeed."

At its essence, it boils down to a very student centered approach—focusing on who students are (even if they themselves don't quite know it yet), and giving them the opportunity to discover and experiment with their interests and gifts.

One of Latterell's strong interests is the mechanics of how students actually learn. A colleague notes that primary goals of Latterell's research and publications are to promote understanding of how people best learn, identify the obstacles or challenges that students commonly face, and arrive at innovative ways of teaching the subject matter. In pursuit of those goals, she gravitates to teaching 1000-level courses—what she refers to as "the pipeline"—the time when students make the transition from high school to college mathematics.

Being in tune with students as they struggle to find their "intellectual home base" has a strong impact on those she teaches, and gives them the confidence that they do in fact possess the skills they need to overcome their own particular obstacles.

Carmen Latterell...

"I believe that another aspect of teaching is availability, which includes holding office hours, but also includes conducting oneself in such a manner that students believe that one is available to them. Sometimes this is as simple as directly telling them, 'I am here for you.'"

A former student who is now an instructor at a major state university says simply, "She has shaped the way that I interact with the students I teach."

Justin Rubin works hard to show students—even non-music majors who may only be fulfilling a liberal education requirement—how much of a role the arts play in their world, and how they, in turn, impact the artistic process. A colleague reports that many of Rubin's students say they "learned to appreciate how art—whether performing, written, or studio—cannot be divorced from what is happening politically, culturally, and historically during the life of the artist."

For those who choose to pursue music, Rubin makes certain they have opportunities to maximize their creativity and improve their skills.

Justin Henry Rubin...

"I have come to the teaching philosophy of trying to offer my students the best of what I experienced in my education in addition to what I would have dearly desired to have had."

Recalling his days as an undergraduate, Rubin says, "I still remember that one of the most difficult aspects of developing myself as an artist was trying to find other student musicians that had the time and patience [...] to put together my original works for performance. This is key for any student composer, as working with live musicians is the choice situation for improving writing."

If Stephen Castleberry were to teach a music course, he'd point out that people aren't always going to play the notes as written and might even hit a few wrong ones.

In his Marketing Research and Fundamentals of Selling courses, he impresses on his students how fluid, unpredictable, and even unethical markets and people can be.

Ethics and empathy are big topics. He's taken students on field trips to federal prison camps so they can learn from those who've made poor choices, and he orchestrates curve balls in the role-playing students do in his classroom. A student relates that Castleberry would tell them, "This isn't about just presenting. It's about helping your buyer solve his or her problem with your service."

Just as his students constantly adjust their sales pitches as their "clients" respond in the role-playing, Castleberry is constantly adjusting his subject matter. Colleagues report he is continually in contact with former students, sales people, managers, executives, entrepreneurs, and strategic thinkers in the for-profit and not-for-profit world, asking, "How are you training and being trained? What is cutting edge? What is coming down the road? What should I be teaching my students?"

Says a student, "He definitely is committed to providing his students with the most up-to-date, accurate, beneficial information to better their education."



Contract bridge

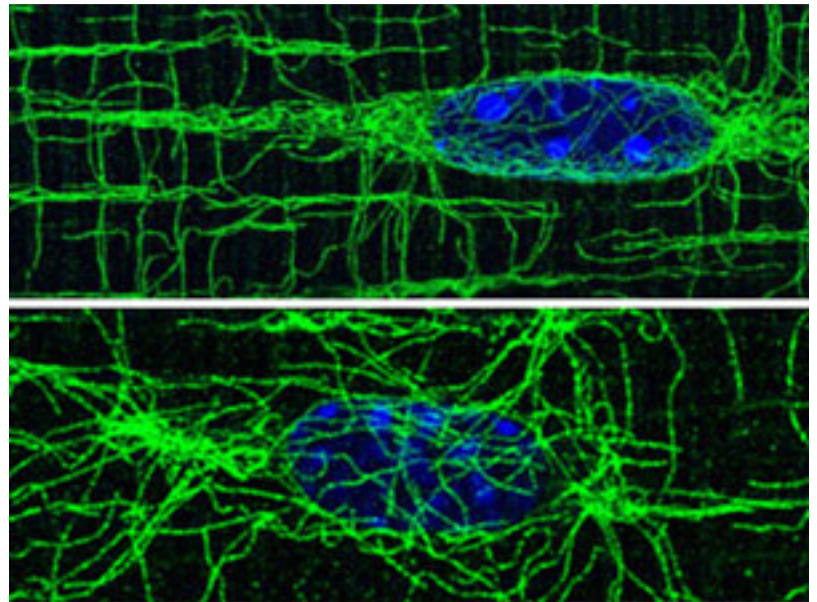
August 17, 2009

How the key protein in Duchenne muscular dystrophy stabilizes muscle cells during contraction

By Deane Morrison

The tragedy of a broken bridge doesn't confine itself to the transportation realm. It also stalks the boys born with Duchenne muscular dystrophy, in whose every muscle cell a major bridge lies broken.

Work by [James Ervasti](#), a University of Minnesota professor of biochemistry, molecular biology and biophysics, and his colleagues reveals a new reason why that bridge—a protein called dystrophin—is crucial to normal muscle function.



Normal (above) mouse muscle cells show an orderly network of microtubules (green lines) that is disordered in mice with muscular dystrophy (below).

Photo: Evelyn Ralston, NIH

Published in the [Journal of Cell Biology](#), the research may help efforts to cure the deadly disease, which strikes one in 3,500 boys. (Females may be carriers, but they don't get the disease.)

Pillar of strength

Duchenne patients carry a genetic defect that cripples dystrophin, and with it a muscle cell's internal structure and ability to absorb the shock from repeated cycles of contraction and relaxation.

Central to the structure of muscle cells are long, thin bundles of protein filaments that shorten to produce contraction and lengthen to produce relaxation. At regular intervals the bundles are encircled by ringlike protein structures; each connects to dystrophin, which in turn is anchored to the "cell membrane," which encloses the cell.

These multiple connections even out the mechanical stress on cell membranes as the cell contracts and relaxes.

"Dystrophin is a mechanical shock absorber protecting membranes from stresses in contraction and relaxation," says Ervasti.

He likens dystrophin molecules to shock absorbers in cars, where the bundles of contractile filaments are the wheels and the cell membrane is the shell of the car. With nonfunctional shocks, a car would suffer progressive damage to its body, including doors and windows, and could no longer control who and what gets in or out of the vehicle.

"Dystrophin is a mechanical shock absorber protecting membranes from stresses in contraction and relaxation."

Similarly, muscle cells have structures on their outer membranes that control what gets in or out of the cells. If dystrophin can't do its job, those structures deteriorate.

Dystrophin also has long been known to connect to two types of protein filaments that act like 2 x 4's in a house, giving the cell internal structure and strength. In his most recent work, Ervasti, along with University M.D./Ph.D. student Kurt Prins and Evelyn Ralston's group at the National Institutes of Health, found that dystrophin also connects to a third supporting element: an orderly, 3-D lattice of filaments called microtubules. These form an internal railroad for transporting nutrients, chemical signals, and other materials.

The researchers showed that this lattice was disordered in mice lacking functional dystrophin. The finding cemented dystrophin's role as a central pillar of muscle cell organization.

"There are about 40 neuromuscular disorders, and many are caused by defects in either dystrophin or its associated proteins," Ervasti observes.

Doing the impossible

Can defective dystrophin be replaced? That was long considered impossible, because cells aren't designed to take delivery of proteins they normally make themselves.

Earlier this year, however, Ervasti, led a team that [showed it was possible](#) to replace dystrophin in mice with muscular dystrophy. If successfully adapted to humans, it could mean a therapy to extend the lives of boys born with Duchenne.

"It would be like giving insulin to a patient with type I diabetes," Ervasti explains.

The researchers still must demonstrate, however, that the technique can be modified to safely replace dystrophin in humans. But things are looking up.

"Several companies are interested in developing dystrophin replacement therapy," says Ervasti.



Their own devices

August 19, 2009

Innovators take wing with help from Marie Johnson and the Medical Devices Fellows Program

By Deane Morrison

In February 2002 [Marie Johnson](#) was a University of Minnesota graduate student, working with 3M scientists to develop a computerized stethoscope to assess heart sounds.

Naturally, she tested a prototype on her husband, engineer Robert Guion. Studying the signals, she found the trace of an intermittent heart sound.

"I think there may be something wrong with your heart," she told him.

But his doctor found nothing during a regular stethoscope exam. Even more disturbing, a follow-up exercise stress test showed no abnormalities. Johnson soon gave birth to the couple's second child, and seven weeks later, in October, she got the go-ahead to resume exercise.

She arranged to meet Rob at the "Y" and pulled into the parking lot around noon. There she saw an ambulance and a shrouded body on a stretcher.

It was her husband, felled by a heart attack at 41.

An autopsy showed major blockage in several coronary arteries, including one called the LAD (left anterior descending). It also showed enlargement of the left ventricle—the source of the heart sound Johnson had picked up.

After his death, Johnson pored over both the stethoscope and accelerometer (which measures sound and vibration in the chest) signals she had recorded from him and the medical literature. Eventually, she identified a new and persistent signal in her husband's records and traced its origin: blockage in the LAD artery.

Sharing the experience

Following her collaboration with 3M—which funded Johnson's doctoral research in biomedical engineering and a postdoctoral fellowship at the University—Johnson worked on her own and came up with algorithms to process signals from the heart and quickly pick up LAD blockage.

She tested an algorithm-based stethoscope on angioplasty patients of University cardiologist [K.P. Madhu](#) and found it reliably detected LAD blockage. Then, after completing two more "postdocs"—in Italy and at Stanford University—she put her innovation experience to work in 2007 as the new director of the University of Minnesota's fledgling Medical Devices Fellows Program.

"I've known Marie for a long time, and she's definitely the kind of person who would want to turn a tragedy into a blessing for somebody else."--Arthur Erdman

"The goal of the program follows the goal of the University: the public good," says Johnson. "We strive to improve health care and save lives, train leaders, and create jobs."

The program brings in cross-disciplinary teams comprising postdoctoral level engineers, scientists, and physicians for a rigorous, one-year initiation as inventors of medical devices.

How rigorous? First come six weeks of state-of-the-art lectures by experts in clinical medicine and technology, FDA representatives, insurance reimbursement strategists, venture capitalists, and leading medtech innovators, and at companies like Medtronic, Boston Scientific, St. Jude Medical, and start-ups.

Next, fellows spend six weeks observing medical practice in five Twin Cities hospitals, noting where an innovation could improve care, outcomes, and patient comfort. The 2008-09 fellows made 185 observations during clinical immersion.

In the next stage, fellows filter the potential projects, picking those with the largest patient incidence and greatest impact. They study them from every angle, including FDA requirements and insurance reimbursement, so that they won't end up reinventing the wheel or being blindsided by legal or economic obstacles.

When the fellows begin to invent, they immediately build 3-D mockups of devices with simple materials before making "durable prototypes" in University machine shops. They try out their creations in facilities like the Medical School cadaver lab and with the experimental surgery group headed by Richard Bianco, an assistant professor of surgery.

License to heal

Working at breakneck pace, the 2008-09 fellows developed, among other technologies, devices to control infection of catheters, treat chronic sinusitis, gauge the severity of and treat glaucoma, and treat obesity in minimally invasive fashion.

The goal is to license the technologies, all of which belong to the University, to local companies or to launch start-ups to license them. One fellow has already started a company to do just that.

Only Stanford and the University of Michigan have anything comparable to the Medical Devices Fellows Program, says Johnson.

"We have unbelievable support," she notes. "We would not be here if local people at hospitals, companies, and the University had not embraced this program."

As program director, Johnson applies everything she's learned to help inventors interested in translational research.

"I think she has a unique set of skills, both technically and as a leader of innovation, that has really led this program to be a premier program," says University mechanical engineering professor [Arthur Erdman](#), who is director of the Medical Devices Center, which includes the Fellows program.

Johnson's own experience shows what one person with an idea can do. Less than seven years since her husband's tragic death, she has founded AUM Cardiovascular, a company that is developing a fast, noninvasive, hand-held, easily affordable device to assess coronary artery disease, using the algorithms she wrote. It is placed on the chest and displays data on a PDA.

"I've known Marie for a long time, and she's definitely the kind of person who would want to turn a tragedy into a blessing for somebody else," notes Erdman.

"We're continuing to improve the platform technology to get the product ready for release," says Johnson.

It's already drawing notice. Five judges for LifeScience Alley, a nonprofit trade association for the life sciences in Minnesota and adjoining areas, selected AUM Cardiovascular and two other technologies for the New Technology Showcase, which was held during the LifeScience Alley conference in December 2009.

Check out a [story and video](#) about the Medical Devices Center and Medical Devices Fellows Program.



Marie Johnson invented a device to detect blockage in a coronary artery (projected image) and now helps young innovators.

Photo: Patrick O'Leary

Partners in productivity

The companies that work with Medical Devices Fellows are just one example of University-industry collaboration. For another, read about the century-long [innovative partnership](#) between 3M and the U's Institute of Technology.



Behind harassment

August 20, 2009

Female supervisors more likely to report being sexually harassed than non-supervisors

By Rick Moore

Sociology researchers from the University of Minnesota have found further evidence that sexual harassment in the workplace might be more about gender and power than sexual desire.

Women who hold supervisory positions are more likely to be sexually harassed at work than non-supervisors, according to the first-ever, large-scale longitudinal study to examine workplace power, gender, and sexual harassment.

The study reveals that nearly 50 percent of female supervisors reported sexual harassment in the workplace, while only one-third of women who do not supervise others reported such harassment. While supervisory status increased the likelihood of harassment among women, it did not significantly impact the likelihood for men.

"Male coworkers, clients, and supervisors seem to be using harassment as an equalizer against women in power," says Heather McLaughlin, a sociologist at the U of M and the study's lead author. As the first large-scale longitudinal examination of sexual harassment, the study provides the strongest evidence to date linking sexual harassment to supervisory status and gender.

McLaughlin says the findings are something of a paradox. "Traditionally, you think of sexual harassment as the male boss and the female secretary," she says. That's how individuals who started talking about harassment in the late [1970s] thought about it, because that was largely the case for women in the workforce at that time.

"But since then, the composition of the workforce has changed and women are moving more into [these] leadership positions. We're finding that there's some backlash against that, and female supervisors who have workplace power are more likely to be harassed."

McLaughlin and her co-authors based the study on 2003 and 2004 data from Jeylan Mortimer's Youth Development Study (YDS), which began in 1988 with a sample of 1,010 ninth graders in the St. Paul public school district. The study has continued near annually with the same sample, and respondents were approximately 30 years old during the 2003 and 2004 waves. The analysis was supplemented with in-depth interviews with a subset of the YDS survey respondents.

"This study provides the strongest evidence to date supporting the theory that sexual harassment is less about sexual desire than about control and domination," says Heather McLaughlin, a sociologist at the U of M and the study's primary investigator. "Male coworkers, clients, and supervisors seem to be using harassment as an equalizer against women in power."

In the same study, the sociologists also found that, in addition to workplace power, gender expression was a strong predictor of workplace harassment. Men who reported higher levels of femininity—rating themselves as anywhere from "somewhat feminine" to "very feminine"—were more likely to have experienced sexually harassing behaviors (44 percent) than less feminine men—those who rated themselves as "not at all feminine" (31 percent). And more feminine men were at a greater risk of experiencing more severe or multiple forms of sexual harassment.

"For men, self-reported femininity really makes a difference," McLaughlin says. "Men who aren't really conforming to what coworkers think real men should act like are more likely to experience this sort of treatment (harassment)."

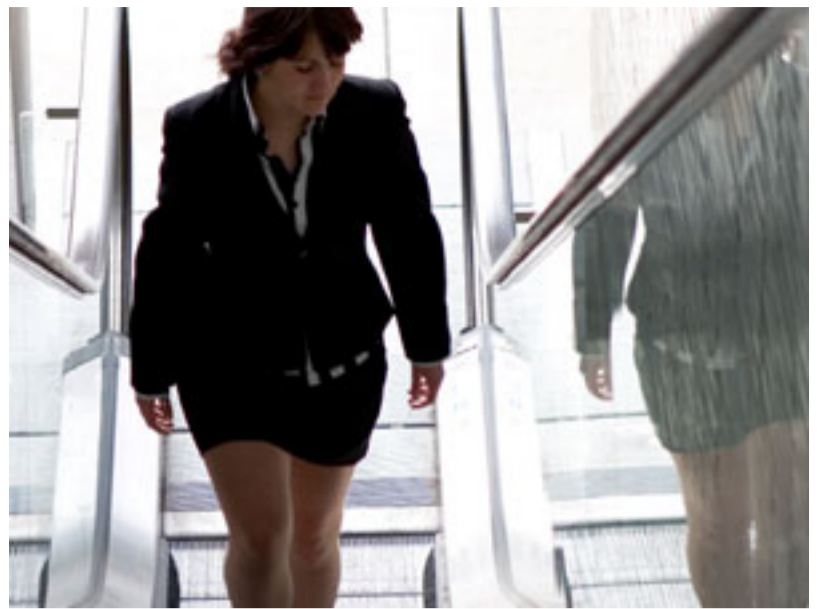
In a separate analysis examining perceived and self-reported sexual orientation, study respondents who reported being labeled as non-heterosexual by others or who self-identified as non-heterosexual (gay, lesbian, bisexual, unsure, other) were nearly twice as likely to experience harassment.

Researchers also found that those who reported harassment in the first year (2003) were 6.5 times more likely to experience harassment in the following year. The most common scenario reported by survey respondents involved male harassers and female targets, while males harassing other males was the second most frequent situation.

McLaughlin says that the magnitude of survey participants reporting sexual harassment suggests that employers should be paying attention. Over the years, courts have found that it's not only the harasser who is responsible for the offending act, but also the organization.

"As a response, organizations are writing up these [sexual harassment] policies, which is good, but it's not really given the proper attention that it deserves," she says. "The organizations have a certain responsibility to take these issues seriously and improve workplace culture."

McLaughlin co-authored the study with sociologists Christopher Uggen, chair of the University of Minnesota's sociology department and a distinguished McKnight professor of sociology, and Amy Blackstone, associate professor of sociology at the University of Maine. The multi-method research was supported by grants from the National Institutes of Mental Health and the National Institute of Child Health and Human Development.



The study found that nearly 50 percent of female supervisors reported sexual harassment in the workplace, while only one-third of women who do not supervise others reported such harassment. While supervisory status increased the likelihood of harassment among women, it did not significantly impact the likelihood for men.



A wise advocate

August 21, 2009

Josephine Lee is quick to offer words of advice and encouragement

By Bob San

For someone with a physics degree from MIT, Josephine Lee sure has made an impact on Asian American studies and the performing arts graduate programs at the University. Lee was a founder of the Asian American Studies Initiative that ultimately resulted in the formation of the Asian American Studies Program here. She served as its first director and spearheaded the launch of its minor for undergraduate and graduate students, and also has served as the English department's director of graduate studies.

Lee's scientific background shows through in her savvy use of technologies to teach and connect. One of her greatest achievements is the introduction of CourseShare technology, which links instructors at the U with graduate students at other Big Ten universities.



Josephine D. Lee is an associate professor in the Department of English and the Asian American Studies Program in the College of Liberal Arts at the University of Minnesota, Twin Cities.

Photo: Patrick O'Leary

"This work has been amply rewarded, both by [my students'] successes and by how they deeply enrich and sustain my own intellectual life and work."

She is also a pioneering scholar. Her 1997 book, *Performing Asian America: Race and Ethnicity on the Contemporary Stage*, was the first in the world to tackle the issues of Asian American theater history. And she is one of only a handful of faculty in the country who teach Asian American cultural studies at the graduate level and has helped to develop programs nationwide.

Josephine Lee is a 2009 recipient of the Award for Contributions to Postbaccalaureate, Graduate, and Professional Education.

To students, Lee is well known as a compassionate advocate who is quick to offer words of advice and encouragement. "Jo captures the very best of what graduate education should be," said a student. "She is a gifted scholar, the staunchest of supporters, and the wisest of leaders. Her students are lucky to have her and she is a model for what I hope to achieve in my own career."



A way of life

August 24, 2009

May Lee and family named 2009 Farm Family of the Year for Ramsey County

By Rick Moore

At the small parcel of land that they rent near Marine on the St. Croix, May Lee and her family provide food for themselves and the greater community. For the Lee family, it's a way of life. May Lee began farming at the age of 8 in Laos, and continued when her family moved to St. Paul from a Thai refugee camp in 1981.

The Lee family may not be the first that comes to mind when you picture a typical Minnesota farm family, especially in generations past, and that's symbolic of how the face of agriculture has changed over the years.

But one thing hasn't changed. In this state, agriculture is still a family affair. "In the state of Minnesota, our agricultural land and our agricultural production system are owned and operated by farm families," says Bev Durgan, dean of University of Minnesota Extension. "I think that's something to get the word out on and also something to be very proud of."

Durgan and the University are doing just that. Since 1980, the U has annually been naming "Farm Families of the Year" from counties in all corners of the state, and May Lee and her family have been chosen as the 2009 Farm Family of the Year for Ramsey County.

As Durgan points out, it's family farms like the Lees that help define the state. "We're very broad and very diverse," she says, "and I think that's what has helped to make Minnesota agriculture strong."

Durgan says the program looks for farm families rooted in production agriculture and also active in their community. Beyond those common denominators, the family histories are as diverse as Minnesota's landscape. The Bruce and Lynette Wellendorf family, Farm Family of the Year for Big Stone County, tends 2,800 acres of corn and soybeans on a farm that was established in 1912. The Schaper family, the winner from Hennepin County, operates Minnetonka Orchards, a 13-acre spread that has some 3,800 trees including about 825 SweeTango(r) trees—a new apple variety developed by the University of Minnesota.

And going back three years, Kay and Annette Fernholz were named the Farm Family of the Year for Lac Qui Parle County. Annette and Kay are biological sisters as well as members of the School Sisters of Notre Dame, and theirs is [a growing ministry](#).

Promoting health and carrying on traditions

Because access to farmland has been a challenge, May Lee has rented land whenever the opportunity has presented itself. At the Minnesota Food Association, where she has farmed since 2007, she grows a variety of vegetables including tomatoes, bell peppers, cucumbers, peas, and onions. The Lees are the first Hmong farmers to be certified organic in Minnesota.

May works with her daughter, Mhonpaj, and other children in their family of 10. In addition to their land at the Minnesota Food Association, May also grows traditional herbs at a greenhouse in Mahtomedi. She sells her products at area farmers' markets, through her Mhonpaj's CSA (community-supported agriculture), and through the Minnesota Food Association.

According to Mhonpaj, winning the Farm Family of the Year award for Ramsey County is nice, but the family's satisfaction comes from successfully running a farm operation each day and from serving their community.

"It's a way of life. This is how we grew up, and we didn't think our lifestyle should get recognition," she says. "Our recognition that we're still waiting for is to buy land. To buy land that has a house so that we can sustain our lifestyle."

It's a lifestyle that Mhonpaj, 25, became accustomed to while growing up and even throughout her college years at Gustavus Adolphus in St. Peter. She was a triple major in health education, health fitness, and political science, and also worked a number of jobs to get through school.

Even now, she finds time to work outside the farm. Mhonpaj is a medical interpreter at Hennepin County Medical Center, acting as a cultural liaison between doctors and Hmong patients. She's also been approved as a Ramsey County master gardener. And she's well aware of the resources available to farmers and others through University of Minnesota Extension. "I stay very well connected to the University of Minnesota," she says.

Mhonpaj isn't the only one in her family who functions as a cultural liaison. May helps plan cooking shows each year that demonstrate how to prepare the traditional Hmong post-partum diet. And as part of the Mill City Museum's Hmong cultural celebration, May and family show others how to cook Hmong greens.

As Durgan points out, it's family farms like the Lees that help define the state. "We're very broad and very diverse," she says, "and I think that's what has helped to make Minnesota agriculture strong."

Related link

[Bev Durgan joins the Minnesota Farm Network to talk about new agriculture facility at the University \(mp3\), Minnesota Farm Network - Radio](#)



May Lee's daughter Mhonpaj shows off some of the fresh veggies from her family's farm operation at the Minnesota Food Association.

Photo: Patrick O'Leary



Up against the Wall Street

August 27, 2009

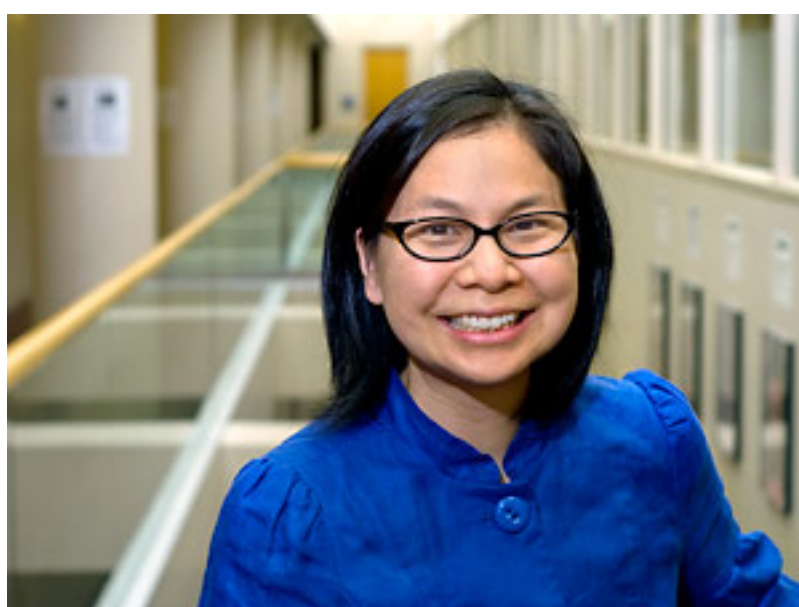
An anthropologist's view of the investment banking mentality

By Deane Morrison

A world where the job market for highly skilled workers is a revolving door, firms get sliced or spliced every day, and bonuses depend on the quantity—not the quality—of deals a banker can swing.

That's Wall Street, a Wonderland of insecurity. And to those in the swim of it, it's normal.

So claims University of Minnesota researcher **Karen Ho** in *Liquidated: An Ethnography of Wall Street*, a new book that reveals the elements of the financier psyche that helped generate the recent financial crisis.



In her new book, University anthropologist Karen Ho describes the Wall Street mentality.

Photo: Patrick O'Leary

An associate professor of anthropology, Ho says a “culture of liquidity” has arisen on Wall Street over the last three decades. In that culture, no institution or job is sacred and the only goals are to increase short-term stock prices and generate a record flow of deals by encouraging corporate clients to restructure.

However, says Ho, “it's not how financial markets always must behave.”

Ascendance of the shareholder

One root of the current trouble lies in the philosophy that corporations should put increasing short-term value to shareholders above all other considerations. But it was not always so.

“In the mid-20th century and into the 1980s, if [corporations] contributed to communities, stability, and long-term employee careers, they could rationalize that these practices would, in the long term, increase shareholder value,” Ho explains.

“With the takeover movement, suddenly a corporation had to be very concerned about its stock price, because if it wasn't high and continually rising, it could be bought.”

“But the reinterpretation of shareholder value says, ‘If you are not constantly—and only—making the stock price jump, you are betraying shareholder value.’”

Ho argues that this is likely to decrease shareholder value in the long run.

Splice and dice

In Wall Street's view, corporations must, at all cost, get more money for their shares “now,” says Ho. Short-term gain for shareholders trumps employment, and profits can't be shared with employees because they belong to shareholders. No matter that a merger or a selloff would wreak havoc with a corporation and its employees; if it will increase stock prices, it must be done.

The '80s takeover craze sparked a massive shift from regarding a corporation as a long-term social institution to thinking of it as a fungible site for constant shareholder value appreciation, Ho says. No longer are corporations parts of the societal infrastructure, but mere collections of shares in temporary portfolios.

“With the takeover movement, suddenly a corporation had to be very concerned about its stock price, because if it wasn't high and continually rising, it could be bought,” Ho explains. Bought, merged, or sold off in pieces—any transaction that would make work for financiers and raise stock prices.

Broken wheel and deal

If that weren't enough, investment bankers who swing these kinds of deals reap bonuses based not on the quality of the deals but on the sheer number.

“Deals aren't tied to long-term stability or productivity,” Ho notes.

The record bonuses posted by many investment banks before the last few financial crashes correlate tightly with the number of unsustainable deals marketed to corporate America, she says. Also, new financial instruments like junk bonds, derivatives, and policy deregulation made Wall Street deal-making and over-leveraging, especially in the mortgage market, easier than ever.

It may be fine for financiers making \$300,000 a year plus \$500,000 in bonuses to be fired with shifts in investment banks; most can easily survive until the next shift lands them another job in the same neighborhood: New York's financial district.

But not so on Main Street.

“The ‘culture of liquidity’ bankers used to thrive on is based on a relatively privileged model,” says Ho. “The culture, especially the [big] bonuses, allows a cushioned and challenging revolving door.” But applied to the average worker, this model causes “social violence,” including downward mobility and unemployment.

Off the treadmill

Breaking this culture won't be easy, Ho says. With mutual funds, 401k's, and other pension funds tied up in the stock market, change must be cautious.

“We need to first rethink the social safety net,” she says. “What other opportunities are available for retirement savings? Unless you ... begin to build a social safety net that's not tied to the stock market, radically restructuring American dependence on bubble culture being the norm—which I think needs to happen—will upset the apple cart.”

For one thing, the nation should rebuild the firewall between the securities markets and other markets, such as commercial banking and insurance, Ho says. Reinstating the Glass-Steagall Act, which was repealed in 1999, would keep regular banks from playing the stock market and would have prevented AIG from going under because “an insurance company couldn't have engaged in financial derivatives.”

But Ho sees rough sledding ahead.

“I think these changes will be very difficult to make,” she says.



Helga Leitner: Intercontinental mentor

August 27, 2009

In a global classroom, geography professor Helga Leitner is a constant meridian

By Deb Parker

Geography professor Helga Leitner not only is "an inspiring teacher" but also "has created a vibrant international intellectual community and support network." Apart from mentoring students in a wide variety of fields, she has played an important role in the Interdisciplinary Center for the Study of Global Change, working with graduate students from all over the world.

One advisee describes Leitner as "extremely demanding and tirelessly committed to her students, always pushing for greater depth, precision, and creativity, but simultaneously providing support, reassurance, and guidance." That support stretched across the ocean for another student in South Africa who was trying to finish a dissertation.

Students describe Leitner's courses as "exciting," "motivating," "engaging," and "thought provoking." A former graduate student writes, "Any graduate course that Helga is involved in will undertake an exhaustive exploration of current research and relevant literature in that area."

"Perhaps even more than the books and articles we write, it is the students we teach and mentor, carrying living traditions of scholarship into the future, that are our lasting legacy."

One student who took two of Leitner's graduate seminars described her as being a "full participant in discussion, but [she] did not lead the students to a preordained position or conclusion." She also writes, "I had the impression that Helga simultaneously knew the material inside-out and that she was reading it for the first time." A former student who is now teaching at the college level found in Leitner a mentor "passionate about her research and teaching, but also one who cares deeply about graduate students."

Helga Leitner is a 2009 recipient of the Award for Contributions to Postbaccalaureate, Graduate, and Professional Education.



Helga Leitner is a professor in the Department of Geography and the Institute for Global Studies in the College of Liberal Arts, University of Minnesota, Twin Cities.

Photo: Patrick O'Leary



Bank on success

August 28, 2009

The Gophers hope to vault to new heights in 2009

By Rick Moore

For months, fans of Gopher football have been casting their gaze in the general vicinity of 2009 University Avenue S.E. as TCF Bank Stadium—the shiny new jewel of the Big Ten—has emerged from a nondescript parking lot. But beyond the exhilaration of returning to campus, the question on most fans' minds is whether the 2009 Gophers will emerge as serious contenders on the field of play. This year's team is loaded with intrigue and potential, along with a few scattered question marks.



The 2009 captains, from left: Garrett Brown, Eric Decker, Lee Campbell, Simoni Lawrence, Adam Weber, and Eric Small.

Photo: courtesy University Athletics

Last year's 7-6 record—counting the 42-21 loss to Kansas in the Insight Bowl on New Year's Eve—was a major turnaround for the Gophers, who struggled to a 1-11 mark in 2007, head coach Tim Brewster's first season. In fact, no team in Division I football increased its win total by more games last year. Still, 2008 was a tale of two seasons. After starting the season 4-0 against nonconference opponents, the Gophers fell to 14th-ranked Ohio State. But they bounced back with three Big Ten wins—including two on the road—to find themselves at 7-1 overall and ranked No. 20 in the nation.

The season shifted the following week in the Homecoming game against Northwestern, when an interception return for a touchdown with 12 seconds remaining gave the Wildcats the win. Losses followed against Michigan at home and Wisconsin on the road, then to Iowa, 55-0, in a bruising Metrodome finale.

Despite the bowl bid—Minnesota's eighth in 10 years—the late-season skid put a damper on what was otherwise a successful season. "Obviously, what it showed us is that we're not there yet and that we've got a lot of work to do, particularly against the upper-echelon Big Ten teams," Brewster says. "I think we got exposed late in the season from a depth standpoint."

Depth and experience are likely to transfer to the assets column for Minnesota this season. Brewster has built a reputation as a dynamic and effective recruiter, and his dedication to making the Gophers faster, bigger, and more athletic should be readily apparent.

"Our fans very much want to get behind a Big Ten champion-caliber team. The onus is on me to provide that. I think that we're where we need to be; I think we're right on track," Brewster says. "The truly exciting thing for me is to see it happening. It is unfolding the way I anticipated it to unfold."

The offense, under the direction of new coordinator Jedd Fisch and running game coordinator Tim Davis, will place more of an emphasis on establishing the running game, which averaged only 3.1 yards per rush last season. Running back Duane Bennett returns from a knee injury that ended his season last year in the second game, and leads a backfield that includes DeLeon Eskridge, Shady Salamon, Jay Thomas, and Kevin Whaley.

Junior captain Adam Weber will be back at quarterback. In two seasons, Weber already ranks second all-time at Minnesota in completions (513) and fourth in passing yards (5,656). His favorite target is senior captain Eric Decker. Decker, a consensus first-team All-Big Ten selection, broke his own single-season record for receptions last year with 84, and ranks second, third, and fourth all-time in career receptions, receiving touchdowns, and receiving yards.

But watch for the ball to be spread around to a host of other returning wide receivers, including Ben Kuznia, Brandon Green, Da'Jon McKnight, and tight end Nick Tow-Arnett. Brewster feels that receiver Hayo Carpenter, a highly touted junior college transfer, can make an immediate impact, and Troy Stoudermire and David Pittman can both catch the ball and return kicks.

Also look for freshman quarterback MarQueis Gray to display his talents. Tall and lean like Weber, Gray has good speed, a live arm, and as defensive tackle Garrett Brown notes, "fluid hips."

Success likely will hinge on the improvement of the offensive line. Guards D. J. Burris and Ned Tavale are among the returnees, and junior college transfer Jeff Wills is a fully loaded refrigerator at 6 feet, 7 inches and 375 pounds. And Matt Carufel, who was ineligible to play last year after transferring from Notre Dame, is also expected to be a presence on the line.

Getting nasty on defense

Last season, while running up its 7-1 record, Minnesota was tops in the nation in turnover margin. The Gophers defense, under new co-coordinators Kevin Cosgrove and Ronnie Lee, will again count on its playmakers to step forward. Seniors Traye Simmons (four interceptions last year), Marcus Sherels, Kyle Theret, and Kim Royston are part of a veteran secondary, and senior captains Lee Campbell (who led the team with 80 tackles) and Simoni Lawrence lead a solid linebacking corps.

The other two defensive captains, seniors Brown and Eric Small, will anchor the middle of the defensive line, along with sophomores Brandon Kirksey and Jewhan Edwards. And Brewster is counting on the continued development of senior defensive end Cedric McKinley to offset the loss of Willie VanDeSteege, who led Minnesota last year with 10.5 sacks.

Brown says fans are going to see a "nastier" defense than in previous years, and he's looking for the Gophers to be in their mid-season form of a year ago. "That's the team we want to be all the time," he says. "We want to be mentioned with those Tennessees and Texas and all those big-time teams. And I feel like this year is going to be the year that we put it all together on offense and defense and the kicking game."

Brewster feels the angst of Gopher fans who haven't had to locate Pasadena on a map since 1962, the last time the team made it to the Rose Bowl. "Our fans very much want to get behind a Big Ten champion-caliber team. The onus is on me to provide that. I think that we're where we need to be; I think we're right on track," Brewster says. "The truly exciting thing for me is to see it happening. It is unfolding the way I anticipated it to unfold."

Which should give fans even more of a reason to keep their eyes fixed on the happenings at 2009 University Avenue.



LEEDing the way

September 1, 2009

TCF Bank Stadium receives LEED certification for sustainable design

By Rick Moore

When it comes to opinions on the new TCF Bank Stadium, the superlatives already are flying, from the biggest and best locker room in collegiate sports to the biggest and best scoreboard north of Texas.

But the University recently received another nod of approval. On September 17 it was announced that TCF Bank Stadium has gained LEED (Leadership in Energy and Environmental Design) Silver certification from the U.S. Green Building Council, the standard for sustainable, or "green," design.

The stadium becomes the first LEED-certified collegiate or professional football facility in the nation.

From brown to green

Before the University could choose features to make the new stadium green, it had to worry about cleaning up a polluted "brownfield," a task it knew lay ahead when the stadium was approved. An old railroad yard operated by the Chicago Great Western Railway Co. had been at the site, and there had been a creosote operation on the grounds.

"In the late 1800s and early 1900s there had been a wood treatment facility that used creosote to make railroad ties and telephone poles," says Brian Swanson, budget officer in the U's Office of Budget and Finance and a project manager for the stadium. "And there was a lot of remnant material in the ground. We dug it up and properly disposed of it all, which will have a lasting impact on groundwater."

That was a big task, but it could have been worse. "There weren't really any other environmental surprises," he says. "For a former railroad yard, it was actually pretty clean."

A river runs near it

Some of the most impressive—and decidedly green—features of the new stadium center on storm water management.

Previously, when the Huron Boulevard Parking Complex occupied the stadium site, rain washed sand and grit from the asphalt lot through storm sewers and down to the Mississippi River.

With construction of the stadium, the U has built a comprehensive storm water management system for the full 75 acres of the East Gateway District, which encompasses both the stadium and the surrounding biomedical buildings.

The system can handle a 100-year storm event, Swanson says, and it meets the city of Minneapolis requirement that the water leaves the area as clean as it would have been before people settled in the region.

"The U is moving this way in general, so this project fit in to the overall construction programs that the U has," says Swanson. "It's the right thing to do from a stewardship role."

A number of features control both water quality and flow. For starters, a series of bioswales, which are landscaped planting beds with special soil, will remove the suspended solids from the water, Swanson says. "Then some of the water is absorbed right on site for plant use, and the rest of it drains, eventually, to the rate control pond."

There is also the EPIC System by Rehbein Environmental Solutions, comprising three giant troughs that hold three inches of water in sand pans. Above the pans is grass, which is irrigated by the standing water in the pans. (Watch video below.)



The rate control pond (known as a turlough) across the street from the stadium is another intriguing feature. Two 42-inch pipes bring water from the stadium area into the pond, and one 18-inch pipe takes it out. After a rainfall, water will flow into the pond faster than it can flow out and will collect there, then gradually flow out at a desired rate to ease the pressure on the sewer system.

"The pond is the last point of exit before [the water] leaves and goes into the Oak Street tunnel," Swanson says. "By the time the water gets to the pond, it's gone through the quality function, so the pond is strictly for rate control."

Speaking of water, if you were hoping to watch a game in pouring rain and see players sliding all over the field on standing water, you're out of luck. The stadium's FieldTurf is spread atop 24 inches of gravel in three sizes, progressively finer the closer it gets to field level. The net effect of the two feet of gravel is incredible water absorption.

"The idea is that if it just rained and rained and rained and rained, you wouldn't want your field floating," says Swanson. "This [system] can hold two back-to-back 100-year rain events, which would be an awful lot of water. ... There's really good field drainage."

Other shades of green

TCF Bank Stadium has a host of other green features that fall into three broad categories: design, construction, and operation. They include:

- **The use of regional materials**, defined by LEED as within 500 miles. The steel for the stadium is 90 percent recycled and was fabricated primarily in Minneapolis by LeJeune Steel Co. The concrete seating bowl was produced in Maple Grove by Hanson Structural Precast. Brick came from Gage Brothers in South Dakota. And the concrete portals above the entrances and the cast stone county markers were made by American Artstone in New Ulm.

- **Green building materials**. The University chose paint, carpet, sealants, and adhesives that are low in volatile organic compounds, which can aggravate health problems.

- **Efficient fixtures**. Swanson says that plumbing fixtures are the most efficient the University could get under the Minnesota building code. The stadium also has energy-efficient lighting and elevators.

- **Recycling construction waste**. Mortensen Construction, the general contractor for the stadium, was a big proponent of properly handling construction waste, Swanson says, and during the construction there were separate dumpsters on site for wood, cardboard, and glass. "They achieved incredible recycling rates on their construction waste," he says.

- **Proximity to mass transit**. While the vast majority of fans will likely arrive via car, they will have many alternatives. The stadium has bicycle racks; fans can choose buses (the Transitway will be in use on game days); and eventually, a light rail station may be right across the street.

While the stadium has a good number of green features, some ideas were deemed not to have a cost benefit for a stadium that isn't in constant use—for instance, solar panels, wind generators, and even waterless urinals.

"Certain things about the way the building is used preclude certain kinds of green technology," says Swanson. "We did things on this project that made sense from an institutional perspective and that had a payback."

Of course, gaining LEED certification is further payback, but that's not what motivated the University, Swanson says.

"The U is moving this way in general, so this project fit in to the overall construction programs that the U has," says Swanson. "It's the right thing to do from a stewardship role."

Plus, he adds, "The building is going to be here for a long time, so we might as well make it as inexpensive to operate as possible."



In the rate control pond, or turlough, across the street from the stadium, storm water flows in and collects, then flows out at a desired rate to ease the pressure on the sewer system.

Photo: Patrick O'Leary



Iron man

September 2, 2009

New Regents Professor Lawrence Que studies iron-containing enzymes that scientists would love to mimic to save energy and even lives

By Deane Morrison

Growing up in the Philippines, University of Minnesota chemistry professor [Lawrence Que](#) found his calling early.

“I was interested in magic,” he explains. “That proceeded to chemical magic like smoke and fire and color changes. A high school teacher would give me chemicals even though I wasn’t in high school yet. I took them and did experiments.”

Que (“Kay”) has since become a world leader in the chemistry of a large class of medically and commercially important enzymes. This June he and two other professors were named Regents Professors, the University’s highest faculty rank.

The enzymes Que studies contain iron, but hold it in place with structures quite unlike the one found in hemoglobin. Known as “nonheme iron” enzymes, they capture oxygen and use it to build chemical messengers in the nervous system like adrenaline, L-dopa (used to treat Parkinson’s disease), and serotonin; to make antibiotics; or to repair damaged DNA in cells.

Understanding how these enzymes work could lead to better treatments for maladies like Parkinson’s or even cancer. But nonheme iron enzymes also perform the crucial first step in the production of industrial chemical feedstocks from methane gas. That talent, if harnessed, could mean enormous energy savings for industry.

Swamp gas and diamonds

After graduating from college in Manila, Que came to the University of Minnesota for doctoral work with chemistry professor Louis Pignolet. Que left for other positions but returned to the University’s chemistry department for good in 1983.

Working with University of Minnesota biochemistry professors [John Lipscomb](#) and Eckard Münck (now at Carnegie Mellon), he became intrigued by how nonheme iron enzymes use iron to put oxygen to work.

If a chemist can be said to have a pet enzyme, Que’s is one that turns swamp gas—methane—into methanol, a major feedstock for all kinds of industrially important chemicals. The enzyme is found in lake bacteria living in the zone where methane rising from the ooze meets oxygen diffusing from the surface.

“Larry is right at the pinnacle of this field worldwide. ... He gets things done, and he not too subtly encourages the rest of us to keep moving forward.”

Methane is a simple molecule: one carbon atom and four hydrogen atoms. To make methanol, a hydrogen atom must be pulled away from the carbon to make room for an atom of oxygen. But the carbon doesn’t let go easily; thus, making methanol commercially requires very high temperature and pressure.

“But bacteria in the middle of [Minnesota’s] Lake Minnetonka [do this] at or near 35° F,” says Que. “We’d like to understand how that works because soon we’ll have to think about methane as a replacement for petroleum to make all sorts of things, like plastics and drugs. Plastic now comes from crude oil, and we’ll probably run out of that before methane.”

In a major discovery, Que and his colleagues found that the lake bacteria’s enzyme generates a key, diamond-shaped structure—the “diamond core”—comprising two iron atoms and two oxygen atoms. The diamond core efficiently catalyzes the conversion of methane to methanol, a feat that, if reproduced on an industrial scale, would mean big savings of money and energy in the commercial production of chemicals.

By discovering the diamond core mechanism, Que, Lipscomb, and Münck knocked out a major obstacle to understanding how nonheme iron enzymes work.

“Realizing that the diamond core was a possible explanation for how [the bacterial enzyme] works was a major highlight for me,” Que remarks.

Que is best known for producing simplified chemical models of what makes nonheme iron enzymes work their magic. The environment of an iron atom within such an enzyme is complex, and “it would be impossible to fully understand how the chemical reactions occur without the aid of the simpler [models]” that Que synthesizes, says Lipscomb, who remains one of Que’s closest research colleagues.

“Larry is right at the pinnacle of this field worldwide,” he adds, calling Que’s synthesized models “his masterworks.”

Personal chemistry

A sought-after teacher and adviser, Que has shepherded 32 doctoral students (with 10 more currently in his lab) and around 70 postdoctoral fellows. Often, they learn about more than chemistry.

“One reason I like the Twin Cities is the abundance of accessible theater,” Que says. “I’ve been known to get my students to go.”

Que has a way of bringing out the most in them—and his colleagues.

“He gets things done, and he not too subtly encourages the rest of us to keep moving forward,” Lipscomb says. “Somehow [people find themselves] volunteering for projects that they might never take on when left to their own devices. Almost always it works out for the best, but you end up shaking your head and wondering how he talked you into it.

“We need people like Larry.”

Share this:



Lawrence Que, the new Regents Professor of Chemistry, is one of the world’s foremost experts on iron-containing enzymes.

Photo: Patrick O’Leary

The other honorees

The two other Regents Professors named in June are Bruce Blazar, chief of the University of Minnesota Pediatric Bone Marrow Transplantation Program, and Thomas Johnson, professor of geological sciences at the University of Minnesota, Duluth. Look for articles on them coming soon.



A hearty welcome

September 4, 2009

U's expanded Welcome Week helps first-year students make connections

By Rick Moore

For anyone under the impression that the University of Minnesota is a huge and impersonal place where freshmen get swallowed up on the first day of classes, think again. Well, the U is still a big place, but an expanded Welcome Week program has made great strides in making sure students feel well adjusted and connected by the time September 8 rolls around.

Welcome Week is an action-packed set of activities on and off campus designed to complement orientation and give incoming first-year students opportunities to enhance their academic, as well as personal, success.

“We designed Welcome Week to help students continue their transition to the University of Minnesota—connecting them with people (other students, faculty, and student service providers) as well as helping them learn about our resources,” says Beth Lingren Clark, director of the Office of Orientation and First-Year Programs. It’s also meant to “ease their anxieties about starting their first day of class so that they feel comfortable here.”

The program has a detailed and very intentional format that utilizes student development and learning outcomes, she says. The first day is about getting settled; Day 2 includes Convocation and a breakdown by colleges; Day 3 has sessions to help students navigate resources; and the weekend is devoted to a combination of community exploration and community service.

The topics for the Day 3 sessions can be particularly useful to students. Some examples are money management, health and wellness, careers, and diversity.



Students formed a giant "M" on the field of the University of Minnesota's TCF Bank Stadium during Welcome Week 2009.

Photo: Patrick O'Leary

VIDEO

The "Pride & Spirit" session at the football stadium included students venturing down on the field to form a giant "M."

[Watch the making of the "M" video.](#)

“I go to a school that has the power to rent out the Mall of America’s ‘Nickelodeon Universe.’ And we have enough freshmen to fill up the place!”

And there are copious amounts of fun and lively activities interspersed throughout the week, especially in the evenings. On September 2, students made a late-night run to Target to get last-minute school supplies and snacks for the week. The following evening offered a “Pride & Spirit” session at the football stadium, during which students went down on the field to form a giant “M.” The traditional “Gophers After Dark” event kicks off on the evening of September 4. And on Saturday, for a second straight year, students have the option of going to the Mall of America for an evening of amusement. (The alternate choice is the Minnesota State Fair.)

It was during Welcome Week at the Mall of America (MOA) last year that second-year student Stephanie Hornung knew she had made the right choice in attending the University of Minnesota.

She thought to herself, “I go to a school that has the power to rent out the Mall of America's 'Nickelodeon Universe,'" she smiles. "And we have enough freshmen to fill up the place!"

Hornung volunteered to be a Welcome Week leader this year, and on Tuesday was looking forward to her role in helping commuter students with their adjustment. “I feel like it makes a big difference what kind of leader you have,” she says. “I am excited to be here.”

Her favorite part of Welcome Week last year came at the MOA event. “This girl walked up to me and said, ‘Hey, I don’t know anyone; can I stand next to you so I don’t look alone?’” she says. They wound up exchanging numbers, hanging out, and becoming fast friends.

“That’s kind of how I met some of my best friends,” adds Maddy Wunrow, another second-year student who, like Hornung, will be working with commuter students. As a prospective teacher, she appreciates the leadership qualities she’s developing as a Welcome Week leader, as well as her ever-expanding circle of friends. “I’ve probably met 100 new people this week,” she says.

Lingren Clark notes that while other universities have similar Welcome Week–type programs, some are taking interest in “the intentionality of each day” in the University of Minnesota’s model, which is based on utilizing student development and learning outcomes. The U is also dedicated to measuring how students feel about each component of the program, she says, and has made several changes to last year’s format.

She was particularly heartened by the comfort level and excitement she noted in students at Thursday’s Convocation. They cheered when the University of Minnesota Marching Band appeared, and at one point broke out into college-based chants: “C-B-S! C-B-S!” And “Who are we? ... I-T!”

Says Lingren Clark: “I’ve never seen anything like that since I’ve been here.”



U to dedicate Veterans Tribute

September 9, 2009

Event will include a flyover and the historic first raising of the American flag over stadium

The University of Minnesota will host a dedication ceremony for the Veterans Tribute at TCF Bank Stadium on Friday, September 11, at 7 p.m. The event is free and open to the public.

The dedication program will feature a flyover from three WWI "replica" airplanes and performances from the Metropolitan Boys Choir, the University of Minnesota Marching Band, and Dorothy Benham, Miss America 1977. Military leaders including General John W. Vessey, the former chairman of the U.S. Joint Chiefs of Staff, will be in attendance, and there will be greetings on the giant video board from Minnesota troops stationed in Iraq. The program will also include the historic first raising of the American flag over the stadium.

The Veterans Tribute at TCF Bank Stadium honors all Minnesota veterans of past, present and future conflicts. It is located on the southwest corner of the stadium, between the main scoreboard and Gate E. The tribute incorporates a bench and a lighted inscription similar to the message that was on Memorial Stadium.

From the inside of the stadium, the tribute is conceived as a stage where, as part of the game-day tradition, a color guard can raise the flag of the stadium. The tribute stage will be used for many military ceremonies throughout the year.

Retired Air Force Brigadier General Dennis Schulstad, a former national president of the U of M Alumni Association, co-chaired the Veteran Tribute Committee. "The original Memorial Stadium was built in honor of WWI Veterans, and it is important to remember and honor the sacrifices made by all veterans," he said. "They are the reason we can enjoy Saturday football games at the University of Minnesota."

Schulstad notes that the tribute stage will be used for a variety of military ceremonies throughout the year, including ROTC commissioning ceremonies, holidays like Memorial Day, and other special events. "It's something that's not just for football; it will be used for military events all year," he says.

The Veterans Tribute was built at a cost of \$450,000, and more than a dozen donors contributed \$580,000 for the project. The extra dollars will go toward maintenance costs, flags, and potential upgrades.

The curved wall of the tribute, designed by Architectural Alliance, is 18 feet tall and 72 feet in length. Etched in its surface are a number of short phrases: "Minnesota Veterans" and "Thank You for Our Freedom" facing the interior of the stadium and "Duty Honor Country" on the exterior. The lighted inscription reads "This veterans tribute was erected by the members and friends of the University to honor the men and women of Minnesota who served their country."

Says Schulstad of the tribute: "It's something that I think veterans from the past and future will look at with pride."

The inaugural football game at TCF Bank Stadium will take place on Saturday, September 12, when the Gophers (1-0) host the Air Force Falcons (1-0). The kickoff is at 6 p.m.



The Veterans Tribute, located on the southwest corner of the new stadium, includes a bench and a lighted inscription similar to the message that was on the old Memorial Stadium.

Photo: Patrick O'Leary

A tribute to Norman Borlaug

September 13, 2009

The University graduate wrestled with world hunger and won

By Deane Morrison

He was never a household name in the United States, but the work of Nobel laureate and University alumnus Norman Borlaug may have saved a billion lives. When Borlaug died Saturday (September 12, 2009) at age 95, he left a legacy of accomplishment and caring for others that few people in the world have equaled.

Plant breeders are unlikely celebrities, but in many developing countries, Borlaug is a hero. By breeding higher-yield varieties of wheat, he is credited with playing the key role in staving off starvation in India and Pakistan.

Borlaug's gift, which he used up until his death, was a devotion to ending world hunger and figuring out how to get more food out of fewer acres. He spent most of his life trying to help people all over the world live a decent life.

It was more than 70 years ago that Borlaug first stepped onto the University of Minnesota campus. A member of the wrestling team, he earned a bachelor's degree in forestry and went on to receive master's and doctoral degrees in plant pathology.

Today, his name lives on at his alma mater and far beyond its borders. Examples include Borlaug Hall, the largest building on the St. Paul campus; the USDA Borlaug Fellows program; and an extensive wheat-breeding program.

In 2007 the Department of Plant Pathology established the Norman E. Borlaug Fellowship for International Agriculture. When fully endowed, the fellowship will provide a stipend for graduate fellows to complete part of their studies in an underdeveloped country while obtaining their degrees from the University of Minnesota.

"Norman Borlaug remains one of the University's most distinguished alumni—a scientist, educator, humanitarian, and Nobel laureate whose work made him a hero around the world," says University President Robert Bruininks. "From his early wheat research in Mexico to his ongoing advocacy for modern farming practices and policy, he saw the human face of hunger in the world and never strayed from his principles.

"Even in recent years, Dr. Borlaug continued to push the University—and me personally—to a greater understanding of the world's food needs in the face of growing environmental concerns. Without a doubt, he was still the tough-minded grappler from Iowa who first came to the University more than 75 years ago."

"Norman Borlaug was extremely dedicated to the University of Minnesota," says Allen Levine, dean of the U's College of Food, Agricultural and Natural Resource Sciences (CFANS). "He returned for various events and recently visited for the 100th anniversary event, even though his health was not ideal. He understood the importance of his education at the University and was a hero of many of our faculty and students."

The entire state honors Borlaug each year on October 16. In 2005, to commemorate Dr. Norman Borlaug World Food Prize Day, students in what is now CFANS organized the Borlaug Food and Fund Drive to benefit Second Harvest Heartland, a hunger relief organization in Minnesota and Wisconsin.

"I heard him give a lecture to undergrads and I was struck by what an accessible, down-to-earth person he was, even with such a distinguished title and so many accomplishments," said Nadilia Gomez in 2005. The Panama native was a doctoral student in applied plant sciences who met Borlaug that year.

"So many of us go into grad school hoping we'll have a significant impact on the world, but he didn't start out like that," she continued. "He started out interested in plants, in learning about plant physiology, and just by being in the moment and doing what he wanted to do, he got there. His work has been controversial, but he's a man who still has his convictions and above all feels strongly about trying to do your best. That's what inspires me."

Borlaug is called the father of the Green Revolution, a dramatic increase in crop yields due to improved seeds, the use of fertilizers, and irrigation. Through careful and unconventional breeding methods, he developed short, strong varieties of wheat that led to a doubling and tripling of the yields of taller varieties and that were also resistant to disease and capable of growing in a wide range of climates. Beginning in 1944, it took him two decades, working in test plots in Mexico, to develop this "semi-dwarf variety" wheat, so called because of its short stature.

Impatient with only one crop per season, he started growing the same wheat varieties in two different locations in a method now called "shuttle breeding."

"The way he did his research is still having an impact on researchers today," says Jim Anderson, associate professor in agronomy and plant genetics and a wheat-breeding expert. "When he was in Mexico, he did his breeding at two locations quite distinct in latitude and temperature. Up until then, it was thought that you needed locally adapted varieties, so you needed to do your breeding in the areas where the crop would eventually be grown. But he showed us that you could breed for wide use."

Although this highly adaptable wheat variety allowed Mexico, in a few short years, to move from being heavily dependent on wheat imports to being a wheat exporter, it was principally Borlaug's work in India and Pakistan that won him the Nobel Peace Prize in 1970. During the 1960s and 1970s, his work helped those countries avert the famine that many had thought inevitable due to population growth. India's wheat yield nearly doubled from 1965 to 1970; Pakistan was self-sufficient in wheat production by 1968. Parallel methods were also used in developing short-statured high-yield rice and, now, other varieties of crops around the world.

"There is a song that says, 'Let there be peace on earth, and let it begin with me.' I think this was the basis of the Nobel Peace Prize to Norman Borlaug."

If there is such a thing as a Midwestern character, Borlaug had it in spades. Almost everyone who ever spoke of him mentioned his connection to his family. He once told Minnesota magazine that when he worked in Mexico, he would drive 300 miles home to Mexico City on "miserable" roads on a Friday night to coach his son's Little League games, and drive 300 miles back to the test plots on Sunday night. He was noticeably humble, tenacious, and single-minded about what he believed to be the right thing to do.

"My personal respect for Norman Borlaug was tremendous," says Ronald Phillips, Regents Professor of Agronomy and Plant Genetics and McKnight Presidential Chair in Genomics. "But everyone respected him, as we all watched him continue to work well into his 90s on behalf of the world's starving people, extending his influence nearly 38 years after receiving the Nobel Peace Prize.

"In addition to promoting food production, he continuously warned the world of what he called the 'population monster' and the need to work on food and population constraints at the same time. More recently, he took opportunities in the New York Times and the Washington Post to state the need and value of biotechnology in agriculture, criticizing the activists who never experienced hunger.

"At the University of Minnesota, he stood on the shoulders of giants—E.C. Stakman of the Department of Plant Pathology and H.K. Hayes of the Department of Agronomy and Plant Genetics. Now, we will miss standing on the shoulders of this giant."

'A rare type of scientist'

Phil Pardey, a professor in the Department of Applied Economics who has worked with Borlaug, says Borlaug wasn't just a plant breeder focused on his work in the field and the lab, but a rare type of scientist who did everything in his power to get his crops to the people who need them and freely shared his knowledge with the rest of the world. In an analogy with open source software, Pardey sees Borlaug as an "open source" scientist who, along with his colleagues, had a global impact on wheat production by fostering the international flow of improved crop varieties.

"We did an economic study on the impact of CIMMYT (Centro Internacional de Mejoramiento de Maiz y Trigo)—where Norm spent most of his career—not on the developing world, but on the developed world," says Pardey. "Turns out that in the early 1990s in California, which is a pretty big wheat state, either every variety came directly from that program or both parents came from that program. The value of this research to the United States alone is upwards of \$13.6 billion from improved crop yields."

People young enough to be Borlaug's great-grandchildren are inspired by his energy and commitment. As a freshman majoring in agricultural education, Sangeetha Gummadi an essay on Borlaug to fulfill a requirement for the Siehl Scholarship she received from CFANS.

"I did a ton of research and I just loved learning about what he did and how he went about learning it," says Gummadi. "I focused on the science of his work and how he just didn't give up. In high school, he really inspired me to keep trucking along." Gummadi made it to the top five in the National FFA Agriscience Fair for her work on the effect of sucrose on plant protoplasts.

In February 2006, Borlaug visited the White House to receive a rare honor for American scientists: the National Medal of Science, conferred by President George W. Bush.

Administered by the National Science Foundation, the National Medal of Science was established by Congress in 1959 as a presidential award to be given to individuals "deserving of special recognition by reason of their outstanding contributions to knowledge in the physical, biological, mathematical, or engineering sciences." In 1980 Congress expanded this recognition to include the social and behavioral sciences.

An inspiration for future generations

Borlaug's work has a reach that may never be fully appreciated. The historically unprecedented increase in crop yields that his research helped bring about has protected millions of acres of land from being plowed because, with high-yield crops, more food can be grown on fewer acres. The international research centers where he did much of his work continue that research. They also conserve, in gene banks worldwide, more than 670,000 samples of crop seeds that today's breeders are using to feed future generations.

"The world has lost a great man, but Dr. Borlaug's life work and humanitarianism will continue to inspire future generations of plant pathologists and plant scientists," says Carol Ishimaru, head of the Department of Plant Pathology. "Human hunger, which he so passionately worked to alleviate, still exists, especially in sub-Saharan Africa. One of the greatest enduring acknowledgments of his accomplishments we could give is to continue the fight against this devastating condition."

In 1984 Borlaug joined Texas A&M as a Distinguished Professor of International Agriculture. He continued to serve as senior consultant to the director general of CIMMYT and to lecture at universities worldwide. He also turned his attention to Africa as president of the Sasakawa Africa Association, where he worked with former President Jimmy Carter to bring improved varieties of wheat, corn, and native crops to that continent.

With the world population expected to increase from 6.4 billion to 9.2 billion in the next 50 years, the U.N. Food and Agriculture Organization and the U.N. Population Fund estimate the world's food supply will have to grow by 75 percent. The work Norman Borlaug has done in the last 50 years will undoubtedly help us get there.

"There is a song that says, 'Let there be peace on earth, and let it begin with me,'" says Phillips. "I think this was the basis of the Nobel Peace Prize to Norman Borlaug."



University alumnus and Nobel laureate Norman Borlaug fought hunger by breeding high-yield wheat.

Photo: Patrick O'Leary

All the top prizes

On July 17, 2007, Norman Borlaug received the Congressional Gold Medal, joining Martin Luther King Jr., Mother Teresa, Elie Wiesel, and Nelson Mandela as the only people to have been honored with this award, the Nobel Peace Prize, and the Presidential Medal of Freedom. He also won the National Medal of Science.

[Read more about Borlaug's life and triumphs from the College of Food, Agricultural and Natural Resource Sciences.](#)



True measure

September 13, 2009

Michael Rodriguez invites his students to serve as 'psychometricians-in-training'

By Kristin Cleveland

Students don't generally gravitate to educational measurement and statistics unless it's their specialty area. Michael Rodriguez's courses, however, usually fill early and often have waiting lists. On the last day of class, students frequently give him a standing ovation.

Rodriguez's mission is to enhance school policies, programs, and outcomes by designing testing methods that are more accurate, efficient, and non-discriminatory. Much of his work focuses on assessments for students with disabilities or those who are disadvantaged, with the goal of generating data that can better inform decision-making for school personnel and families of the children they teach. He has worked with the St. Paul Public Schools, the Educational Testing Service in Princeton, USAID, and the Ministry of Education in Guatemala.



Michael Rodriguez is an associate professor in the Department of Educational Psychology in College of Education and Human Development, University of Minnesota, Twin Cities.

Photo: Patrick O'Leary

"I love teaching. I probably teach more than I should, but it is my way of making a real difference in the world, by preparing my students to improve educational outcomes for children and families. I teach to improve educational decision-making, the field of educational measurement, and education more broadly."

"He strives to help students and professionals learn the technical language and theory while showing their use and application in practical examples," says a colleague. In class, he does it with authentic learning activities, such as having students design an exam that will accurately measure what they've all learned.

Rodriguez also invites students to serve as "psychometricians-in-training" in the research he does, and he's developed a group to give them a forum for practicing their professional conference presentations. "This venue afforded [us] an opportunity... to critically and constructively review proposed research—a vital characteristic of thriving research-intensive environments," says a student.

Michael Rodriguez is a 2009 recipient of the Award for Contributions to Postbaccalaureate, Graduate, and Professional Education.



Back home again

September 14, 2009

Fans savor the experience as Gophers christen TCF Bank Stadium with a 20-13 victory

By Rick Moore

Sometimes it's hard to live up to hype, especially when it's three years in the making.

Since May of 2006, when the Minnesota Legislature and Governor Tim Pawlenty signed off on a new on-campus football stadium, Gopher football fans have had September 12, 2009, circled on their calendar.

That date finally arrived on Saturday, and by all indications, football returned to campus in grand style.

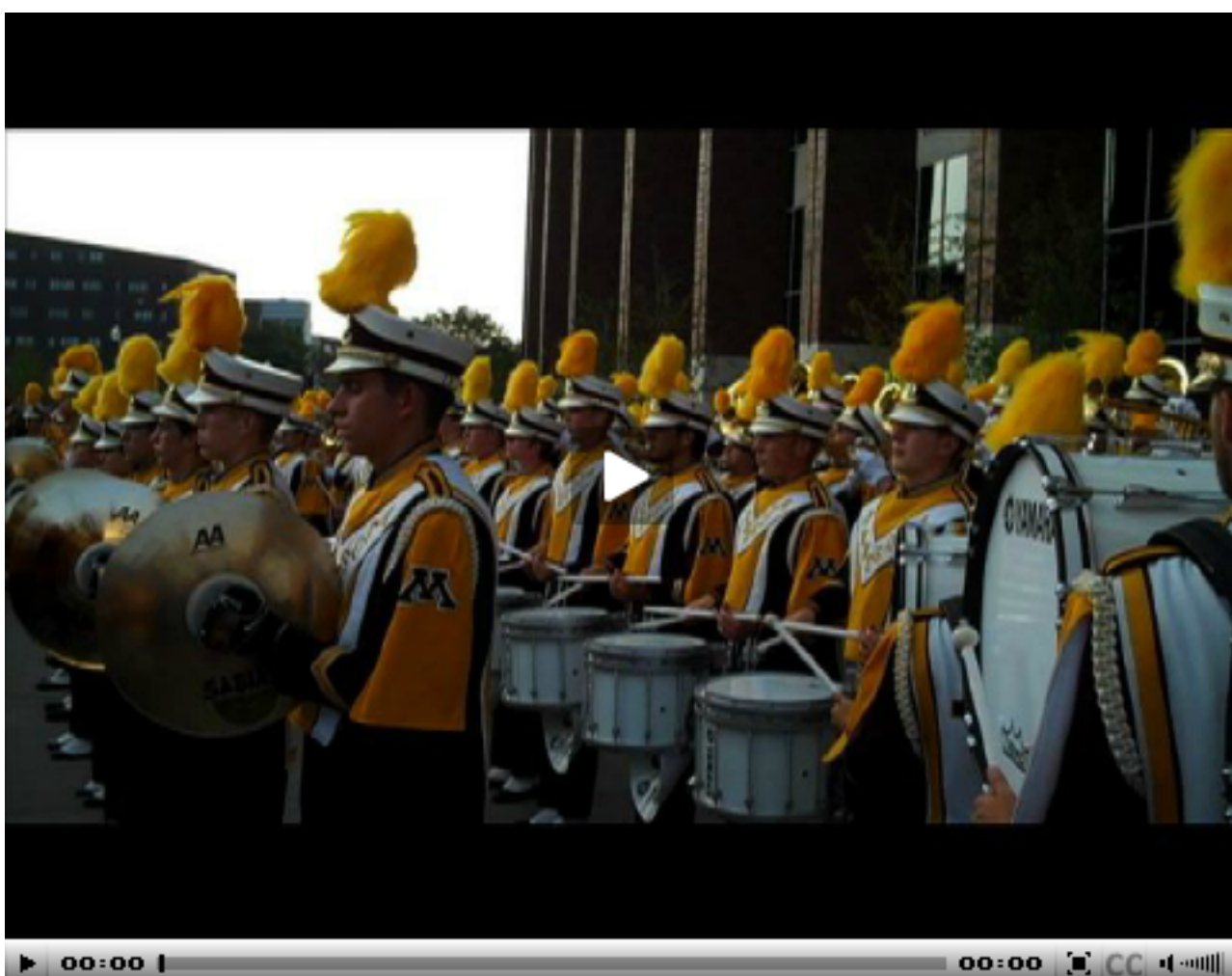
Shortly after 2 p.m., still four hours before kickoff, the scene along University Avenue's fraternity row—never without some excitement on a weekend—was absolutely electric. Music blared, barbecues flamed, and footballs flew through the air.

Some of the most prolific tailgaters were situated at locations off campus. At a parking lot at University Avenue and 27th Street, there were maroon canopies signaling a number of parties, big and small—some with savory spreads of food so impressive that you wanted to crash the party.



The University of Minnesota Marching Band, a.k.a. "The Pride of Minnesota," performed before and after Saturday night's game and also at halftime, as the sun was beginning to set over the downtown Minneapolis skyline.

Photo: Patrick O'Leary



But the most festive

atmosphere was on campus. Approximately 8,000 fans visited the Game-Day Party at the McNamara Alumni Center, on the site of the old Memorial Stadium. Dressed almost uniformly in gold and maroon, they ate, drank, and listened to the Pigs Eye Jazz Band. Part of the way through its set, the band was joined by Stan Freese, a U alum and world renowned tuba player who fit in seamlessly with the ensemble.

The crowd filled the outdoor plaza and created a human walkway for the traditional Victory Walk. Shortly after 4:00, with the University of Minnesota Marching Band playing and the Spirit Squad cheering, the Gopher football team walked across the plaza through the masses and crossed University Avenue to their new home.

"It's amazing. I just sit back and I look at all these people, and it's so cool. I haven't been to many Gopher events, so to be out here and to do this is [great]," says occasional fan Brenda Metcalf. "I was just looking at those seats over there (behind the west end zone). They're so close and personal; it's incredible."

Fans old and new were impressed with the game-day atmosphere. "It's fabulous to be back on campus," says John Currie of Faribault, Minnesota, who used to go to one or two games a year at the Metrodome. "We're just delighted," adds his wife, Shirl. "It's the first time we've ever had season tickets, so we're ready to go.

Those who didn't have tickets to the game were able to watch it in four different rooms with big-screen TVs in McNamara. But there were plenty of fans out on the street seeking seats in the stadium, and willing to pay quite a few extra dollars for the privilege. One verbal plea, from U sophomore Patty O'Keefe, stood out among the hand-written signs. "Does anybody have extra tickets?" she pleaded. "We want to pay \$3."

Her sarcastic bid belied her desperation; in fact, she seemed almost overcome with emotion and was willing to pay \$50 for a ticket. "The atmosphere of the people at the U made me excited, it just gave me something so immense to look forward to," says O'Keefe, who was dressed in a #7 Eric Decker jersey (she's a big fan), and with just traces of the eye black she had applied much earlier. "It's almost too much to handle, it's so exciting. It's something you can't pass up. It's worth scalping tickets."

Inside the stadium, fans that were visiting the venue for the first time walked to the edge of the concourse where the field comes into view. Their wide eyes and smiles were proof positive that TCF Bank Stadium is a site to behold.

"It's amazing. I just sit back and I look at all these people, and it's so cool. I haven't been to many Gopher events, so to be out here and to do this is [great]," says occasional fan Brenda Metcalf. "I was just looking at those seats over there (behind the west end zone). They're so close and personal; it's incredible."

The excitement continued to build before game time. At the end of pre-game warm-ups, the Gopher players went to greet more than 400 former Minnesota players from years past, who were gathered in the northeast corner of the field.

Then it was the band's turn to put on a show, playing the "Minnesota March" and "Battle Hymn of the Republic" before forming a giant "M" and leading the crowd in an especially stirring "Minnesota Rouser."

As the team captains were gathering for the coin toss, nine honorary captains and one honorary coach—96-year-old Murray Warmath—were introduced in an emotional ceremony in the center of the field. There was a flyover by four F-16s (all piloted by Minnesota natives) and the first playing of the national anthem. At 6:05 p.m. the coin landed on tails and the Gophers elected to receive.

Then, at 6:07 p.m. and with a game-time temperature of 80 degrees, the Gophers' Troy Stoudermire returned the opening kickoff 39 yards to midfield, and with that, football had finally and officially returned to campus.

There were many firsts thereafter, including Duane Bennett's 5-yard run on the first play from scrimmage and Eric Ellestad's 34-yard field goal for the first points ever at the new stadium. And the public address announcer was first with a play on the stadium's name: "Put six points in the bank!" (after DeLeon Eskridge's 7-yard touchdown run early in the fourth quarter).

The only thing that didn't look secure was a Gopher victory. Through three quarters Air Force, with its impressive triple-option offense, had carried the play and was leading 10-3. But 93 seconds after Eskridge's tying touchdown, Gopher linebacker Nate Triplett picked up a fumble forced by Brandon Kirksey and sped 52 yards for a touchdown to put Minnesota up 17-10, and the Gophers never looked back in a satisfying and hard-fought 20-13 victory.

Again, the announcer pounced on the pun: "And the first win at TCF Bank Stadium is in the vault!" For punctuation, fireworks exploded above the stadium (at 9:12 on 9/12 for the numerologists in the crowd), and the Gopher players celebrated with a victory lap around the stadium, their new home for many years to come.



Model educators

September 17, 2009

Jean King and Jennifer York-Barr are recognized for their work in educational development

By Kristin Cleveland and Adam Overland

Jean A. King

Education doesn't begin and end within the walls of the University of Minnesota--not for Jean King. From her first months here in 1989, her commitment to academic innovation and educational development has remained strong. King was a founding director of the University's Center for Applied Research and Educational Improvement. In 1996, she organized the first Minnesota Evaluation Studies Institute, an annual forum for local and national evaluators.



Jennifer York-Barr (left) and Jean King are professors in the Department of Organizational Leadership, Policy, and Development, College of Education and Human Development, University of Minnesota, Twin Cities.

Photo: Patrick O'Leary

Every year, King advises and mentors a large number of students, going so far as to host advisees at her home, "not only for intellectual sustenance," says a colleague, "but to contribute to an ongoing feeling of 'connectedness.'" Many consider themselves colleagues because she treats them with such parity. "Great teachers not only impart knowledge, but encourage growth," says one former student. "Professor King encouraged me to open my mind... and I have gone on to achieve and accomplish things I never would have without her encouragement, guidance, and support."

"My students are among my strongest colleagues, and we routinely collaborate on evaluation and research projects.... I believe [they] come to appreciate that the process of completing a dissertation marks the real beginning of their sustained engagement in evaluation studies and not the conclusion."

King's impact in improving education has been felt far beyond the University. "Through my assistantship with Professor King, I met and worked with a local school district to create and implement an evaluation of a curriculum change effort," says another former student. "Almost two years after the project ended, the superintendent contacted me directly about future employment."

Indeed, King's greatest accomplishment may simply be the accomplishment of so many others.

Jennifer York-Barr

That school administrators and teachers from around the state consider Jennifer York-Barr instrumental in shaping the direction of professional development at district, state, and even national levels isn't all that surprising once you realize how many of them have studied, worked, or collaborated with her. These peers utilize and value her expertise, says a colleague, "because of her deep understanding of what it takes to help educators accomplish the very challenging and complex work of school improvement."

York-Barr views her teaching, research, and service as inextricably linked. Because the cornerstone of her research is staff development within the schools, she maintains strong ties in the state's public school system. A colleague notes that you'll find her "working in the trenches weekly." That work is often done with graduate students participating fully in her research.

"The privilege of serving as a faculty member carries with it the responsibility of using one's power, even in small ways, to advance the greater good in society. I instill this value in the students who entrust us with the opportunity to influence their thinking and expand their knowledge...."

In the classroom, she's dedicated to providing a research-based learning environment with real-world examples, often inviting educators to talk about their day-to-day practices and challenges. One student in the Staff Development Certificate Program describes leaving each class "feeling energized...with 'wheels spinning' as I headed back to my school and implemented...what I learned." York-Barr later invited that same junior high science teacher back to the classroom to talk about her experiences. That teacher remarks, "The chance to share and respond to questions helps me to be more reflective of the work I lead."



Going to the Mall

September 18, 2009

U solar decathlon team to showcase its solar house at international competition in Washington, D.C.

By Rick Moore

If you saw the description for this house in a Parade of Homes guide, it might just catch your attention.

Cozy, south-facing living and dining rooms with floor-to-ceiling windows. Bright, contemporary dining area with space to seat 10. Radiant floor heating for extra comfort in the winter. Three-season porch and 2,000-square-foot deck. Skewed gable roof design...



University of Minnesota President Robert Bruininks visits with students at the solar house they are building for the international Solar Decathlon competition in Washington, D.C.

Photo: Patrick O'Leary

Huh? Skewed gable roof design?

In this case, the skewed gable is not an architectural abnormality; it's what defines the house built by some 150 students from the University of Minnesota to compete in the upcoming international Solar Decathlon contest in Washington, D.C.

The U's ICON house, named for how its asymmetrical roof may come to symbolize solar homes in the future, is powered entirely by the sun. It has solar panels aplenty plus the latest in energy-efficient materials. In fact, the house can generate 13 months of energy over a 12-month period, meaning it could conceivably have energy to spare for the power grid.

And it was conceived, designed, and built by U students representing colleges from every discipline related to housing, including the College of Design, Institute of Technology (IT), College of Continuing Education, Carlson School of Management, and College of Liberal Arts. If there were an entry for "collegiate interdisciplinarity" in the encyclopedia, a picture of the ICON solar house would be next to it.

"It provides an unparalleled opportunity for students to work across colleges," says Ann Johnson, the team project manager and a faculty member in civil engineering. "We have civil engineering, electrical engineering, and mechanical engineering students coming from IT; we have landscape architecture, architecture, interior design, and graphic design coming from the College of Design; and then we have construction. It's an unparalleled opportunity to work across colleges, but it's also an opportunity to work on a real-life project."

"I'm deeply proud of the work we do at the University of Minnesota to find solutions to the most pressing concerns facing our world, such as alternative energy and sustainability," says University President Robert Bruininks. "The Solar Decathlon is particularly exciting because it brings people from a wide range of disciplines together to solve practical problems. Students learn from the experience of designing and constructing what may prove to be the house of the future, and in the process they inspire our imagination and redefine what is possible today."

One of the overarching goals was to come up with a house that was appealing to the general public, from the facades of the exterior to the comforts of the interior.



"There are many houses you might see at the Solar

Decathlon that are not warm or beautiful," says Johnson. "A lot of them look like a box full of technology. We made a very, very specific effort to make our house accessible, warm, comfortable, and familiar—something that was iconic. We want this to become something that can be implemented and become an iconic part of our culture. I know it sounds grand but it's really true."

Americans are used to the look of gables on homes, and the U's house retains that look, with an eye toward the future. "Our thought is that the skewed gable would become an icon for solar housing," says Shengyin Xu, the architecture team leader.

"It's an unparalleled opportunity to work across colleges, but it's also an opportunity to work on a real-life project," says Johnson.

Whether or not the ICON logo and shape become standards for the industry, there are components of the house that are worthy of admiring, if not immediately emulating.

The solar panels, of course, stand out as a shining example. The main array of 30 panels produces more than enough power for the home, which has an 800-square-foot footprint. A secondary array absorbs direct light on the front and reflected light on the back for maximum energy production. And a thermal array provides the energy for hot water and radiant floor heating.

The student builders heavily insulated the walls and roof to values of R-50 and R-70, respectively. The east and west windows contain electrochromic glass, which can take a small amount of electricity to activate a tinted film that reduces the amount of sunlight that can pass through. And where possible, the house uses recycled materials and products made in Minnesota.

Late last week, the team worked to put the finishing touches on the house—external, internal, and systems—and they conducted brief tours for the media and the public. Beginning September 23, the team will disassemble the house into seven modules and load them onto seven trucks for transport to Washington, D.C.

That's where things will get interesting. Beginning October 1, the team will have just under a week to reassemble the house, complete with 2,000-square-foot deck, small lawn, and landscaping that reflects its Minnesota roots.

"It will be a challenge," says Xu, who notes that the team will be working in shifts around the clock. "It's doable, I think. We've been scheduling our six and a half days down to the minute."

"Our goal is to send pretty much a completed house to D.C. and then do touch-ups and [completion work] when we get there."

The Solar Decathlon takes its name from the 10 categories or "events" that the entrants will be judged on. Five are considered "objective" categories: comfort zone, hot water, appliances, home entertainment, and net metering; and five are "subjective": architecture, market viability, engineering, lighting design, and communications.

Perhaps more important than which team wins the decathlon, the ideas, technology, and blueprints will live on. The design specifications will become the property of the U.S. Department of Energy after the competition, Johnson says, but anyone will be able to download the house plans.

What will ultimately happen to the U team's house? It may be moved to University property for demonstration purposes, but there's also the chance it could be sold to a private owner. "Two people have offered to buy the house from me," Johnson says.

That might be a very good indication that the solar house students produced a house with lasting appeal.

For more information on the project and to check out the team's blog, visit [Solar Decathlon](#).



Terry Roe models effective teaching

September 24, 2009

Distinguished teacher Terry Roe provides general equilibrium in the classroom

By Gayla Marty

Advising and mentoring graduate students is the hallmark of Terry Roe's career. This strength builds on his own first-rate scholarship and tough, engaging classroom teaching. "[He] would never get tired of new ideas," remembers a former student, now a professor in Turkey. "His office whiteboard was a meeting place for all students, his own plus all the guests. It was as if there [were] a continuous seminar going [on...]."

Roe is an expert at using dynamic general equilibrium models to address issues in economic development and international trade. He draws on policy experience gained in positions with the World Bank and the U.S. government, and in a two-year residence in a foreign ministry. As the social sciences have become more mathematical, one colleague attests, Roe has modeled effective teaching. Many former students today hold influential positions that span the globe.



Terry L. Roe is a professor of applied economics in the College of Food, Agriculture and Natural Resource Sciences.

Photo: Patrick O'Leary

"I find young professionals have greater opportunities for making contributions throughout their professional careers if they can be encouraged to enjoy and feel creative with the process of knowledge discovery as much as with the discovery itself."

Since 1976, Roe has developed or revised and taught or co-taught 11 graduate-level courses, served on graduate program policy committees, and contributed to curriculum reform. He has expanded the applied economics program through partnerships in liberal arts, management, public affairs, and public health.

"To him," says a former student, "teaching...has to do with the opening of the mind, the kindling of interest, the awakening of creativity, the instillation of a framework, the transfusion of knowledge, and the suggestion of new frontiers."

Terry L. Roe is a 2009 recipient of the Award for Contributions to Postbaccalaureate, Graduate, and Professional Education.



A-maizing grease

September 28, 2009

Researchers stalk a high-oil corn for fuel and food

By Deane Morrison

About five years ago, University of Minnesota adjunct professor Kim Joo heard from North Korean corn breeders about a variety with high oil content and asked if they would give her an ear. They did, and she brought it back for her colleague [Ron Phillips](#) to study.

An analysis showed its oil content reached a whopping 20 percent—way higher than the 3.5 percent of normal corn or the seven to eight percent of most “high-oil” corn on the market.

“That got my attention,” says Phillips, a Regents Professor of agronomy and plant genetics at the University.

Corn with high oil content holds potential as a source of raw material for biofuels, especially biodiesel. Also, says Phillips, it would make a high-energy animal feed. And, of course, the starch in its kernels could be used in ethanol production. Not to mention plain old corn oil for cooking.

Phillips and a team of University researchers found that besides being abundant, the oil in the North Korean corn contained lots of oleic acid, the major constituent of heart-healthy olive oil.

When the researchers grew the North Korean corn and crossed it with domestic corn lines, they created a variety with 12 percent oil content. That’s enough to produce up to 1,000 pounds of oil per acre, which is 70 percent more than from soybeans, according to University Extension economist [Doug Tiffany](#), one of three other co-investigators on the team with Phillips.

“The biodiesel industry has struggled because of high soybean oil prices,” Tiffany says. “A good strategy is to use lower-cost fats and oils to make biodiesel.”

“The dream is to have high-oil, high-yield corn that can be used for biodiesel, ethanol, animal feed, and food.”

With the potential for producing more oil per acre, a high-oil corn could also move Minnesota closer to its goal of 20 percent biodiesel blends by 2015, says Phillips.

The researchers have identified genes responsible for the high oil content and are now working to breed a high-oil variety that’s also economically competitive. But there’s the rub: Prices depend on yields, which are measured in terms of weight, and weight depends mostly on starch content.

“Usually, there’s a negative correlation between the amounts of oil and starch,” says Phillips. “Our goal is to break that relation.”

The 12 percent-oil corn had 10 percent less starch—which is to say, about a 10 percent lower yield. The researchers have identified regions of the corn genome that carry genes for both starch and oil production, and they hope to separate the genes for high oil and low starch and breed plants with high levels of both.

“We don’t know if we can do this,” Phillips cautions. “The dream is to have high-oil, high-yield corn that can be used for biodiesel, ethanol, animal feed, and food.”

The North Korean corn can’t be used “as is” because it is a hybrid and so does not breed true. American growers could produce the hybrid seed if they had the right parent varieties to cross. Unfortunately, says Phillips, North Korea has not been forthcoming about supplying pedigree information for the high-oil corn.

“I’m hoping someday North Korea will open up,” he adds.

The other co-investigators on the project are [Roger Ruan](#), professor of bioproducts and biosystems engineering, and [Nathan Springer](#), associate professor of plant biology.



Veteran corn breeder Ron Phillips and his colleagues bred this high-oil corn, here seen growing on the University of Minnesota’s St. Paul campus.

Photo: Patrick O’Leary



The Ultimate Homecoming

September 29, 2009

Academics takes its place with football in this year's Homecoming celebration

By Mark Cassutt and Katherine Himes

When Thomas Wolfe wrote "you can't go home again," he didn't reckon on a hometown that could boast a new stadium and a top research university.

But this fall the University of Minnesota has all that, plus the first homecoming game on campus since 1981, the first in TCF Bank Stadium, and the first homecoming to feature academic-themed activities. No doubt about it: Homecoming 2009 will go down as the U's Ultimate Homecoming.



This year's Homecoming is set to be the best yet.

Photo: Patrick O'Leary

Charged with designing events that showcase and benefit the U while generating a high level of participation from students, graduates, fans and residents, more than 300 students, staff, faculty, and community members spent two and a half years planning this once-in-a-lifetime homecoming experience.

The committee realized that homecoming is about more than football. They decided to make the U's outstanding scholarship, research, and education part of the celebration. As a result, Homecoming 2009 features nearly 80 University departments, units, and colleges in what may become academic homecoming traditions.

Provost Tom Sullivan, whose office has been heavily involved in the planning and implementation efforts for these academic activities (which are led by co-chairs from University colleges) says homecoming offers a tremendous opportunity for exposure throughout the University and the state.

"I look forward to a terrific academic presence during Homecoming 2009," he says. "This is our opportunity to showcase our great academic progress at the University during the excitement of football in the new stadium. I am impressed with the range of Homecoming events. From an open house and visit from the U.S secretary of agriculture to a scholarship and engagement showcase and a blood drive, Homecoming 2009 truly showcases the breadth of the U."

Among the major academic events:

- **TCF Bank Stadium Tours and University Open House**—Sunday, October 4, 1-4 p.m., TCF Bank Stadium. This is the general public's only chance to tour the stadium. More than 40 academic units will showcase teaching, research, and/or outreach through interactive displays.
- **Freeman Lecture-Great Conversations**—Monday, October 5, 7:30 p.m., Ted Mann Concert Hall. This special fall edition of Great Conversations will feature U.S. Secretary of Agriculture Tom Vilsack in a conversation that will enlighten, engage, and inform the audience. Deans Atwood from the Humphrey Institute and Levine from the College of Food, Agricultural and Natural Resource Sciences will host the conversation.
- **Student Scholar and Public Engagement Showcase**—Wednesday, October 7, 1-4 p.m., TCF Bank Stadium. The University will host a student research showcase at the stadium in concert with Public Engagement Day. Art, design, and posters from University undergraduate, graduate, and professional students, as well as recent alumni, will be highlighted in one location for the first time in the U's history. Also, faculty and staff will showcase public engagement activities and scholarship. Nearly 150 students and 40 faculty and staff exhibits will take part.
- **Homecoming Parade**—Friday, October 9, 7 p.m., University Avenue. As in the past, the parade down University Avenue will be a centerpiece of Homecoming. Parade-goers will see entries from the U's academic community during this event, which now takes place on Friday night before the football game. All freshman-admitting colleges, as well as many other colleges and academic units, will be represented.

Also during Homecoming 2009: the University of Minnesota Alumni Association Awards Banquet (Thursday, October 8); Parents Weekend (October 9-11); and a strong academic presence on game day.

Homecoming 2009 also includes collegiate picnics, lectures, a blood drive, a volunteer project, a food drive in partnership with Rainbow Foods, and more. Nonperishable food items will be collected at the Sunday, Monday, and Wednesday events.

Homecoming 2009 is the culmination of efforts by seven University offices: Intercollegiate Athletics, the President's Office, the Provost's Office, the University of Minnesota Alumni Association, University Relations, Student Unions and Activities, and the Foundation.

For more information visit the [Homecoming Web site](#).





Ag overview

October 1, 2009

USDA Secretary Vilsack to talk food policy at the University of Minnesota

By Anne Mason

The U.S. Department of Agriculture oversees a \$134 billion portfolio that includes leadership on food, agriculture, natural resources, and rural development. It's appropriate that a former governor—and Midwesterner—would take the helm to steer the nation's food policy. It's also appropriate that he would address these issues and their local implications at the University of Minnesota.



U.S. Department of Agriculture Secretary Tom Vilsack

U.S. Department of Agriculture Secretary Tom Vilsack will address an audience of students, elected officials, and members of the public at the University at 7:30 p.m. on Monday, October 5. Hosted by the Humphrey Institute of Public Affairs and the College of Continuing Education, Vilsack's Freeman Lecture and Great Conversations discussion is a special venture between two University lecture series.

Vilsack's talk, called "Feeding the World: At Home and Abroad," will address many of the challenges facing the world today, including skyrocketing food prices; increased pressure on food programs, such as food stamps; diet and health; and global hunger.

"It's important that we recognize and understand the current crises and how agricultural policy plays a role," says J. Brian Atwood, dean of the Humphrey Institute. Atwood and Dean Allen Levine of the College of Food, Agricultural, and Natural Resource Sciences (a cosponsor of the event) will participate in a wide-ranging conversation about these issues with the secretary, followed by a question-and-answer session with the audience.

"The University of Minnesota is at the forefront of agricultural research and has an opportunity to take part in the solution to marry food policy challenges," says Atwood.

U.S. Sen. Amy Klobuchar will introduce Vilsack. "Making sure we have a safe and accessible food supply is one of the top responsibilities of our government," says Klobuchar, who represents Minnesota's interests on the Senate Agriculture Committee. "Secretary Vilsack has been a leader on agricultural and food issues and I am excited that he will be speaking about these important issues at the University of Minnesota's Freeman Lecture."

The Orville Lothrop Freeman Lecture series honors Freeman's lifetime commitment to the University of Minnesota and to public service. The 29th governor of Minnesota, Freeman went on to serve as Secretary of Agriculture in the Kennedy and Johnson Administrations. He cared deeply about world hunger and is credited with creating the food stamp program to provide better nutrition to America's poor.

Great Conversations is produced by the College of Continuing Education. Since its inception in 2002, the lecture series has connected more than 15,000 Minnesotans with thought leaders, risk takers, and peacemakers for energetic conversations that bring issues into sharp focus.

The program is free and open to the public, but tickets are required. Attendees are encouraged to bring a nonperishable food item to help those in need. For tickets, call 612-624-2345 or visit [ag discussion](#).



Lasting bonds

October 1, 2009

Jon Schommer connects students with pharmacy practitioners from around the country

By Kristin Cleveland

One of Jon Schommer's former students describes him as the "glue" that holds the Social, Administrative, and Clinical Pharmacy Program together. He has been director of graduate studies since 1999, and in that time the program has tripled in size, developed two new tracks, and consistently placed graduates in leadership positions for associations, health care companies, and universities.



Jon Schommer is a professor and director of graduate studies in the Department of Pharmaceutical Care and Health Systems in the College of Pharmacy.

Recruiting quality graduate students is no small feat given the opportunities available for pharmacists. One colleague/former student notes that Schommer's success is due in part to his tireless efforts to obtain funding and resources. More important, however, are the bonds he's created amongst students and practitioners from around the country. "During my dissertation years, he checked in with me daily," says another former student. "He made sure to consider not only my research, but my personal and professional development."

"I often hear... my former students repeat something I told them as they mentor their own students. It's then that I pause to think where I first heard it (from one of my mentors!), and... realize how teachers affect the future."

As president of the Academy of Pharmaceutical Research and Science at the American Pharmacists Association, Schommer initiated many collaborations between practice, scientific, and student communities, and is still instrumental in its Career Pathways Program. This program identifies career opportunities for students as well as practitioners, and evaluates human resource needs across the profession. A fellow academy president notes, "He never forgot to also contemplate how any action or topic of discussion might affect or pertain to student pharmacists, postgraduates, or residents."

Jon C. Schommer is a 2009 recipient of the Award for Contributions to Postbaccalaureate, Graduate, and Professional Education.



Innovative couple

October 2, 2009

U researchers receive NIH awards to improve health

By Allison Campbell Jensen

Seeking a new approach to create an HIV/AIDS vaccine is the infectious-disease focus for David Masopust. Exploring an avenue to determine why autoimmune disorders such as diabetes and multiple sclerosis can last for the lifetime of an individual is the concept for Vaiva Vezys. By nature, the two immunologists like to challenge conventional scientific thinking and pursue their own ideas. "We have strong ideas...we're stubborn," says Vezys of herself and spouse Masopust.



David Masopust and Vaiva Vezys were 2 of just 55 scientists from around the country to receive NIH New Innovator Awards.

Photo: Will Dunder

Following their own lights meshes well with the goals of the National Institutes of Health New Innovator Award, which in September granted Masopust and Vezys each \$300,000 a year for five years. The New Innovator and two other awards are designed so that "investigators are encouraged to challenge the status quo with innovative ideas, while being given the necessary resources to test them," said NIH director Francis S. Collins. New Innovator Awards are supported by the NIH Common Fund and the American Recovery and Reinvestment Act.

Both Masopust and Vezys believe in their science. So they gambled on the Innovator Awards, each applying separately in a process that is streamlined compared with the usual lengthy, detailed, and time-consuming NIH grant application.

"Masopust and Vezys have quickly become integral members of the immunology research community here at the University," said Matthew Mescher, director of the Center for Immunology.

Masopust wanted to examine whether tricking the immune system to produce more memory T-cells at points of entry for HIV would help battle an infectious disease responsible for 5 percent of deaths annually worldwide. His approach draws on his graduate work describing where immune system cells go to fight infections, resulting in a seminal 2001 *Science* article, and recent studies that push the limits of generating immune memory, resulting in a 2009 *Nature* article.

Vezys sought funding to explore causes of flaring of symptoms that lead to ongoing tissue damage in debilitating autoimmune diseases. Previously, she developed the hypothesis that a part of the immune system which had been assumed not to participate in chronic infectious disease is required to bolster the number of infection-fighting cells. "It wound up being true," she says, "and opened up a whole new way of thinking."

Their unconventional thinking paid off: Vezys and Masopust were two among 55 scientists from around the country to receive New Innovator Awards. These early-career awards are, Masopust says, "an attempt to allow people new to the game to reach for the stars."

"I am pleased to have the strength in our department and our Medical School to attract two such able and creative faculty members," said Ashley Haase, head of the Department of Microbiology.

"Masopust and Vezys have quickly become integral members of the immunology research community here at the University," said Matthew Mescher, director of the Center for Immunology.

Vezys and Masopust met in graduate school at the University of Connecticut. In 2007, the couple left Emory University for the University of Minnesota, coming to what Masopust calls a "world class program" in immunology with an open-door culture that encourages collaboration among colleagues. Here they share, along with their home, a laboratory and an office.

That will change later this year, when they move to the Medical Biosciences Building, the latest addition to the Biomedical Discovery District, where each will have an office in the Center for Immunology. But they will continue to talk about their work and to rely on each other's scientific insights. Says Masopust of his marriage to Vezys: "I'm certainly a better scientist because of it."



Building a strong financial body

October 2, 2009

Narayana Kocherlakota is ready to strengthen the Federal Reserve Bank of Minneapolis

For decades the body of economic, monetary, and fiscal policy produced by the Federal Reserve Bank of Minneapolis has been built upon and strengthened by University of Minnesota research. And Narayana Kocherlakota—the U of M economics professor who on Oct. 8 becomes head of the bank—belongs to this tradition.



Theory for the real world

The current interplay between University of Minnesota research and the real-world policy produced by the Federal Reserve Bank of Minneapolis

traces its roots to 1970, when a special studies group of U professors working to produce a theoretical model for the Fed to predict economic behavior inadvertently triggered a surge of research into "rational expectations" theory. Ideas from this research found their way into Federal Reserve policy, and the theoretical partnership took off.

Today, University researchers collaborate with Federal Reserve economists on the most varied questions of macroeconomic theory and monetary and fiscal policy. Over half of the U's economics professors have worked with the Fed's research department, and at any given moment several graduate students are also doing so.

Kocherlakota believes that progress in economics demands rigorous discipline and an often highly technical dialogue between data and theory. In brief—the relationship that exists between the University's Department of Economics and the Minneapolis Fed. He puts it this way: "Few if any important questions in economics can be addressed with data or theory alone. Good answers require that the two be used together."

Road to the Fed

Kocherlakota, 45, received a doctorate in economics from the University of Chicago in 1987 on the topic of pricing financial assets. After teaching at the University of Iowa and at Northwestern University, in 1998 he joined the economics faculty at the University of Minnesota.

He left for Stanford in 2002 but returned to Minnesota in 2005, becoming chair of the economics department and leading a recruiting effort that increased the number of professors and enhanced the department's national standing. He stepped down as chair in 2008 to devote time to research on how developed societies can best design their tax systems.

Challenges ahead

Kocherlakota now prepares for new challenges. As the last two years have shown—state and national economies are more than bodies of policy. They are living bodies. Kocherlakota will lead one of the dozen federal district banks that set monetary policy for the nation. "For an economist who has spent his career working on issues related to macroeconomics, monetary policy, and finance," he says, "there can hardly be a better job than president of a Federal Reserve Bank."

"I am excited about this new opportunity for many reasons, and the special bond between the Federal Reserve Bank of Minneapolis and the University of Minnesota is certainly one of them," Kocherlakota says. "I plan to keep the partnership between these two great institutions strong and vital."

University of Minnesota economics professor Narayana Kocherlakota.

Photo: Kelly MacWilliams



Showcasing academics

October 5, 2009

U student-athlete's research is part of special Homecoming Week event at stadium

By Rick Moore

Kelli Blankenship has spent much of her life playing the sport of her choice—hockey—in front of parents of all types. She knows firsthand the rap against some hockey parents; namely, that they can be overly intense and, ahem ... less than polite to referees.

But Blankenship, a senior forward on the Gopher women's hockey team, had a chance to take a look at another side of sports parents in her recent research project, "Not All Sports Parents are 'Out of Control':

The Happy Side of Youth Sports." She was part of a research team that included her mentor, Nicole LaVoi, a research associate in kinesiology and the associate director of the U's Tucker Center for Research on Girls & Women in Sport.

Among Blankenship's findings is that the athletes were most likely to make parents happy (70 percent) during their child's competition, much more so than coaches (21 percent), other parents (8 percent), or referees (1 percent). In addition, parents were happiest about their child's positive experiences, followed by their child's performance and their development.

"Performances and experiences were more important to parents than the kids' actual development," notes Blankenship. "In other words, if their kid hit a home run as opposed to holding the bat right, the home run would be more encouraged on the parents' side."

For Blankenship, the opportunity to do research with LaVoi has been a highlight of her time as an undergraduate student in kinesiology. And she loves to explain the results with anyone who is interested.

"I think that was my favorite part [of the research], reaching that end product and being able to share that with everyone," she says. "That gave people an understanding as to what I was doing. Some of my teammates came out to [a previous] poster session, along with my coaches and a bunch of the staff. They definitely [appreciate] the research, but whether or not they really understand what it takes to get that end product, probably not so much."

She is also quick to credit LaVoi for her mentoring assistance. "She really, really helped me out," says Blankenship. "She was really patient with me and she gave me a lot of very helpful advice. Not just for the research but for other pieces I'm going to need to take into my academics."

After finishing her kinesiology degree this year, Blankenship plans to become a dental hygienist.

"I have always had a passion for teeth—taking care of my teeth—and I love going to the dentist," she says. "I love the hands-on interaction and the social aspect of working with other people and working for people. It's what I want to do for sure."

Blankenship, incidentally, appears to practice what she one day will preach. She has a million-dollar smile worthy of a TV commercial for any dental care product—a far cry from the mug of your average National Hockey League player.

Speaking of hockey, Blankenship and her teammates opened their season this past weekend with two games against Syracuse. But as this interview was winding down, her focus was clearly on the topic at hand. "Would you like to know a little bit more about my research?" she asked.

Research on display during 'The Ultimate Homecoming'

Blankenship has already presented her research twice, including at a poster session for McNair Scholars at the end of the summer. Now she has been invited to share her findings again at the Student Scholar and Public Engagement Showcase on Wednesday, October 7, from 1 to 4 p.m. at TCF Bank Stadium. The showcase is among the featured academic components of this year's "Ultimate Homecoming" week October 4-11, which celebrates the return of football to campus after a 28-year absence.

Falling three days before the Golden Gophers take the field against the Purdue Boilermakers in the Homecoming football game, it will fill the stadium with posters from University undergraduate, graduate, and professional students—as well as recent alumni—along with art and design displays and exhibits of faculty and staff public engagement activities. As many as 150 student projects and 40 faculty and staff exhibits will be on display.

This Student Scholar and Public Engagement Showcase is expected to attract an audience of local colleges, high schools, corporations, and nonprofits, and will serve the dual purpose of spotlighting student work and providing recruitment opportunities. University faculty and staff, as well as families of presenters, are also invited to attend.



Kelli Blankenship stands with her research adviser, Nicole LaVoi, in front of their poster, "Not All Sports Parents Are 'Out of Control': The Happy Side of Youth Sports."



The news from 13.7 billion years ago

October 5, 2009

Physicist Vuk Mandic is on a hunt for a prize quarry: gravitational waves generated as far back as the Big Bang

By Deane Morrison

Gravity may not seem weak when you're falling flat on your face, but take it from Einstein—it's puny.

In his theory of general relativity, Einstein described gravity as a curvature of space, like the sag in a mattress beneath a bowling ball. He predicted that cataclysmic events like the merging of two black holes would send ripples called gravitational waves coursing through the fabric of space at the speed of light. But they would be too feeble to detect.

That was 1916. Now, University of Minnesota physicist [Vuk Mandic](#) and 700 colleagues around the world are engaged in an ingenious, National Science Foundation-funded search called LIGO (Laser Interferometer Gravitational-wave Observatory) that will ultimately either detect the waves or spark a rethinking of Einstein's theory.

The LIGO physicists are looking beyond violent but recurring events like black hole mergers or supernova explosions. Gravitational waves were likely generated in the first unimaginably tiny fraction of a second after our Universe's birth in the Big Bang 13.7 billion years ago; thus, they hold clues to how everything came to be.

Mandic, an assistant professor of physics, is lead author of a [paper](#) in an August issue of Nature that analyzed two years' worth of LIGO data. No gravitational waves were detected, but just as listening for a sound and not hearing it can reveal something about its maximum possible loudness, so the analysis by Mandic and his colleagues placed limits on the energy content of gravitational waves. The finding is already helping to shape ideas about how the Universe formed.

Just a little perturbed

Gravitational waves perturb space in the plane perpendicular to their direction of movement, alternately stretching it in one dimension while shrinking it in the other and vice versa.

In LIGO, two perfectly synchronized laser beams travel down two 2.5-mile "arms" set at right angles to each other. Reflected by mirrors, the beams return and hit a detector, still in perfect synch.

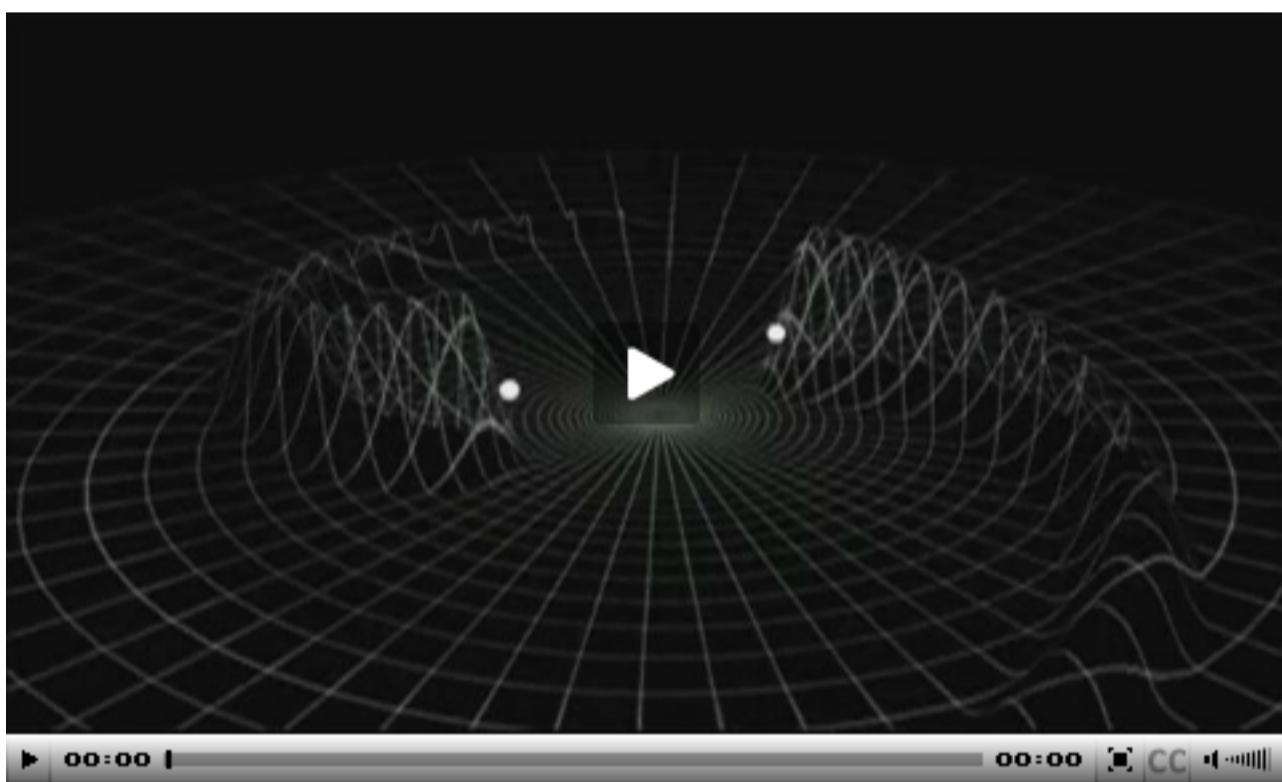
If a gravitational wave were to stretch and shrink the arms, "the difference in the arm lengths would be about one ten-thousandth the size of the smallest atom," says Mandic. Still, the shifting travel distances would put the beams out of synch when they hit the detector. (But no wonder Einstein doubted gravitational waves could be observed.)



University physicist Vuk Mandic is part of the LIGO experiment, which includes this installation in Louisiana.

Photo: LIGO Laboratory

Home page photos: Kenny Hoang



LIGO operates three detectors, two at a site in

Washington state and one in Louisiana. Comparing signals at widely separated sites allows scientists to discard any from local sources like seismic activity or rumbling trucks.

In 2014 an upgraded version of the experiment, Advanced LIGO, will come on line. Ten times as sensitive as the current LIGO, it will be able to explore a thousand-fold greater volume of space and so will stand a much better chance of finding gravitational waves.

"It would be surprising if Advanced LIGO didn't see anything," says Mandic. "If it doesn't, this result would likely trigger revisions of general relativity."

A gravity telescope

Gravitational waves are weak because gravity hardly interacts with matter at all, says Mandic. This sets gravity apart—far apart—from the other three fundamental forces of nature: electromagnetism; the strong force, which holds the nuclei of atoms together; and the weak force, which causes radioactivity.

The finding

In his role as co-chair of the Stochastic Working Group of the LIGO Scientific Collaboration, Vuk Mandic led an analysis of data from 2005 to 2007. The search revealed that over the frequency range monitored, the energy locked up in gravitational waves from any source must be less than 0.0007 percent of the Universe's total energy. Watch Mandic on a [webcast](#) by the National Science Foundation.

The four forces are thought to have been united when the Big Bang began. Because gravity interacts so weakly with matter, it's expected to have been the first to uncouple and become its own force. When and how that happened holds tremendous interest to physicists and is currently not understood.

It's clear, however, that gravitational waves will play a central role in reconstructing the Big Bang and its aftermath—especially a period known as inflation, which occurred sometime in the first trillionth (millionth of a millionth) of a second after the Big Bang.

During that instant the extremely hot, dense Universe expanded enormously. The scale was such that a pea-sized object would have grown to many times bigger than our current Universe.

As it continued to expand, the Universe cooled and gradually took the shape we observe today. One minute after the Big Bang, the first atoms formed. Another milestone was passed 300,000 years later, when the first photons of light decoupled from the stew of matter and energy and began to travel through the Universe, rendering it visible. (Of course, no one was around to see it.)

Since no visible light exists from before the 300,000-year mark, ordinary light-gathering telescopes can't probe the Universe at earlier ages. However, physicists can recreate and study the conditions that existed between one minute and 300,000 years after the Big Bang.

"Unfortunately, the exceedingly hot conditions that existed in the earliest moments after the Big Bang cannot be recreated and studied in laboratories," says Mandic. But gravitational waves from those times, even from the period of inflation, may still ripple the fabric of space and time.

"This leaves gravitational waves as potentially the only way of looking back at the very beginning of the Universe and of studying the physical laws that apply at correspondingly high temperatures," Mandic says.

LIGO is thus a gravity-based telescope turned on the first moments of creation, seeking revelations no other signal can carry. When detected, the ancient gravitational waves will be mixed with more recent ones from black holes, supernova explosions, etc. in a cacophony whose amplitude holds clues to the behavior of the Universe all the way back to the Big Bang.

"We're really looking for the 'white noise' of the Universe," muses Mandic.

It's a noise he can't wait to hear.



My friend Norm'

October 6, 2009

U wrestling coach J Robinson shares his relationship with Nobel laureate Norman Borlaug

By Ryan Maus

Norman Borlaug was many different things to many people. He was a scientist, a Nobel laureate, a life-saver, a father, and a husband.

But to University of Minnesota wrestling coach J Robinson, he was just his friend Norm.

At first glance, it seems like an unlikely friendship. Borlaug, a U of M alumnus who passed away at age 95 on September 12, was one of the most influential people of the 20th century. His work spearheading the "Green Revolution" is estimated to have saved hundreds of millions of people worldwide from starvation. He was honored with the Nobel Peace Prize in 1970.

Robinson is equally as respected in his own field, as one of the most accomplished head coaches in the history of collegiate wrestling. His teams have won three NCAA championships and he has coached eight individual national champions and 44 All-Americans in his 23 years at the U.

Borlaug and Robinson bonded over a shared passion—the sport of wrestling. Before Borlaug became a world-renowned scientist, he wrestled for three years for the Gophers under then-head coach Dave Bartelma.

Robinson met him about a half century later.



Nobel laureate Norman Borlaug and Gopher wrestling coach J Robinson share a moment at a Gopher practice.

Photo: courtesy Mary Christensen-White



"When I first got the job here [at the U of M] in 1986, I was down the hall in an office, and this guy came in and introduced himself as Norm Borlaug," says Robinson about the first meeting between the pair. "He just sat down and we probably talked for about an hour, talked about sports, talked about wrestling.

He told me all the things he did, and his time wrestling here.

"He said 'My name's Norman Borlaug, and I was a history major.' I'm thinking 'Borlaug, Borlaug...' It didn't really dawn on me who he was until he left."

"He was a wrestler, an alumnus, a friend," says Robinson. "He was one of those special people you meet throughout your life that, even if you see them 20 years later, your face lights up. There was a magic there, a connection there."

The meeting marked the start of a friendship that would last for more than 20 years. Borlaug, who once recalled that he won "nine of 11 bouts" during a stretch of his Gopher career and who was also a referee at the first-ever Minnesota state high school wrestling tournament in 1938, would often speak to the Gopher wrestlers during his visits to Minnesota, imparting important lessons to Robinson's athletes. He was a guest of honor at the Minnesota-Iowa dual meet in 2002 at the Xcel Energy Center, and would often write the Gophers to congratulate them on their national success.

"The legacy he'll leave for the wrestling team is that there's life after wrestling," says Robinson. "The skills that you learn in wrestling are transferrable to other things in life. Yeah, it's great to be an NCAA champion or Olympic champion, but there are other things to come."

Robinson, who spent a day with Borlaug late this summer in his Texas home, especially admired Borlaug's humble nature.

"He really enjoyed his roots," said Robinson of the Cresco, Iowa, native. "He never forgot who he was and where he came from, and that's what kept him so grounded. He was a very gentle and unassuming person."

"The guy won awards and associated with presidents, but you would have never known," he adds.

Robinson is one of several scheduled speakers at the October 8 memorial for Borlaug at the McNamara Alumni Center, and the lone non-academic. While others can speak to Borlaug's lifetime worth of monumental achievements, Robinson will eulogize him the only way he knows how—as his friend.

"He was a wrestler, an alumnus, a friend," says Robinson. "He was one of those special people you meet throughout your life that, even if you see them 20 years later, your face lights up. There was a magic there, a connection there.

"That's what made Norm Borlaug so special to so many people. Because of his roots, he connected with so many people. That's who he was to me—he was my friend Norm."



The 'ultimate' celebration continues

October 6, 2009

This weekend is full of Homecoming events celebrating the return of football to campus

By Rick Moore

The billboards that have dotted the area around the Twin Cities campus for the last year were meant to spark interest in the new football stadium: "Stadium Village. Now With Stadium." "Biggest Comeback in Gopher History." And "Join the Ultimate Homecoming."

"The Ultimate Homecoming" is also the slogan for this year's annual autumn celebration. And with good reason. This year's Homecoming Week festivities are two and a half years in the making, and more than 300 students, staff, alumni, and community members have put together a week that students and alumni alike will remember for years to come.

According to Kayleen Alexson, the student spokeswoman for Homecoming 2009, the event has taken on a new level of energy this year, fed by the excitement of football returning to campus.

"I think that's definitely carried over this week, with Homecoming being one of the larger campuswide events," says Alexson, a senior majoring in communication studies. "There's definitely a larger group of people involved in Homecoming this year."

Maroon and gold... and an evening parade

Homecoming Week kicked off on Sunday, October 4, with tours of TCF Bank Stadium that drew about 15,000 visitors. With each passing day the excitement has been building, and it will reach a crescendo on Friday and Saturday.

For the first time in more than 20 years, the Homecoming parade will occur on the eve of the game, beginning at 7 p.m. The festivities commence with a special Maroon and Gold Pre-Parade Party at the McNamara Alumni Center at 4 p.m. Among the many activities will be carnival games and prizes; appearances by the parade grand marshals, Goldy, and the Spirit Squad; an autograph session featuring former Gopher greats; and a "Best Maroon and Gold Dressed" contest, with the winner receiving two tickets to the Homecoming game.

While the parade is technically in the evening, it may not seem that way. Light "balloons"—similar to those that light up construction zones—will turn night into day along the length of the parade route on University Avenue, from Pleasant Street to Williams Arena.

"I've heard that these "balloons" light up a city block," notes Alexson. "It'll be interesting to see the [fraternity row] house fronts lit up with the balloons, as well."

The parade's grand marshals are some of the U's most renowned alumni: former Vice President Walter Mondale, "A Prairie Home Companion" creator Garrison Keillor, NFL Hall of Famer and All-American Bobby Bell, Mpls.St.Paul magazine publisher Deb Hopp, and All-American basketball star Lindsay Whalen. They will be joined by Jeanie Borlaug Laube, the daughter of U alum and Nobel Prize winner Norman Borlaug, who passed away September 12.

For the first time ever, the parade will feature entries from the U's academic community, including 12 of the 16 colleges, as well as student organizations and area businesses. There are more than 80 entries.

Following the parade, a special Homecoming pep fest will rock the new stadium. Students and fans will be entertained by the University of Minnesota Marching Band and Spirit Squad and hear talks from Keillor and head coach Tim Brewster. The evening concludes with a fireworks show set to music.

Bank on an exciting game

On Saturday, all eyes will be turned to the FieldTurf at TCF Bank Stadium as the Golden Gophers take on the Purdue Boilermakers in what should be the ultimate Homecoming game. Minnesota (1-1 in the Big Ten, 3-2 overall) will be looking to stem the disappointment of losing to Wisconsin last week and try to make it two straight wins against Purdue (0-1, 1-4).

Coincidentally, the last Homecoming game at Memorial Stadium was also played on October 10, exactly 28 years ago. The Gophers beat Northwestern 35-23 in that contest. (The very first Homecoming game, you ask? That was in 1914, when Minnesota beat Wisconsin 14-3 in front of 17,000 fans at Greater Northrop Field—Memorial Stadium's predecessor.)

Game time is 11 a.m., but fans can get rolling at 8 a.m., when the Game-Day Party begins at the McNamara Alumni Center and plaza. The event features live music, family-friendly activities, remarks by President Bob Bruininks and Athletics Director Joel Maturi, and the popular Victory Walk, where the Gopher players march through a human walkway formed by the spirit squad, marching band, and fans.

Food, soft drinks, and alcoholic beverages are available for purchase, and fans who don't have tickets to the game can watch it on one of the jumbo video screens inside the McNamara Center. To top it off, the party continues all afternoon at the Mac after the game ends.

Lastly, the focus turns to community service with "The Ultimate Volunteer Experience" on Sunday. Students will perform various service projects suggested by members of the community, such as cleaning up streets, washing windows, or pitching in on preexisting service projects for local nonprofits.

It all adds up to a Homecoming that deserves the label of "ultimate." Says Alexson: "It'll probably be setting the standard for future Homecomings at the U."



"House fronts," like this one on the Delta Tau Delta fraternity house in 1946, are a Homecoming staple. Light "balloons" will cast a new light on this year's creations.

Photo: courtesy University Archives



Relating theory to real rocks

October 8, 2009

Distinguished teacher Jim Stout has a unique talent for making rocks come alive

By Deane Morrison

In a typical lecture, Jim Stout holds up a rock and asks, "What's unusual about this?" or "How do you know this rock didn't come from Hawaii?" Often, students get answers straight from the source. Stout has led innumerable field trips to places like Mexico, the Grand Canyon, Mt. St. Helens, Canada, and—seven times—Hawaii.

"Jim went out of his way to ensure a quality education by leading at least 15 undergraduates for 10 days in Hawaii, where we went to the tops of volcanoes and the southernmost point in the United States," says one former student. "I learned more in that field experience than in much of the coursework I took."

Stout, says a colleague, is well aware that "he is not a contributor to grade inflation." Yet, present and former students invariably name him as the faculty member who has had the biggest impact on their education and lives.

"[One way] to engage students is teaching by example. When I teach either of our two required summer field camps, students have my undivided attention all day long, for 21 days. We camp together, eat together, and learn together."

Director of undergraduate studies in his department for more than 10 years, he has spearheaded reform of the curriculum to prepare students to deal with complex systems that include interactions between organisms and rocks and human influence on global climate change.

Stout's concern for students often goes beyond academics, as in the case of a certain student he helped apply to graduate school. Stout, the younger man noted, also "offered personal experience-based advice on how to maintain a healthy long-distance relationship with my girlfriend (now wife) during my first year of graduate school."

James H. Stout is a 2009 recipient of the Horace T. Morse-University of Minnesota Alumni Association Award for outstanding contributions to undergraduate education



James H. Stout is a professor of geology and geophysics in the Institute of Technology.

Photo: Patrick O'Leary



U takes fifth in D.C.

October 14, 2009

Minnesota tops all other first-time entries in 20-team international solar home competition

The University of Minnesota's first-ever entry into the U.S. Department of Energy's Solar Decathlon ended successfully Friday. The U placed fifth overall (838.544 points) in the 20-team competition, which featured entries from the United States, Canada, Germany, and Spain.

U.S. Deputy Secretary of Energy Daniel Poneman announced the winners of the fourth biennial competition this morning from the "Solar Village" on the National Mall in Washington, D.C. Finishing in the top three were Team Germany (908.297 points) in first, the University of Illinois (897.300) in second, and Team California (863.816).



The University of Minnesota's ICON solar house finished first in the lighting design category, which meant an added treat for nighttime passersby on the National Mall.

Photo: courtesy ICON solar house team

"Our team performed extremely well, especially for a first-time entry," says civil engineering faculty member and U of M project manager Ann Johnson. "All the teams ahead of us in the overall standings had previously competed in the Decathlon, so to place fifth on our first try is truly a monumental achievement."

The 2009 Solar Decathlon tasked student to create a modern, full-featured, and livable home powered solely by the sun. Teams competed in 10 contests (hence the "decathlon" name) that evaluated several aspects of the home's appearance—such as architecture, market viability, and comfort—and that measured the way it provided energy for heating and cooling, hot water, home entertainment, lighting, and appliances. The competition ran from October 8-15.

Minnesota's entry (called the ICON Solar House for the iconic shape of its gabled roof) finished first in the engineering and lighting design competitions, and placed high in several other categories throughout the competition. The U finished third in the appliances and home entertainment contests and fifth in both market viability and hot water.

More than 150 undergraduate and graduate students worked on U's solar home, which began taking shape in late 2007. This interdisciplinary project brought together students from many University colleges and departments, including engineering students from the Institute of Technology, architecture and design students from the College of Design, and construction management students from the College of Continuing Education.

"Many of the same students have been working on this project for two years, and it's really rewarding to see their dedication and commitment pay off," says Johnson. "Being able to bring together students from so many different disciplines really gave us a leg up on the competition here in D.C."

The University does not yet have definitive plans for the ICON house, which has an estimated value around \$500,000, once it leaves the National Mall next week. The team has discussed selling the house in order to jumpstart fundraising for an entry into the next Solar Decathlon, scheduled to take place in 2011.

Related links:

- Visit [Solar Decathlon](#) for complete team standings and information about the competition.
- More information about the ICON solar house can be found at [ICON house](#).
- Check out the UMNews story and video on the U's team at [Going to the Mall](#).
- Watch [videos](#) describing details of the the house in the decathlon's 10 different categories.



U of M among three winners of new federal wind energy grant

October 16, 2009

A University-led consortium will receive up to \$8 million for wind power research and education

By Deane Morrison

Years of research and investment in wind energy generation paid off for the University of Minnesota Thursday (October 15, 2009), when U.S. Energy Secretary Steven Chu named a U of M-led consortium and two others to share up to \$24 million for wind energy research and education.

The grant, funded from the American Recovery and Reinvestment Act, will support research to improve both land-based and offshore wind generation. The University of Minnesota-led group stands to receive up to \$8 million.

"We're thrilled," says Rod Larkins, associate director of the Initiative for Renewable Energy and the Environment (IREE), a signature program of the University's Institute on the Environment.

Wind power has been around for centuries, but the modern field has a crying need for investment and improvement, Larkins says. For one thing, its efficiency is low, so investments take a long time to pay themselves off. Also, turbines wear out and break down, sometimes catastrophically.

"Since they're so big and bulky and there's so much stress on the towers and foundation, they tend to be overbuilt, and people haven't found the optimal construction," he explains.

Perhaps most important, however, is the lack of infrastructure, both technological and human.

"Who are the next generation of scientists working on these turbines? We need a university department training students to do this," Larkins says. Also needed, he adds, are the means and people to build and repair wind energy structures.

The University's consortium comprises academic and industrial partners working to improve the efficiency of wind power and educate a generation of scientists and engineers to specialize in wind energy technology. [Fotis Sotiropoulos](#), professor in the University's Institute of Technology (IT) and director of its St. Anthony Falls Laboratory, along with other researchers from IT and the University of Minnesota, Morris, lead the consortium.

The group began years ago, when IREE invested in U of M faculty wind research projects and also provided more than \$500,000 in matching research funds. One major project is under way at the Morris campus, which is now in the process of integrating multiple wind turbines and distributed storage into a campus microgrid.

"The University of Minnesota, Morris, and its research partner, the West Central Research and Outreach Center, are pleased to be partners in this grant," says Lowell Rasmussen, vice chancellor for finance and facilities for the Morris campus. "We appreciate that the Department of Energy recognizes that we are a combination of leading companies and institutions drawing on resources such as the tremendous capabilities of the U of M."

Among faculty wind energy projects are mechanical engineering professor [Kim Stelson's](#) work to make the wind power transmission system more durable. Now, problems arise when the wind blows too fast and puts pressure on the system. Another is one by [Susan Mantell](#), also a mechanical engineering professor, to place sensors on turbine blades to detect signs of failure before they become acute--and expensive to fix.

Larkins credits the state of Minnesota's support of wind power for helping set the stage for the University's successful pursuit of the new grant.

"Minnesota is fourth with respect to wind energy generated in the United States," says Larkins. "But what really separates us is the combination of the University and industrial collaborators [in this state] to drive the technology forward."

The U of M plans to install a new Siemens 2.3 MW turbine research facility at the University of Minnesota Outreach Research and Education (UMore) Park in Rosemount, Minn., to study novel mechanical power transmission and electric generator systems. Besides Siemens Energy, industrial partners include Barr Engineering, Eaton Corporation, Honeywell, Lockheed Martin, Luna Innovations, 3M and WindLogics. Academic partners include Syracuse University and Dakota County Technical College.

The grant will also allow students to benefit from instruction focused on wind power technologies and integration with other renewable energy sources, and from internships with industrial partners at consortium field sites.

The other two grant awardees are consortia led by the Illinois Institute of Technology and the University of Maine. More details are available from the DOE [news release](#).



A new federal grant will help the University of Minnesota improve wind power generation. Above: a turbine at the University of Minnesota, Morris.

Photo: Richard Walker



Connecting to the river

October 16, 2009

UMC students help develop new park area in Crookston

By Rick Moore

In fall 2003 the city of Crookston suffered an unlikely natural disaster. A section of embankment along the Red Lake River gave way, leading to the loss of a motel and a number of homes. Various factors led to the "slope failure," including a low water table level and some heavy rains that added weight to the top of the bank.

Six years later, the area now known as the Sixth Street Park has a new life and a new look, thanks to students from three classes at the University of Minnesota, Crookston (UMC).

When the city received funding about a year ago to renovate the area, it contacted UMC for help. There, Eric Castle, an assistant professor in the Agriculture and Natural Resources Department at UMC, immediately saw an opportunity for students in his various classes.

First, students in his Land-Use Planning class investigated how other communities developed park areas. Heather Herrig, a student in that class and a senior in natural resource management, says they examined different looks for the park, including one that would be more educational, with interpretive signs; one that would be kid-focused; and one that would have a more natural look.

The students then presented their findings at a "charrette"—which Castle describes as "a design brainstorming process" involving Crookston community members—and various design ideas emerged.

"We had students summarize those ideas, and then the Landscape Design class took those ideas and came up with three different design scenarios," Castle says. "Those three preliminary designs were presented to the city."

The final design approved by the city contains an array of features including a contemporary gazebo structure, a fishing pier, benches, and a walking path down to the river.



UMC students in Eric Castle's Landscape Installation and Maintenance class beautify the entrance to the Sixth Street Park in Crookston.

Photo: John Zak

"As you get down next to the river, you don't hear the cars and you don't see the houses," says Castle. "You hear the river."

This fall, yet another of Castle's classes is involved with the Sixth Street Park project—his Landscape Installation and Maintenance class. For the past month, those students beautified a main entryway to the park, installed a seating wall and pavers, and planted trees, shrubs, and other perennials. "It's a very visible corner," says Castle, "so we wanted to dress it up and make it an asset rather than a visual liability."

For each of Castle's classes, the work has taken the form of a service-learning project, where community service becomes an essential part of the educational experience.

Real-world experience and a new park for the city

Ultimately, while the UMC students gain hands-on experience in their field, their work serves a greater purpose.

Castle points out that the Red Lake River is an inherent part of Crookston's identity, but there aren't many places in town where people can connect to the river.

The new-look Sixth Street Park helps to change that. Beyond the entrance visitors will discover an area of transition, both for the eyes and the spirit. The grass next to the highway now yields to a buffer zone of natural prairie grasses, courtesy of Castle's students.

"As you get down next to the river, you don't hear the cars and you don't see the houses," he says. "You hear the river."

"It's nice for the community because there's another green space for people to enjoy," adds Herrig.

Mike Field, a senior majoring in environmental landscaping and turf grass management, has been in all three of the classes involved with the park project. He appreciates what the experience means, both for his own career (he already operates a 50-client landscape maintenance business) and for the city.

"It was a lot more than just digging a trench or doing manual labor," Field says. "We turned this barren landslide area into a nice park that's easily seen by [people driving by]. It's nice to spruce up the landscape of the community."

"It's a project and an assignment that they'll remember," adds Castle, especially down the road as returning alumni. "They'll drive by and see what's happening with their park."



Washed-up wolves

October 20, 2009

Surprising discoveries about aging wolves and their effects on elk

By Deane Morrison

Contrary to their fearsome, folk tale-rooted image, wolves just aren't all that good as predators. To bring down big prey, they have nothing but speed and teeth--no claws that can rip flesh, no massive paws to kayo their quarry.

Now, a University of Minnesota-led study of wolves in Yellowstone National Park shows how even that modest ability soon ebbs away. Daniel MacNulty and his colleagues found that the wolves were in their hunting prime at the ages of 2 and 3, but then their skills deteriorated steadily. They lived, on average, till age 6.



The elk-hunting skills of wolves decline significantly with age, a University of Minnesota study shows.

Photo: Douglas Dance

Writing in the [September 23, 2009 issue](#) of Ecology Letters, MacNulty, a postdoctoral researcher in the University's Department of Ecology, Evolution and Behavior, and his colleagues reported that the higher the proportion of wolves older than 3 in the park, the lower the rate at which they kill elk, their main source of food.

The findings run counter to a belief, held by many ecologists, that wild predators maintain their physical skills as long as they live.

But the study "shows that aging impairs the ability of the wolves to catch elk," says MacNulty, "The data connect aging with an important ecological process, namely predation."

MacNulty has followed the Yellowstone wolves since their reintroduction to the park in 1995. He says the lowered hunting ability of older wolves may afford some protection to the elk, which would fare worse if all the wolves were spring chickens.

"For example, when 22 percent of the wolves in Yellowstone were 3 or older, the kill rate was 0.4 elk per pack per day," says MacNulty. "If the older wolves were 52 percent of the population, the kill rate dropped to 0.22 elk per pack per day."

In general, for every 10 percent rise in the proportion of wolves older than 3, the Yellowstone wolf population saw a decline in the kill rate of 10 to 15 percent, he says.

"... [W]hen 22 percent of the wolves in Yellowstone were 3 or older, the kill rate was 0.4 elk per pack per day. If the older wolves were 52 percent of the population, the kill rate dropped to 0.22 elk per pack per day."

MacNulty has also documented the decline of individual aging wolves' hunting skills. For example:

"Wolf number 21 in the Druid Peak pack lived to about 9," he says. "Video of 21 over his lifetime showed him slowing down when chasing elk as he neared the end of life."

As the geezer wolves lose their edge, the study suggests that young adults in the pack shoulder more of the workload and share their kills. This may provide aging members of the pack with a lupine version of social security.

Why wolf hunting may backfire

The number of elk in Yellowstone has declined in recent years, and many believe wolves are the main cause, MacNulty says. But he notes that drought, which has reduced the supply of plants elk eat, and predation of elk calves by grizzly bears have also probably contributed.

Montana legalized wolf hunting after the animal was taken off the endangered species list in 2008. But hunting of wolves won't necessarily help the elk, and not just because only a few wolves have been taken so far, MacNulty says.

"It's been shown in other hunted populations of wolves that hunting skews the population toward younger age classes," he explains. And, as his research shows, that could spell more deaths, not fewer, for the elk.

The reason hunting pushes a population's age structure downward is because being hunted is like playing Russian roulette. If, starting early in life, every member of a society had to play Russian roulette regularly, not too many would live to a ripe old age, he says.

Currently, MacNulty is working with a colleague at Michigan Technological University to "nail down," or quantify, the effect on elk of wolf management that involves hunting.

"We're modeling wolf-elk dynamics and looking at how changes in wolf age structure affect elk numbers," he says..



Mapping the bottom of the world

October 23, 2009

Paul Morin charts the ultimate terra incognita: Antarctica

By Deane Morrison

What's black and white and spreads red all over?

That would be a penguin. Thanks to pigments in the birds' krill and fish diets, penguin poo has a reddish tint that makes their colonies and trails stand out on satellite images.

That's a boon to researchers who want to identify and keep track of remote, inaccessible colonies. But to do so, they need somebody to turn satellite images into maps. That's when they call the University of Minnesota's Paul Morin, director of the National Science Foundation-funded Antarctic Geospatial Information Center (AGIC).

Based in the Department of Geology and Geophysics, Morin and his staff of 10, including some five undergrad and graduate students, produce tailor-made maps that researchers and logistics experts in the U.S. Antarctic Program depend on daily. Morin will use images from any satellite belonging to any country, and many of his team's maps are "firsts."

"We do reconnaissance mapping for places no one has ever been to," he says. "We map everything from rocks to rock hoppers [a type of penguin]."

Besides studying penguins or seals remotely, researchers and logisticians may need the help of maps to find interesting outcroppings of rocks, measure how far a glacier has receded, or learn whether a boulder is blocking a path. And, of course, to show where the crevasses are.

All they have to do is call AGIC.

For example, "People will ask us for a line-of-sight map so they can decide where to locate remote radio towers," says AGIC staffer Claire Porter, a geography graduate student who makes her first trip to Antarctica in December. The researchers, she explains, set up the towers so they can radio each other without the signals being blocked by landforms.

A knack for visuals

In 2007 Morin pulled off a rare feat. Although he held no academic degree--and still doesn't--he won the National Science Foundation grant that established the AGIC.

"I've always been in scientific visualization, making pretty pictures with a computer," he says. "I realized there was a need for mapping in Antarctica and wrote a proposal to the NSF, which is the main funding agency for work on the ground there."

Besides using satellite images, he also maps the rugged landscape the old-fashioned way: by going to Antarctica and surveying the terrain first hand.

Morin conducts his work in the McMurdo Dry Valleys region, a mountainous, rainless, 12,740-square-mile region whose rocky crags have been sculpted by wind for millions of years. Some of its valleys have lakes formed by glacial melt; these are of interest to Morin and other researchers because their levels reflect the amount of melting tied to global climate change.

Morin's field site lies 100 miles from McMurdo Station and is accessible only by helicopter. It's in one of several specially protected areas of the continent where everything brought in must be brought out. That includes not only equipment, but every trace of garbage, including--well, you know what we mean.

All of which explains why logistics people outnumber researchers by six or seven to one. They, as well as the researchers they support, make heavy use of AGIC maps.

"I'm most excited about how important our job is," says Brad Herried, also a geography graduate student. "We help with logistics and map-making for people in the most deserted spot in the world."

Morin will return to Antarctica in January, but before feeling sorry for him, remember the midnight sun.

"It gets up to about 35 degrees, warmer than a Minnesota winter," he says. "And it's always sunny in the summer."



Paul Morin, director of the University of Minnesota-based Antarctic Geospatial Information Center, pauses next to a wind-sculpted rock in the Dry Valleys region near McMurdo Station.

Photo: Michelle LaRue



Fan-tastic

October 29, 2009

Fan ambassadors and new Spirit Section enhance fan experience at the U

By Rick Moore

In the years leading up to the opening of TCF Bank Stadium, one message was stressed again and again: Having a new stadium means more than just bringing football back to campus; it's about creating a positive game-day experience for fans at the University of Minnesota.



U students are taking the lead to make sure that happens.

There are perks to being a fan ambassador. Once inside the stadium ambassadors assume choice seats in the student section.

After attending a Big Ten Sportsmanship Conference at Ohio State in July 2008, several students formed a Sportsmanship Council at the U. In turn, the council created the new "We are... Minnesota Spirit Initiative," whose mission is "to lead the University of Minnesota community in fan participation, Gopher spirit, and positive behavior." The initiative includes a "fan ambassador" program and a new spirit section at Gopher football games, as well as men's hockey and men's basketball games.

"We're starting small and hoping to build it moving forward. The students have been really excited about it since it's their idea and their initiative," says Mandi Soderlund, an assistant director in the Student Unions and Activities office on the Twin Cities campus.

They have the answers

If you've been to a football game this year, you've probably seen a fan ambassador. They wear neon green T-shirts with an information icon on the front. And they arrive in force. Soderlund says there are 40 at every football game, and honorary fan ambassadors who volunteer on a per-game basis sometimes join them.

The ambassadors are at three fan information tents—at Gates A and E and on the McNamara Alumni Center Plaza, the site of the Game-Day Party that begins three hours before kickoff. They also greet fans around the perimeter of the stadium and answer any questions that might come up, from where gates and restrooms are located to where the band performs its pre-game show and when the football team's Victory Walk begins.

According to Brittany Geissler, a student intern for the Spirit Initiative, fan ambassadors strive to make every fan's experience more enjoyable. "It was really our focus to make sure people knew where they were going and what kind of things they could bring into the stadium," she says, adding that another goal is to make sure that their experience outside the stadium matches their enjoyment of the game.

The fan ambassador program is drawing cheers, or at least praise, from the guests of honor—the fans themselves. "We are getting tons of positive feedback from our fans," Soderlund says. "Especially with the new stadium, I think it's setting the tone on game days."

The program is now transitioning to the winter sports season. Fan ambassadors will be at both men's hockey and men's basketball games, though in smaller numbers and inside of the buildings, since fans are already acquainted with Mariucci and Williams Arenas.

A section of good sports

This year, students are also working with the Spirit Squad and Marching Band to reinvent the student section. They have created new chants and cheers and are emphasizing good sportsmanship. (Students learned about the new traditions at the Welcome Week Pride and Spirit event and at the Syracuse game viewing event.) According to Soderlund and Geissler, more than 200 students are populating the new Spirit Section for each football game in their preferred seats right behind the band.

The "Golden Gopher Pride and Spirit Guide" captures the sentiment of the Spirit Section. The brochure contains a fan creed; fun facts about the origins of cheerleading (it began at the University of Minnesota in 1898), The Rouser fight song, and the Ski-U-Mah chant; the lyrics to Hail Minnesota and the Minnesota March; and a list of new traditions, including the jingling of keys leading up to every Gopher kickoff and the tipping of students' hat when they walk through the student gate below the "Hats Off to Thee" engraving.

In addition, the Spirit Section students are focused on positive cheering, Geissler says. When they hear negative or distasteful chants, they're instructed to cheer "Go Gophers!" to change the tenor of the crowd.

Geissler believes the "We are... Minnesota Spirit Initiative" and the fan ambassador program are a great way for the University to enhance its reputation as a great place to watch athletic events. "If we become a leader in starting this initiative, other schools can look to us," she says.

She notes that fans in Minnesota have a full range of sporting options, including the Vikings, Twins, Lynx, Timberwolves, and Wild, and every venue has a different atmosphere.

"If we can make our game-day experience the best, the University of Minnesota could really benefit," she says.



U part of global pandemic team

November 2, 2009

Multidisciplinary effort will work to combat emerging pandemics in developing countries

Experts from the University of Minnesota will soon be on the frontlines working to help developing countries better respond to emerging animal diseases that pose a threat to human health.

The University of Minnesota is part of a multidisciplinary team that will implement a United States Agency for International Development (USAID) cooperative agreement with funding up to \$185 million.

The project, called RESPOND, is one of five that will work together to pre-empt or combat the first stages of emerging zoonotic pandemics—diseases that can spread between animals and humans.

Faculty from the College of Veterinary Medicine, the School of Public Health, the School of Nursing, the Medical School, the College of Education and Human Development, and College of Food, Agricultural, and Natural Resource Sciences, will be traveling to hot spots (likely located in Southeast Asia, the Congo Basin, and the Amazon Basin) to try to prevent the next pandemic. They'll be tasked with improving the ability of countries to recognize and respond to new epidemics in areas where ecological relationships—between humans, animals, and the environment—are unstable.

"The University of Minnesota was sought out because of our range of expertise in zoonotic diseases that crosses disciplines and our focus on the connection between animal and human health," said Frank B. Cerra, M.D., senior vice president for health sciences at the University of Minnesota. "We are one of only a handful of places in the country that has this range of disciplines."

"Without the leadership of Deans Trevor Ames (veterinary medicine), Connie Delaney (nursing), John Finnegan (public health), and collaboration from the Medical School, College of Education and Human Development and College of Food, Agriculture and Natural Resource Sciences this would not have happened," Cerra said.

DAI, a company based in Washington, D.C., will lead the RESPOND team, in partnership with the University of Minnesota and Tufts University in Medford, Massachusetts—another key member of the cooperative.

"With this project, USAID recognizes the unique leadership role the University of Minnesota plays in bringing together the multiple disciplines and expertise required to address this global challenge," said Minnesota Congresswoman Betty McCollum.

Although members of the RESPOND team will be dealing with diseases that don't yet exist, examples of similar diseases they might try to prevent include SARS, Ebola, and avian influenza.

"USAID recognizes the critical need to address emerging illnesses from a global perspective, and to better understand the intersection between human and animal health," said Minnesota Congresswoman Betty McCollum, founder of the Congressional Global Health Caucus. "With this project, USAID recognizes the unique leadership role the University of Minnesota plays in bringing together the multiple disciplines and expertise required to address this global challenge."

The College of Veterinary Medicine's new Ecosystem Health program, National Center for Food Protection and Defense, and Center for Animal Health and Food Safety were instrumental in obtaining funds to join RESPOND.

"We are increasingly aware that our health depends on the health of livestock, wildlife, and the environment," said Katey Pelican, D.V.M., Ph.D., who championed University of Minnesota's proposal effort to join the DAI/RESPOND team and is the head of the Ecosystem Health program. "Nowhere is this clearer than in the increasing number of diseases that are emerging from animal populations as environmental degradation forces more interactions between wildlife, livestock, and humans. The RESPOND program will provide the University of Minnesota the opportunity to use its unique ability to work across animal and human health disciplines to improve global response to these life-threatening outbreaks."

Over the course of the five-year project, the RESPOND team will work to improve the training and response capacity for zoonotic disease outbreak identification, investigation, analysis, and control within countries and regions; strive to improve the coordination among public and private interests involved in an outbreak; support in-country outbreak response activities; and introduce new technologies to help improve a country's response to an outbreak.

John Deen, D.V.M., Ph.D. will be the director of the project at the University of Minnesota. USAID's other four projects under the Emerging Pandemic Threats Program are PREPARE, PREDICT, IDENTIFY, and PREVENT. To learn more visit: <http://www.usaid.gov/>

Read the [release](#) on the Academic Health Center Web site.



University researchers, including Katey Pelican and John Deen (pictured), will be part of a new multidisciplinary team working to pre-empt or combat emerging pandemics in developing countries.

Photo: Jack McTigue



Field station of dreams

November 5, 2009

The Itasca Biological Station and Laboratories needs a facelift

By Deane Morrison

A short walk from their summer cabins, students can wade across a narrow stream where the headwaters of the Mississippi, having mingled in Lake Itasca, flow out to form our great national river.

As incoming freshmen in the University of Minnesota's College of Biological Sciences (CBS), the students have a lot in common with the river. Here in Minnesota's great North Woods they, too, experience a birth of sorts, as their lives as biologists start to come together and take form.



This crumbling cabin foundation is one reason the Itasca station needs attention.

They get their feet (and sometimes more) wet through CBS' Nature of Life program at the Itasca Biological Station and Laboratories, on the north arm of the three-armed lake. Set amid a paradise of lakes, bogs, springs, and forests, all teeming with life, the station could not be better situated for its purpose.

"In the upper Midwest, it's as close to a tropical rain forest as we get in terms of biodiversity," says [David Biesboer](#), director of the Itasca station and a plant biology professor in CBS.

The station is celebrating its 100th birthday this year. But while it still draws field researchers and students, its deteriorating cabins and laboratories and outdated energy systems will hobble it if nothing is done. In 2010 the University will ask the Legislature for \$3.7 million for the first phase of a two-phase renovation and construction project that would bring the station into 21st-century form.

"I think of the Itasca field station as part of a family of field stations that includes Woods Hole Marine Biological Laboratory on Cape Cod, Cold Spring Harbor Laboratory on Long Island, and Friday Harbor Laboratories on Puget Sound," says [Robert Elde](#), dean of CBS. "They are magnets that draw biologists from all over the world to do science and to wrestle with deep problems across biology. That's really my vision, [to] bring Itasca into that league."

Tranquil setting, top-notch work

The University created the Itasca station as a summer training camp for forestry students. It enjoys an idyllic setting close to an ecological crossroads.

"Itasca sits almost at the dividing line between hardwood forest and northern mixed forest," says former Itasca director John Tester, author of *Minnesota's Natural Heritage*. "If you go just a little bit to the west, you break out into the prairie. So Itasca sits right in this prime location where three major ecological biomes come together. As a teaching tool that's just fabulous."

"I think that the Nature of Life is considered to be one of the most successful programs of its type in the United States. It wouldn't be possible without the Itasca field station."

"Itasca is essentially the canary in the coal mine," Elde adds. "Its location at the border of these three ecosystems makes it possible to observe the effects of climate and climate change on the behavior of these ecosystems and how one migrates into the other."

One by one, students fall in love with the place because there they can become part of important work. For example, undergraduate Anne Kellerman took part in a study of how earthworms affect aquatic systems.

"The significance of this project is to better understand how our world is changing," she says.

"Earthworms bring up organic matter to the soil surface, and much of it runs off into the lakes and ends up in the sediments," explains [Jim Cotner](#), a University professor of ecology, evolution and behavior. "Small lakes like these may play a huge role in removing carbon dioxide from the atmosphere and putting it out of commission for a long time."

"The variety of habitats in the lakes makes Itasca a perfect place to do research," says [Sehoya Cotner](#), a faculty member in the CBS Biology Program. "You have different size lakes, different depths, you have lakes that freeze solid in the winter and lakes that don't, you have lakes with fish and without them. It's a dream."

Itasca is also home base for an ambitious new study of how agriculture and other human activities affect the diversity of bacteria along all 2,300 miles of the Mississippi. Conceived by Elde and called the Minnesota Mississippi Metagenome Project (M3P), it brings students and faculty together to collect microorganisms from the headwaters and build "libraries" of their genes inside E. coli cells.

The gene libraries will constitute a DNA database to help researchers determine how microbial diversity changes as the river moves south, collecting inputs from regions of the country where land is used for farming, industry, and other activities.

"Microorganisms really are the driving force, the engine, that runs our planet because they recycle materials like carbon and nutrients," says soil, water and climate professor [Michael Sadowsky](#), who directs M3P. "The Itasca field station will play a prominent role in this project."

The need

Most of the Itasca station's 70 buildings date from a 10-year period following World War II. In 2006 Tester led an effort to restore the director's cabin, now the station's only log building, but rustic charm keeps giving way to the ravages of age.

"When the University's consultants came here three years ago and evaluated 47 of our nearly 70 buildings, it was their conclusion that 24 of those 47 should be replaced immediately," says Elde.

"The variety of habitats in the lakes makes Itasca a perfect place to do research. You have different size lakes, different depths, you have lakes that freeze solid in the winter and lakes that don't, you have lakes with fish and without them. It's a dream."

"Some of the buildings are deteriorating so rapidly we can't repair them fast enough," Biesboer says. "The foundation under the faculty offices is crumbling," and at least one faculty cabin has been condemned. "We are beginning to lose our edge as a research center because of the condition of our facilities."

In 2007 the University drew up a Master Plan for upgrading Itasca that would respect its historic and environmental character and set it on the road to becoming a net-zero-energy, self-sustaining campus community. In 2009 the University revised the plan, with two initial phases paving the way.

Phase 1 would revolve around a new 10,900-square-foot building with classrooms/laboratories, a computer room/library, an auditorium, and workstations. Estimated cost of Phase 1: \$5.5 million.

In Phase 2, two more classrooms/laboratories, year-round housing for 48 students, and three new faculty cabins would be added. Estimated cost: \$3 million.

Phases 1 and 2, if completed, would address the programmatic needs of the station for the next 10 to 15 years. Ideally, they would lead to steps toward energy self-sufficiency through means such as demolishing unsafe, inadequate buildings, renovating existing year-round buildings to improve energy efficiency (including future renovation or replacement of the dining hall), and adding renewable energy to the station campus.

It's a goal worth achieving, says alumnus Denny Dvergsten, an award-winning high school biology teacher and CBS scholarship donor.

"I think that the Nature of Life is considered to be one of the most successful programs of its type in the United States. It wouldn't be possible without the Itasca field station," he says. "Some of the buildings that I see here now are the same buildings that were here 50 years ago, when I first visited Itasca. It needs to be upgraded. It should be supported."

Ultimately, Elde hopes to add a retreat center and cabins for scientists and scholars to use when working on long-term projects.

"This is a turning point in Itasca's history," he says. "If we don't improve our facilities, we can't do research or provide educational programs here. That would be an enormous loss. I know these are difficult economic times, but now is the time to act."

To join the University of Minnesota's Legislative Network, visit [Support the U.](#)



Pay per byte' in Internet's future?

November 6, 2009

Observations on the growth of online traffic and Internet capacity

By Deane Morrison

With Internet traffic growing steadily, rumors that overusage will crash this pillar of modern society crop up from time to time. But [Andrew Odlyzko](#) doesn't buy them.

As principal investigator for the [Minnesota Internet Traffic Studies project](#), the University of Minnesota mathematics professor monitors Internet usage, taking advantage of data from a variety of sources. He sees traffic growing at somewhere around 50 percent per year, but it's nothing to worry about—at least not yet.



Andrew Odlyzko keeps tabs on Internet traffic.

"The Internet is growing rapidly, but at rates that can be accommodated by the current rate of improvement in technology," he says. In fact, the rate of growth even seems to be diminishing. In particular, he says fears of "exafloods" of traffic, brought on largely by video streaming, are unlikely.

Such worries have caused some Internet-related businesses to consider, or advocate, a new pricing system based on use. If that happened, instead of paying a flat monthly fee, users would pay "by the byte." (Odlyzko estimates that average consumers use between 10 and 15 Gigabytes per month; high-end users can go up to 250 Gigabytes per month.)

A constant conflict exists between efficiency and fairness in markets, he says, and the Internet is no exception. The fairness issue is embodied in the "net neutrality" concept, which means no one owns the Internet and carriers can't force users to, say, switch from their favorite search engine to another one. But, says Odlyzko, net neutrality doesn't preclude charging according to use, and that's where the potential for conflict comes in.



But, says Odlyzko, "if you charge by the byte, usage drops. Metered pricing is a way for industry to shoot

themselves in the foot." He also can count numerous historical instances where the public protested loudly against what it perceived as unfair pricing schemes.

The unlikelihood of exafloods due to video streaming and similar practices is based on data showing that they are not straining the system.

"It's true that if public decided to abandon TV, or satellite TV, and get all their movies and news stories through the Internet, it would crash," Odlyzko says. "However, we observe that people are not all that fast to change their habits. For example, about a third of the population has digital video recording, but even these people mostly watch traditional TV or cable."

From the industry standpoint, the real concern is people who upload material, especially pirated material, which then gets copied and spread around, he says. Those practices can cause traffic to mount very quickly.

For now, then, no crisis is looming for the wired Internet. "There's no need for a change in architecture or pricing," says Odlyzko. But wireless is a different kettle of fish.

"The explosion in data usage on wireless networks, such as from smart phones and BlackBerries, is putting a strain on the networks," he says, and it could lead to more constraints on the plans offered to consumers.

What's needed—and what Odlyzko does—is to collect information that reveals the balance between supply and demand so decision-makers can do the right thing, he says. He cites the examples of e-mail and texting; the popularity of both was predictable, but took the industry by surprise.

"You need to collect data because people sometimes do unexpected things," he observes.



Walking and clean air

November 9, 2009

New study compares 'walkability' in Vancouver neighborhoods with local levels of air pollution

By Rick Moore

Determining which neighborhoods encourage walking and which parts of a city are beset by pollution seems easy enough. Avoid the core downtown areas and look for a walkable stretch in the suburbs, right?

It's a bit more complicated than that. A new study done for the metropolitan area of Vancouver, British Columbia (host of the 2010 Winter Olympics), compares neighborhoods' "walkability"—the degree of ease for walking—with local levels of pollution, and reveals some interesting findings. Among them: some neighborhoods might be good for walking but have unexpectedly poor air quality.



The walkability study was done for the city of Vancouver, and surveyed 89 percent of the postal codes in the metro Vancouver area. The picturesque city will be in the spotlight in a few months when it hosts the 2010 Winter Olympics.

The study, published in the November issue of *Environmental Health Perspectives*, is the first study to explore interactions between neighborhood walkability and air pollution exposure. The researchers include Julian Marshall, an assistant professor in civil engineering at the University of Minnesota's Institute of Technology, and University of British Columbia faculty Michael Brauer and Lawrence Frank.

Researchers assigned a walkability score by analyzing four attributes of neighborhood design: population density, intersection density, land-use mixing (e.g., residential and retail), and ratio of land area devoted to shopping versus parking. More walkable neighborhoods tend to have mixed land uses, with stores and shops within walking distance of houses. Areas with low intersection density contain more circuitous road networks, making them less walkable.

Marshall and colleagues found a complex interplay between neighborhoods' walkability and air pollution. Downtown neighborhoods are generally more walkable but have high levels of nitric oxide—a marker of motor vehicle exhaust. Suburban areas, on the other hand, tend to be less walkable but have their own issues with pollution; namely, higher concentrations of ground-level ozone. Elevated ozone concentrations tend to occur in the suburbs because ozone takes time to form. During that time, air masses often have migrated away from the downtown area.

"The built environment—how we choose to structure our infrastructure—influences how we act, and [consequently] our health," Marshall says. "If there's no sidewalk, you're less likely to walk."

"Research has shown that exposure to air pollution adversely affects human health by triggering or exacerbating a number of health issues such as asthma and heart disease," says Marshall. "Likewise, physical inactivity is linked to an array of negative health effects including heart disease and diabetes. Neighborhood design can influence air pollution and walkability; more walkable neighborhoods may encourage higher daily activity levels."

Fortunately for Vancouver, the researchers found some "win-win" neighborhoods—those that are both walkable and have lower levels of air pollution—but they account for only 2 percent of the areas they studied. And census data shows that people with relatively high incomes live in those neighborhoods, suggesting that they are desirable places to live and perhaps unaffordable to many. Interestingly, neighborhoods that fare poorly for both walkability and pollution tend to be in the suburbs—and where generally middle-income families make their homes.

Since the data for the study are particular to Vancouver, Marshall can only speculate as to how the Twin Cities metropolitan area would fare when evaluating the intersections of walkability and pollution. But he has some guesses on where some win-win neighborhoods would be; namely, the Macalester-Groveland area on the west end of St. Paul and portions of south Minneapolis near the chain of lakes.

"It's reassuring that you can split the difference—avoid both types of pollution and still get a walkable neighborhood," Marshall says.

Planning for the future

The study's findings suggest the need for urban planners to consider both walkability and air pollution, while realizing that certain neighborhoods are prone to high levels of pollution—either nitric oxide or ozone.

"There *is* urban planning now that focuses on walkability and exercise-friendliness," Marshall says. But while that idea is on planners' minds, "the connection to air pollution isn't as much."

Fortunately, addressing walkability might naturally lessen air pollution. Creating neighborhoods that allow for alternative transportation modes such as biking, walking, and public transit is one way to reduce motor vehicle emissions, the study suggests.

It's about "allowing people to live in a less car-dependent neighborhood, if they wish to," Marshall says.

Sometimes that's easier said than done. Urban planners often face zoning laws and regulations, including height restrictions for buildings and minimum parking requirements for retail establishments.

"The built environment—how we choose to structure our infrastructure—influences how we act, and [consequently] our health," Marshall says. "If there's no sidewalk, or if destinations like shops and restaurants are miles away, you are less likely to walk there."

In the future, the researchers hope to investigate changes over time in walkability and pollution, and also study other urban areas to see how spatial patterns may differ.

To read the study in its entirety, visit the *Environmental Health Perspectives* [Web site](#).



Eyes of a child

November 10, 2009

In a baby's reach, clues to the development of human vision

By Deane Morrison

Sitting on her mother's lap, 5 1/2-month-old Fiona looks at a wire figure hanging in front of her. She reaches out and grabs it, unaware that a camera records her every move.

Fiona is one of many young babies helping researcher [Al Yonas](#) tackle what he calls "the toughest problem in the Universe"—how we construct a meaningful world from a 2-D pattern of light and color on the back of our eyeballs.



Research on babies helps reveal how human vision develops.

A professor in the University of Minnesota's Institute of Child Development, Yonas studies young babies to find out at what age they develop the ability to interpret the 3-D form of the wire figure, which is much like a line drawing.

That interpretive ability is described as sensitivity to pictorial depth cues. People who have it don't need to move in order to perceive the depth of an unfamiliar scene. If the scene is Yonas' wire figure, 7-month-old babies see, and thus react to, the figure the same as adults do; that is, they see the shape as sticking out toward them.

And younger babies? The jury is still out.

Yonas pursues his research both for the sheer joy of discovery and because it may someday yield dividends, perhaps by helping children blind from birth develop sensitivity to pictorial depth cues after having their sight restored later in life.

To understand the experiment, play the accompanying video and freeze it at the :27 mark. The wire figure will probably look like a solid 3-D object, with three sides that meet at a corner in the middle. The middle part appears to be closest to you.



Now freeze the video at the 1:14 mark. The figure is oriented the same way but, clearly, the center of the form is farthest away.

If you were sitting where our camera was, you'd be able to tell that the center is most distant (assuming you have normal binocular vision).

But if you covered one eye, your binocular vision would disappear and the figure would look like a convex object whose nearest point is—you guessed it—the central Y-shaped vertex.

Older babies with one eye covered tend to reach toward the Y because that seems to be the closest part of the object, as it does for adults using one eye. But when older babies use both eyes they tend to perceive, correctly, that the outer corners are closer and reach for one of them instead.

"With 7-month-olds, the difference is reliable," says Yonas. "We're still collecting data for 5-month-olds."

When children learn to perceive spatial layout, they depend partly on their experiences navigating the 3-D environment, using not only motion but also binocular vision, touch, and other cues, according to Yonas. But what about the ability to perceive depth with only one eye in a motionless environment or a picture? He thinks that the ability to use "static monocular depth cues"—which depends on the recognition of particular patterns—is complex and may develop later than sensitivity to other kinds of depth cues.

"The point of our work is to determine when babies first respond to pictorial depth cues like shading and perspective," he says. In Yonas' wire figure, the pictorial depth cue is the way the lines intersect.

"I think that the ability to use these cues develops last and is most fragile," Yonas says. He cites the case of one Michael May, a business executive who was blinded by a chemical explosion at age 3 and had his sight partially restored at age 46. May lacks pictorial depth perception (remember, it's fragile) and can't recognize anything, even his wife, unless he or the object is moving, says Yonas.



Man of many hats

November 11, 2009

Senior Tyler Johnson adroitly juggles academics, activities, and family life

By Rick Moore

There's one motto that U student Tyler Johnson draws upon occasionally—that time should just be a reference, not a standard. (Translation: things don't always have to take as long to do as people say they should.)

For Johnson, that's a good thing. If he ascribed to conventional time guidelines and believed how long things should take, he'd be short about 12 hours each day.

Johnson is a full-time student majoring in kinesiology, and at any given time over the past three years he's been involved in one or more of the following: playing for the Golden Gopher football team, interning as a strength and conditioning coach (first for Fridley High School and now for the Gophers), and running his own five-person house-painting business. Before that, he was in the Marines for four years and served two stints in Iraq. Oh ... he's also married with a 6-year-old daughter and another child on the way.

That's a lot for any resume, but Johnson, 25, is not the kind of person to blow his own horn. He's more likely to shrug his shoulders and say, "It's no big deal."

Still, his accomplishments are worth noting, and it's especially timely to note them this month. November 11 was Veterans Day and Student Veterans Appreciation Day. Also, November is Nontraditional Students Month at the University of Minnesota.

From Iraq to the Metrodome

Johnson graduated from Concordia Academy in 2002 and decided to join the Marines that September. He married his wife, Danielle, the following winter, the day after Valentine's Day, and was deployed to Iraq for the first time a year later. That first stint lasted about six months.

After switching units, Johnson was sent to Iraq a second time in September 2005. He was there for the elections in June 2006—"That was a fun time," he says—and was discharged later in the year.

"After the first year, it just kind of flew by," Johnson says of his service. "I think it means more every day. Maybe the farther you get from something, the more you can understand it."

He enrolled at the U in fall 2006 and admits that making the adjustment to college was "definitely a big switch." Johnson was on the smaller side in high school (he's 5-foot-7 and wrestled at 145 pounds), but coming out of the Corps he had filled out to 190 pounds. Some friends from high school had suggested he try becoming a walk-on for the Minnesota football team, so that's what he did.

In September 2007, with the season already underway, he contacted the football powers-that-be and was told to come back the following day with cleats. A few weeks later he traveled with the team for a contest against Indiana, and [in the seventh game of the season] against Northwestern, he saw action for the first time. He played on special teams (kickoff, kickoff return, and punt-blocking) and wound up lettering that season, Tim Brewster's first as head coach.

"College is college no matter how old you are. There are always assignments and [things] you have to get done," Johnson says. "It's not necessarily difficult to juggle, it's more that I don't feel I can put as much into each individual thing as I'd like to."

In spring camp the next year, Johnson suffered an injury thought to be a mid-foot sprain. He later discovered he needed surgery, but decided to postpone it till after the summer. After all, there was a fledgling painting business to tend to. "Obviously, I couldn't take the whole summer off [or] be on crutches for six weeks," he smiles.

Instead, he had the surgery done on September 12, 2008, a year to the day before the opening of TCF Bank Stadium. However, Johnson says he's not 100 percent in terms of speed or mobility, and when he discovered Danielle was pregnant again, he decided to hang up his cleats.

"I'm 25, and maybe I'm a little too old to be playing football for fun, you know," he says. "And the injury kind of took the fun out of it. I'm a lot more interested in the area of study I'm in now, too."

He's certainly still staying busy. He has an internship with U football strength coach Mark Hill. The GI Bill finances much of his college education, but the monthly stipends only run through the academic calendar. So in the summer, when a majority of students are decompressing and rejuvenating, Johnson is keeping up the frenetic pace. In addition to the house-painting gigs, he usually squeezes in an early-morning workout.

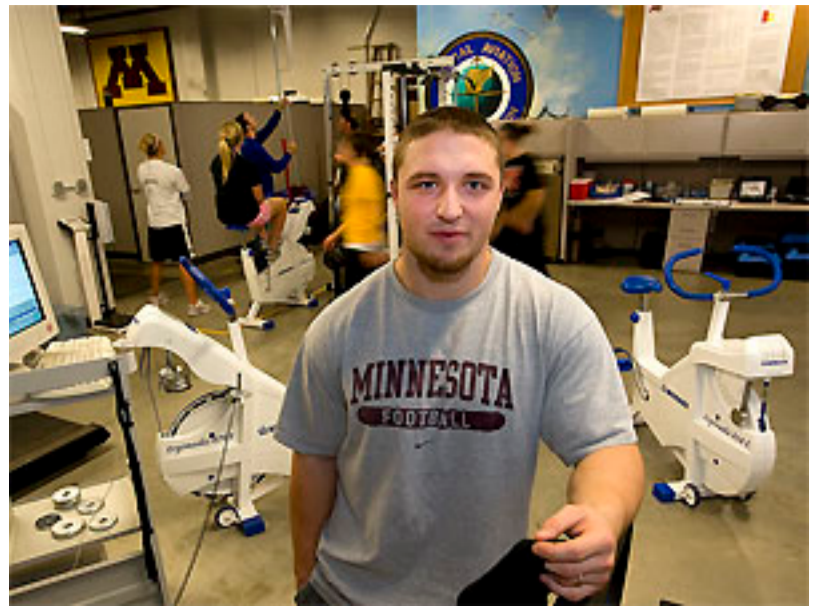
On being a nontraditional student

Johnson is matter-of-fact when it comes to describing his life as a 25-year-old husband and parent. He admits that it can be difficult to find common ground with his classmates—a common refrain among nontraditional students and certainly a recurring theme among veterans—but that doesn't appear to bother him in the slightest.

"You try to just find commonalities between whatever ages you're working with, whether it's your peers or other people," he says. "[I guess] the one thing the military might have taught us is that age or race or any of that stuff doesn't really matter if we're all in the same place trying to work for a common goal."

"College is college no matter how old you are. There are always assignments and [things] you have to get done," he adds. "It's not necessarily difficult to juggle, it's more that I don't feel I can put as much into each individual thing as I'd like to. For school, I'd like to be able to put more into it than I can, but sometimes it doesn't work out that way. Same with the family, I'd like to be able to spend more time with them."

He credits his wife and daughter with being very supportive of all that he does. And Danielle picks up where he may have some shortcomings. "She's [obsessive-compulsive] and a planner, and I'm not a planner," he smiles. "She reminds me of everything else, so I just remind myself about school."



Tyler Johnson is no stranger to the gym. He wrestled and played football in high school, played a year of football at the U, and has worked in strength and conditioning at two different schools.

Photo: Patrick O'Leary



Redefining citizenship

November 13, 2009

U expert Jeffrey Kahn examines ethical concerns in a global pandemic

By Rick Moore

Months after the onset of the H1N1 flu pandemic, Minnesotans are aware of most of the dos and don'ts of staying healthy—and keeping others healthy. Wash your hands a lot. Keep your sneezes to yourself. If you're sick, stay home from work. And if your child is sick, keep him or her out of school.



But there are many other things to think about in a pandemic, according to [Jeffrey Kahn](#), director of the [Center for Bioethics](#) at the University of Minnesota.

One issue around vaccines is whether or not the government should force people who provide direct patient care to be vaccinated. "We don't give people the option of putting on gloves when they operate," says Jeffrey Kahn. "... I think there's a debate worth having about whether vaccine is like that."

Fortunately, Minnesotans naturally tend to be good citizens. "We turn out to be a very well-behaved community when it comes to public health, he says. "We know this from the last time there was a shortage of flu vaccine. We told people, only come [for a vaccine] if you fall into one of the high-risk groups. And in fact, people were so well-behaved there was excess vaccine."

That's one example of what Kahn calls good citizenship in the time of a pandemic. There are other scenarios, other choices we make, where we may not be as conscious of the ramifications. People know it's not a good idea to go to work or to school when they're sick with the flu, but what about getting to the grocery store for soup and crackers or to the drug store for medications?



Good

citizenship would dictate that we refrain from making those trips, and that the task goes to someone who's not sick. "A good citizen would know that their neighbors were ill and make a phone call and say, 'Can I go to Cub Foods for you? I'm going anyway. What can I buy you? I'll buy you groceries. I'll leave them on your doorstep.' ... But that requires us to behave in a particular way. So, I think we want to encourage people to think about what it takes to be a good citizen in a particularly difficult time in our community."

Part of the problem this fall is that people are finding it difficult to distinguish whether they have H1N1, seasonal flu, or a common cold. And as Kahn points out, you might not be able to stay home every time you have a cough.

That leads to another issue. For some families in which a single parent or both parents are working, it can be very difficult to have someone stay home with a sick child. In certain areas where parents had no other options for childcare, there have been much higher rates of H1N1 infection, Kahn says.

There may be another ethical dilemma down the road if there were to be a severe outbreak of H1N1: who would get to use a hospital's ventilators—an older person who's critically ill or a younger person who may not be as ill?

"We don't have lots of extra machines like that, so how do we decide who gets to stay on and who doesn't?" Kahn says.

It's questions like these that Kahn and others at the U are well situated to answer. "We have the interdisciplinary expertise [at the University] to bring to bear. We can work with people in public health, in ethics, in medicine and help the state come to grips with what we hope will never happen. But let's be prepared for the time it does."



Blade runner

November 18, 2009

Minnesota Supercomputing Institute begins second quarter century with increased capacity

By Rick Moore

In the basement of Walter Library, the machines of the [University of Minnesota Supercomputing Institute for Advanced Computational Research](#) (MSI) are doing work that would make most people's heads spin. Work to the tune of trillions of calculations per second, and work that benefits more than 4,000 active users.

Now in its 25th year, MSI is the proud owner of an important research tool: a new supercomputer, named "Itasca" by MSI and powered by 1,083 HP ProLiant BL280 G6 blade servers. The new system is ranked No. 67 on the Top 500 list of the world's most powerful supercomputers.

"Today, high-demand computation is absolutely central to a wide array of important research areas that are vital to putting the University of Minnesota in a leadership position," says Tom Jones, interim director of MSI. "This new computing system is a big step above systems at most other universities, so our faculty and students are really excited by the big boost in computational power they will have to drive the frontiers of knowledge."

And what a boost it is. Prior to installing the new system, MSI had a cumulative theoretical computing performance of 32 teraFLOPS, meaning 32 trillion mathematical computations per second, according to Brian Ropers-Huilman, the director of systems administration and technical operations at the institute. The new HP blade servers deliver 97 teraFLOPS of performance—three times MSI's previous capacity. Factoring in MSI's remaining supercomputing systems, the new capacity is 127 teraFLOPS, which will expand research capabilities immensely.

"[The increased capacity will] improve the quality of the science, in some cases allowing [researchers] to solve larger problems and produce more precise results," Ropers-Huilman says. In addition, the increased capacity will enable researchers to process more data to solve their problems, producing faster results, he says.

A quarter century of enhancing research

Way back in 1981—before anyone dreamed of a laptop computer that you could throw in a tote bag and bring to a coffee shop—the University of Minnesota became the first university to purchase a class VI supercomputer, a 100 megaFLOP Cray 1. Soon thereafter the U began recruiting faculty in research areas that used supercomputing, and it created the Minnesota Supercomputing Institute in 1984.

Over the years, the core mission of MSI has stayed constant: to provide supercomputing resources to academic researchers and to facilitate cutting-edge computational research. And while the supercomputers themselves have changed dramatically in 25 years, so have the needs of their users.

For years, researchers in the physical sciences and engineering were the core users of MSI's resources. Now biologists and medical researchers are increasingly in need of high-end computing and the software packages that MSI offers for genomics, proteomics, and related fields. In fact, the Academic Health Center now has the highest number of MSI principal researchers among U colleges.

This expansion across a wider range of disciplines is paying dividends for the University. In 1989-90, the first year MSI tracked external funding, MSI researchers received about \$11.5 million. For the 2008-09 academic year, researchers brought in \$103.9 million in external funding.

Researchers at the U use supercomputers for a range of activities, often crossing academic disciplines, which has implications for Minnesota and around the world. Some examples:

- The new I-35W bridge contains sensors that analyze structural behavior. Researchers at the U—including Catherine French, Carol Shield, and Henryk Stolarski—are using MSI resources to evaluate data they collect. Monitoring the new I-35W bridge could lead to a better understanding of similar bridges, ultimately contributing to increased bridge safety.
- The Center for Research in Education and Simulation Technologies (CREST) is improving surgical education with the use of virtual reality-based trainers. In collaboration with MSI, CREST researchers are developing interactive, real-time simulation and visualization for remote surgical training, and MSI is providing hardware, software, and technical user support.
- Gunda Georg, an internationally known medicinal chemist, directs the Institute for Therapeutics Discovery and Development, where researchers conduct interdisciplinary research in drug discovery and development. They use MSI's resources to safely and securely record and manage the enormous amount of biological data generated during the drug discovery process.
- A group of researchers led by Fumiaki Katagiri is using MSI resources to investigate how plants recognize the molecular signals of pathogen attack and how they then coordinate their defense responses. The work may lead to methods of disease control that are safer than current methods for humans and for the environment.

In addition, MSI is a great resource for University students, both graduate and undergraduate. A large number of grad students work in MSI research groups. And the Undergraduate Internship Program introduces students to the kind of research they would do as graduate students at the U.

As Vice President for Research Tim Mulcahy points out, we're living in an "information-intense world," and high-end computing capacity is increasingly in demand. To that end, the addition of the new supercomputer is a boon to the University.

"One of the real assets of MSI is the staff expertise and consultation that is provided for faculty around the hardware," he says. And "the addition of Itasca really puts us in a competitive position in terms of the hardware."



Vice President for Research Tim Mulcahy (left) and Birali Runesha, director of scientific computing and applications, stand next to the U's new high-performance computing system, powered by 1,083 HP ProLiant blade servers.

Photo: Amy Danielson

MSI exhibited at the annual international supercomputing conference, SC09, this month in Portland. MSI announced its new Itasca system jointly with HP and showcased recent research collaborations at the U to an international audience of more than 11,000 attendees.



Never leave chopsticks upright in rice

November 20, 2009

Behind eating 'do's' and 'don't's' around the world

By Deane Morrison

If [William Beeman](#) sees chopsticks in a Thai restaurant, he walks out. In Thailand, says the University of Minnesota anthropology professor and department chair, diners use a fork to put food on a spoon, then eat off the spoon.



Table manners help us navigate cultural boundaries, says University anthropologist William Beeman.

That custom is part of a universal pattern of rituals that shape the human habit of eating together, he explains. All over the world, communal dining is more than just eating; it's an event full of transitions, both material and symbolic.

The event begins when guests arrive and transit from outside to inside, then to the eating place. The last boundary is crossed when food enters the body.

"In every single case, you're passing a boundary between cultural spheres," says Beeman. "You must go through ritual actions to mark the passages."

The first action is to greet guests at the door, or to stand as other members of the party arrive at a restaurant. In most societies, diners form a procession to the table, with the oldest, most prominent, or most respected people leading the way, he says. Another boundary marker is the signal to begin eating, which may be "bon appétit," a prayer, or the Muslim blessing for any new undertaking.

Table manners evolved not just to make the communal passage of food into the body pleasant, but to keep out polluting influences.



For example, "in Japan, you turn the

chopsticks around to serve from a common bowl, then turn them again to eat off the other ends," Beeman says. In a big part of the world, eating with the left hand is unacceptable "because the left hand is used for toilet purposes." Likewise, the Thai—also Persian—practice of transferring food from fork to spoon to mouth helps reduce the chance of contamination.

Cultural practices may also banish symbolic pollution. In Japan and China, servings in units of four are avoided because the Chinese word for "four" and the Chinese reading of the number four in Japanese have the same sound as the word for death. And in Japan, says Beeman, "make sure chopsticks never stand upright in rice—that's done at funerals."

Holiday traditions may strengthen bonds between family or group members because sharing ritual foods unique to a group or occasion can cement the feeling of belonging.

"In my family, we always had turkey with stuffing, and the stuffing always contained oysters," says Beeman. "We also had creamed onions. And my sister-in-law brought lime jello with pomegranate seeds."

Holiday dining also tends to emphasize seasonal foods and more elaboration in the foods and how they are eaten, he notes. Pre-dinner eggnog, hors d'oeuvres, and food scattered around the house allow people to eat together even when not at the table. And dessert, coffee, or drinks are often served in another room.

When a meal is over, the processes of greeting one another and starting to eat are reversed, Beeman says. For example, in the West, people signal they have finished by placing the napkin on the table and crossing knife and fork on the plate. And, of course, one must excuse oneself when leaving a meal early.

Many Western table manners have roots in the Renaissance, when eating became a serious event for the upper classes, according to Beeman.

"The fork was invented in the Renaissance as a way to be more genteel," he notes. "Eating can be disgusting, but surrounding it with rituals and choreography makes it less unpleasant."



'Gee' whiz

November 23, 2009

Physicist Dan Dahlberg calculates the G-forces in a football collision

By Deane Morrison

Early in the second quarter of a home game against California September 19, Minnesota wide receiver Eric Decker, en route to the end zone, plucked a 26-yard pass from the air and was immediately hit by a Cal safety.

Decker scored a touchdown on the play, but the blow was so hard, it took him several minutes to get back on his feet. How hard was it? We asked University of Minnesota physics professor [Dan Dahlberg](#) to look over footage of the hit from several angles, in real time and slo-mo, and figure out how much force the safety applied to Decker during the hit.

A little background: The players collided at a right angle, with Decker running down the sideline and the safety parallel to the goal line. They hit at about the one-yard line, and both ended up out of bounds and beyond the goal line.

Dahlberg's mission, which he chose to accept: Calculate the force of the collision in G's—the force of gravity. Since gravity, like any other force, accelerates objects, the assignment amounted to calculating the acceleration imparted to Decker's body during the collision.

If you're not the type to follow calculations, here's what Dahlberg came up with. In a contact that lasted only one-twentieth of a second, the collision applied a force of at least 10 G's, or 10 times the force of gravity, to Decker.

The accompanying video shows the action (Decker is in maroon and gold). Below the video, we'll go through the calculations.



An instant after catching this pass, Gopher wide receiver Eric Decker was hit by a Cal safety (No. 11) with a force of more than 10 G's.

Photo courtesy University Athletics

The Physics Force

Catch Dan Dahlberg and friends in one of two free, highly entertaining public shows by the original [Physics Force](#). 7 p.m. Thursday, January 7, and 2 p.m. Sunday, January 10, 2010, in Northrop Auditorium, 84 Church St. S.E., Minneapolis.



Dahlberg started by figuring out Decker's speed heading

downfield. To do that, he advanced a video frame by frame and noted how many frames it took Decker to run a certain number of yards just before the hit. Knowing the video's speed in frames per second, he was able to estimate Decker's downfield speed at 23 feet per second.

Dahlberg also examined videos from different angles and estimated that Decker hit the ground at a point 4.5 feet out of bounds and 6 feet downfield from the collision.

Next, Dahlberg estimated Decker's speed crossfield (through out-of-bounds territory). He reasoned that since the distance traveled in any direction is proportional to the speed in that direction, the ratio of the crossfield speed to the downfield speed after the hit must equal the post-hit ratio of the crossfield distance (4.5 feet) to the downfield distance (6 feet), or 0.75. Thus, the crossfield speed must be 75 percent of 23 feet per second, or 17.25 feet per second.

Let's turn now to G-forces. The acceleration due to gravity is 32 feet per second per second. That means that for every second a body is in free fall, its speed increases by 32 feet per second. Unlike gravity, though, the force of the football collision was applied for only an instant.

By counting frames in slo-mo, Dahlberg saw that contact between the two players—and thus the application of force in the crossfield direction—lasted one-twentieth, or 0.05, second. So Decker's acceleration in the crossfield direction was 17.25 feet per second divided by 0.05 second, or 345 feet per second per second. That's 10.8 times as high as gravity, or 10.8 G's.

"I read where Navy pilots taking off from aircraft carriers experience three G's, but that force is applied all over the body. The force to Decker was delivered mostly to his chest, so the pressure [force per unit area] on his chest was significantly larger than for a pilot," says Dahlberg.

With these figures in hand, it's clear that the pressures of playing college football go beyond wins and losses. And if you've ever wondered why players wear so much padding, now you know.

Share this:



Making the buck stop here

December 3, 2009

The U's Tourism Center supports tourism initiatives throughout the state

By Rick Moore

Knee-deep in a recession, cutting expenses for leisure travel is a natural strategy, if not a necessity, but that trend has put a dent in the tourism industry.

An \$11 billion industry annually, tourism is critical to the state's economy on a scale comparable to agriculture. It accounts for 15 percent of all state sales tax and about 10 percent (244,000) of the state's jobs.



Ingrid Schneider

That's where the University of Minnesota Tourism Center comes in. The center is a network of individuals—including University of Minnesota Extension educators reaching the entire state—who support tourism-dependent communities and businesses, according to Ingrid Schneider, director of the center.

The Tourism Center's work is highlighted in a new half-hour program airing on TPT's Minnesota Channel beginning December 6. It illustrates five initiatives scattered across the state: the St. Paul Festival Association, the Three Rivers Wine Trail, the Upper Minnesota Valley Regional Development Commission and its Arts Meander (in west central Minnesota), the Brainerd Lakes Area, and sustainability efforts at The Mall of America.

"People don't realize how spread out tourism is across the year," Schneider says. "We think of it primarily as a summer activity. And while the greatest percentage is during the summer, we certainly have tourism opportunities spring, fall, and winter, and the percentage of tourists visiting us during those seasons attests to that."

The Napa Valley of the Midwest?

Ask anyone from outside of the state what he or she equates with Minnesota, and chances are no one will say "wine." But the southern part of the state is actually at the same latitude as some of the better wine growing regions in France.

"We say all the time, this is Napa Valley without the airfare," says John Maloney, co-owner of Cannon River Winery, in "Tourism in Minnesota." "What the University of Minnesota did for the apple [industry]—the Haralson, the Honeycrisp—that's what they're going to do with cold-hardy wine grapes. Several of the grapes we grow are a result of their breeding. Those grapes will tolerate 30, 35, even 40 [degrees] below."

A few years ago, a University of Minnesota graduate student hatched the idea of a statewide wine trail. Kent Gustafson, a University of Minnesota Extension educator, then grabbed the vine and started talking with the wineries, facilitating meetings, and organizing them into a unified group.

The result of this collaboration is the Three Rivers Wine Trail linking wineries along the Cannon, St. Croix, and Mississippi rivers.

"That was a real nice embodiment of education, engagement, and research and represents how we bring our three-legged stool together at the University," Schneider says. "The project idea evolved from a class we teach on nature and culture-based tourism. The student then brought that forward as a UROP (Undergraduate Research Opportunities Program) project, then [University] staff followed up on it, and now we have a couple different wine trails at least, and more on the way."

Some refreshing signs

The state's tourism industry has had its share of challenges. Dollars spent on travel are down this year, although the U.S. Travel Association predicts that domestic travel and lodging occupancy rates will return to growth in 2010.

Minnesota is also hamstrung by a smaller marketing budget. It ranks in the lower third of states for spending, trailing regional competitors like Wisconsin and even South Dakota.

Yet year in and year out, polls indicate that more than 95 percent of Minnesotans believe that tourism is important or very important to the economy, Schneider says.

Although expensive trips might be less tenable due to the economy, taking the time to take a vacation—however close to home—might be more important than ever... *because* of the shaky economy.

"We're increasingly under stress because of the economic situation, both personally and professionally," Schneider says. "That vacation really provides an opportunity for a person to recharge, to reduce stress, and come back as a more refreshed person with a new perspective."

"Tourism in Minnesota: Ideas at Play" will air a number of times on TPT's Minnesota Channel throughout December. It can also be accessed [online](#) at the Minnesota Tourism Center site.



A master switch for metamorphosis

December 3, 2009

A discovery about insect metamorphosis holds potential for better insecticides, clues to human puberty

By Deane Morrison

In solving a 20-year puzzle about insect metamorphosis, a University of Minnesota research team has taken a big step toward the design of better insecticides and understanding the onset of human puberty.

Led by [Michael O'Connor](#), a professor of genetics, cell biology and development, the researchers studied PTTH, a brain-produced hormone that triggers the mechanism of metamorphosis by acting like a key fitting into a lock. PTTH's "key" identity has been known for 20 years, but it took the O'Connor team to find the "lock," completing the picture of this seminal event.



A discovery about insect metamorphosis by University professor Michael O'Connor and his colleagues may aid the design of "greener" insecticides.

Because the onset of human puberty is brought about by a similar mechanism, the finding addresses the question of how a host of organisms, from insects to humans, sense increasing body size and enter the next stage of development on schedule.

"In its overall design, insect metamorphosis is very much like passage through puberty," says O'Connor. "It, too, is regulated by a [small brain hormone] whose production is controlled by nutritional, environmental, and genetic factors. ... [B]oth puberty and metamorphosis accomplish the same goal—to provide reproductive capacity for the species at the appropriate developmental time."

The discovery also may inform efforts to design environmentally benign insecticides targeting a narrow range of species, such as mosquitoes. The [research appears](#) in the December 4 issue of *Science*.

A common thread

From a squirmy larva turning into a beautiful butterfly to a child becoming an adult, developing organisms sense their body size and use a complex system of hormones and other chemical signals to orchestrate the process. The O'Connor team worked with larvae of fruit flies and silk moths, both of which belong to the large group of insects that undergo a PTTH-based form of metamorphosis. Butterflies, bees, wasps, beetles, and mosquitoes also belong to this group.

PTTH is a neuropeptide—a small brain-derived hormone, similar in function to some human pituitary hormones—released by the brain when insects reach a threshold body weight, a signal that also initiates human puberty. After release from the brain, PTTH is snagged by a "receptor" molecule—the "lock"—in the main insect endocrine organ. The University researchers identified the receptor as an enzyme that works like a master switch, turning on other enzymes that turn on still others and eventually lead to a rash to changes resulting in metamorphosis.

Kill the messenger

Now that the O'Connor team has clarified the mechanism by which PTTH delivers its message, work can begin on ways to scramble the signal and thwart insect development. It helps that the PTTH molecule comes in many forms; even closely related groups of insects often have different versions of it. Someday, insecticides may be designed to interfere with PTTH specific to agricultural pests or carriers of disease without harming bees, butterflies, or other desirable species.

O'Connor says the next step will be to figure out how environmental and nutritional cues control the insect brain's production of PTTH.



An unexpected outcome from rising CO2

December 3, 2009

Higher carbon dioxide levels may help reduce some biodiversity losses

By Deane Morrison

For years, a global rain of nitrogen from fertilizers and exhaust fumes has been linked to losses of species diversity among communities of plants. And there are fears that the rising carbon dioxide (CO2) level could also reduce biodiversity, especially when it acts in concert with nitrogen pollution.

Now, work by University of Minnesota researcher [Peter Reich](#) shows that in fact, rising CO2 could mitigate the loss of biodiversity brought about by nitrogen pollution. He [published his findings](#) in the December 4 issue of *Science*.



Elevated carbon dioxide levels may mitigate losses of biodiversity from nitrogen pollution, according to work by Regents Professor Peter Reich.

Photo: Patrick O'Leary

A complex combo

According to Reich, studies indicate that nitrogen pollution today could lead to a 25 percent reduction in plant biodiversity. There is also worry that together, rising CO2 and nitrogen pollution could cut diversity by up to 50 percent. But whether these two factors will join forces to wreak that kind of havoc cannot be predicted, and so Reich decided to find out.

In a 10-year grassland study, Reich, a Regents Professor of forest resources, examined the effects of increasing CO2 and soil nitrogen singly and together. He found that adding nitrogen to the soil reduced the number of plant species by 16 percent, and growing plants under an elevated level of CO2 reduced diversity by about two percent.

But the drop was only eight percent when plants were grown with higher levels of both nitrogen and CO2.

That was a far cry from the worst-case scenario, in which the loss of species under both treatments would have been 18 percent (16 from nitrogen, 2 from CO2) or higher. But neither was it a big surprise, given that environmental forces often combine their effects in complex and unpredictable ways.

So what led to this result?

A battlefield out there

As an example, consider the ways elevated CO2 and nitrogen affect the way plants use water. Under enriched nitrogen, certain species grew faster, used more water, and thus reduced the availability of water for other species. This hurt the less dominant plant species and reduced the overall species number.

But elevated CO2 led to a higher percentage of water in the soil; this counteracted the effect of nitrogen enrichment, allowing more species to survive.

"This gave plant biodiversity a boost," Reich says. But he cautions that this doesn't give one carte blanche for optimism. What his work illustrates more than anything else is the difficulty of predicting the outcomes of interactions among the atmosphere, the climate system, and terrestrial ecosystems.

"While it is a relief to find out that rising CO2 and nitrogen together may not cause enormous losses of diversity, all losses of diversity are troubling, and in any case this finding does not detract from the urgent need for us to curb CO2 emissions, given the other critical CO2 effects," he says.

By the numbers

Here are the levels of elevated CO2 and added soil nitrogen, averaged over 10 years, to which plots of prairie plants were exposed. For CO2: 560 ppm, a level likely to become the global mean between 2050 and 2080 at current rates of increase. Today it's about 380 ppm. Nitrogen: four grams per square meter per year, or about 4-6 times the usual nitrogen pollution in Minnesota. Control plots received no extra CO2 or nitrogen.



Class of the titans

December 7, 2009

A student's account of meeting economics Nobel laureates with differing views

By Philip Zeller

In the midst of the greatest recession my generation has experienced, the chance to study under a world-renowned expert on depressions and financial crises is, for an undergraduate, tremendous. That is what professor [Tim Kehoe](#) gave 26 aspiring economists in his course on depressions and financial crises.

On the first day of lecture, Kehoe declared the course should be the most important part of the students' lives. The students worked with data and analytical models (many developed by Kehoe's colleagues) to determine the causes of significant economic downturns and, hopefully, recoveries. The class, though rigorous and time-consuming, has been worthwhile.

The students used *Great Depressions of the Twentieth Century*, co-edited by Kehoe and Nobel laureate Edward Prescott, as their primary text. In mid-October, Kehoe told his students they would take a field trip to the Federal Reserve Bank of Minneapolis, where Kehoe is an adviser, to attend a presentation by Prescott and fellow Nobel laureate Robert Lucas.

The class was giddy at the prospect. These economists are ranked fifth and 10th, respectively, in the IDEAS ranking of economists, a system based on quantity and quality of published economics research.

On Tuesday, November 10, the class headed to "the Fed." Prescott and Lucas gave brief overviews of their recent research, and then took questions from the students.

Great minds think unlike

It struck me that two men of similar education and work backgrounds, both with tremendous accolades in economics, could present vastly different solutions to economic meltdowns.

A free market economist and outspoken political conservative, Prescott boldly stated, "Economic stimulus is really an economic depressant." In stark contrast, the more interventionist Lucas attributed the length of the great depression partially to the noninterventionist and anti-immigration policy of the Hoover administration. While the gentlemen were entirely cordial and friendly, they clearly have significant professional disagreements.

Afterward, I asked Prescott for his thoughts on the green movement and its effect on technological progress, productivity, and economic growth. He said that while he doesn't question the negative impact of greenhouse gases, and he is confident the green movement can lead to technological growth, he worries that the movement could lead to a technological retrogression, conceivably slowing economic growth.

The chance to candidly chat with Nobel laureates is certainly one I would, in all likelihood, have never had at the other schools where I studied before attending the University of Minnesota.



Nobelist Robert Lucas addresses U of M economics students at the Federal Reserve Bank of Minneapolis. Home page images show Edward Prescott.

Photos: Patrick O'Leary

A live subject

"The current financial crisis has been tragic for many people, but it gives me as an economics professor the opportunity to show my students that economics is a very live subject, with a major impact on the world around us and on them personally."—Tim Kehoe, Distinguished McKnight University Professor of Economics.



Smarter snowplows

December 16, 2009

U researchers enhance automated sanding and salting system for plows

By Rick Moore

'Tis the season to *not* be so jolly ... if you're driving around in the snow. As evidenced again last week, even a little bit of snow in rush hour goes a long way toward a bumper-to-bumper mess on Twin Cities roads. Imagine what Grinches we'd all be without Minnesota's well-oiled (generally) system of snow removal and sanding.

Take heart—things may be getting better soon. Researchers at the University of Minnesota are working on a method to make that latter process—the sanding and salting of roads—more efficient and cost-effective, which could benefit all Minnesotans.

The U is enhancing technology that helps snowplows determine exactly where slippery patches are and to target those specific areas with their sand-and-salt mixtures.

It's all based on measuring friction coefficients, and for those of us whose brains feel frostbitten when discussing coefficients, here's what happens. A sensor system is attached to a wheel near the front axle of the snowplow, and when the sensor filters out the vibration "noise" and detects a loss of friction, it sends a signal to the sand-spreading equipment. A mere fourth of a second later—about the time it takes the applicator to arrive at the ice—the sand begins to fly.

"We are hoping that this technology will be evaluated by MnDOT supervisors and snowplow drivers on two or three snowplows during the next year," says Rajamani.

This automated system yields several benefits, according to researcher Rajesh Rajamani, a professor in the U's Department of Mechanical Engineering who helped develop the technology along with colleagues Lee Alexander and Gurkan Erdogan. For one, it will be helpful to know portions of road that tend to get slippery, and by using GPS technology, the Minnesota Department of Transportation (MnDOT) could create a database of problematic areas.

The technology will also make things easier for plow drivers, who face enough challenges as it is.

"The snowplow driver has to use the blade, clear the snow on the road, and drive in very bad conditions," Rajamani says. "Just driving and plowing the snow is a lot of work. By not having the driver also control the applicator and decide when to sand and when not to sand and what the rate of sanding should be, you're reducing the burden on the driver."

Staying below sea level

This smarter snowplow also stands to save a lot of sand and salt. Estimates suggest that Minnesota uses more than 200 pounds of sand and salt per person each winter, says Alexander, a research fellow who has worked with Rajamani on the technology for about five years. "It's just as important to know when to turn the sand off," Alexander says.

Which is sometimes easier said than done. "Snowplow drivers don't like to have accidents on their routes, so if anything they tend to try a little too hard to make sure [there's enough sand and salt]," he says. "If we can assure them that [in certain locations] everything is fine, they can use less salt and still keep the roads clear." (Rajamani points to an article saying that salt levels in area lakes can approach 50 percent that of oceans at peak times in the winter.)

Even if the final embodiment of the relatively inexpensive sensor equipment is slightly different from what's being tested, the researchers are confident it can be street- and highway-ready soon.

"We are hoping that this technology will be evaluated by MnDOT supervisors and snowplow drivers on two or three snowplows during the next year," says Rajamani.

Watch a short [video](#) of a friction sensor-equipped snowplow in action.



The sensor system that measures friction is attached to a wheel near the front axle of the plow. U researchers Rajesh Rajamani, Lee Alexander, and Gurkan Erdogan are developing the system for the Minnesota Department of Transportation.



Tracking the phantom (advanced explanation)

December 17, 2009

How CDMS-II researchers hunt for elusive dark matter

By Deane Morrison

A leading theory holds that dark matter consists of particles called WIMPs, or weakly interacting massive particles. They would have been created during the Big Bang, the same as ordinary particles. Eventually, the heavier members of the WIMP family decayed away, leaving lighter forms of the particle that are stable and survive today.

If WIMPs exist, each one exerts a gravitational force on ordinary matter.

"Put together enough WIMPs and enough regular matter, and you can see the gravitational attraction acting on a large scale, even if detecting individual WIMPs is so difficult," says University of Minnesota physics professor [Priscilla Cushman](#).

The only way to do that is to catch them interacting with the nucleus of an atom at extremely close range.

If a WIMP, gliding through a solid material, passed close to a nucleus and gave it a bump, it would produce a vibration in the entire solid, similar to ringing a bell. But the ring would be so faint that extraordinarily low temperatures would be necessary to dampen out the thermal background noise.

World's coldest hockey pucks

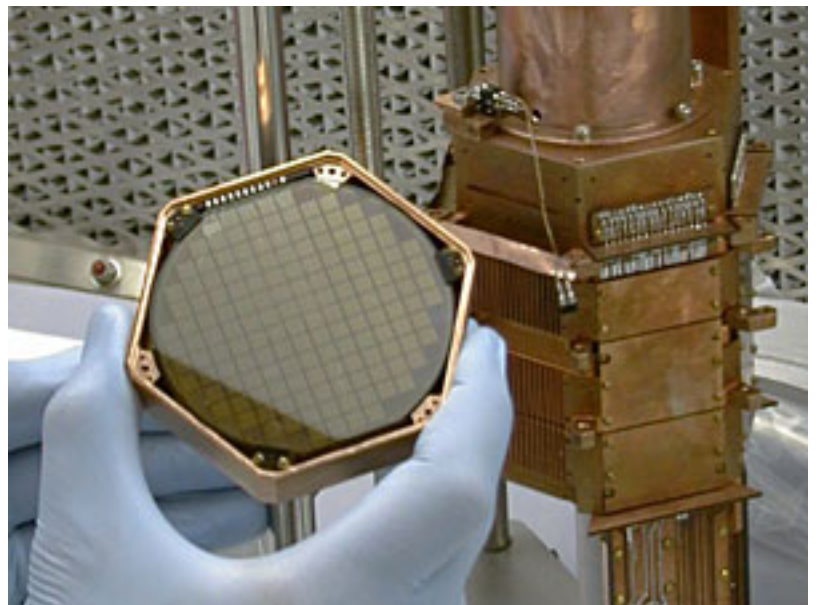
In CDMS-II, stacks of disks the size of hockey pucks, made of crystalline germanium, are kept in a vacuum thermos chilled to -459.31 degrees F. As the germanium atoms travel with the Earth's movements, they should encounter WIMPs in their path and, occasionally, come close enough to interact with one.

If the two signals were not caused by ordinary interactions, they mean that on two occasions a WIMP "bumped" a germanium nucleus and produced a detectable "ring" in the crystal.

Confirmation of the finding may come from one of several experiments around the world that have been searching for WIMPs, says Cushman. Also, the world's largest particle accelerator—the Large Hadron Collider, in Geneva, Switzerland—could create them as it generates conditions approaching those that that occurred after the Big Bang.

Cushman and Mandic are part of a team gearing up for an even larger experiment, SuperCDMS, which is running improved detectors now at Soudan and will eventually move to an even deeper mine in Canada.

See also a general version of this story, [A new form of matter?](#)



Close-up of a CDMS detector, made of crystal germanium.

Photo: Fermilab

Home page image: The Sombrero galaxy, courtesy NASA/Hubble Heritage Team

How to build a Universe

According to theory, the Universe consists of approximately 20-25 percent dark matter, 4-5 percent ordinary matter, and the rest "dark energy"—a mysterious force causing the Universe to accelerate its expansion.



A new form of matter? (general explanation)

December 17, 2009

Particles of invisible 'dark matter' may just have been detected

By Deane Morrison

A decades-long search for the invisible "dark matter" that gives shape to galaxies and forms the bulk of the Universe's mass may be over.

If confirmed, the finding will rank as a milestone in physics and take a big step toward completing the picture of the matter that composes our Universe.

Physicists at the University of Minnesota and 17 other institutions have recorded two interactions of subatomic particles whose signals look like those expected from particles of the elusive dark matter.

"But before you can declare a definitive discovery, you have to have confirmation from other experiments going on worldwide, as well as our own next-generation experiment," says University physics professor [Priscilla Cushman](#). "There's about a one-in-four chance the signals are caused by ordinary interactions."

Besides Cushman, University assistant professor [Vuk Mandic](#) and several graduate students and postdoctoral researchers are involved in the project.

A reclusive substance

Although dark matter accounts for some 80 percent of the mass in the Universe, it is invisible because it cannot absorb, reflect, or emit light. According to theory, it interacts extremely weakly with ordinary matter. Its existence was only inferred when it became apparent that the visible material in galaxies couldn't generate enough gravity to hold the galaxies together at the speeds they rotate.

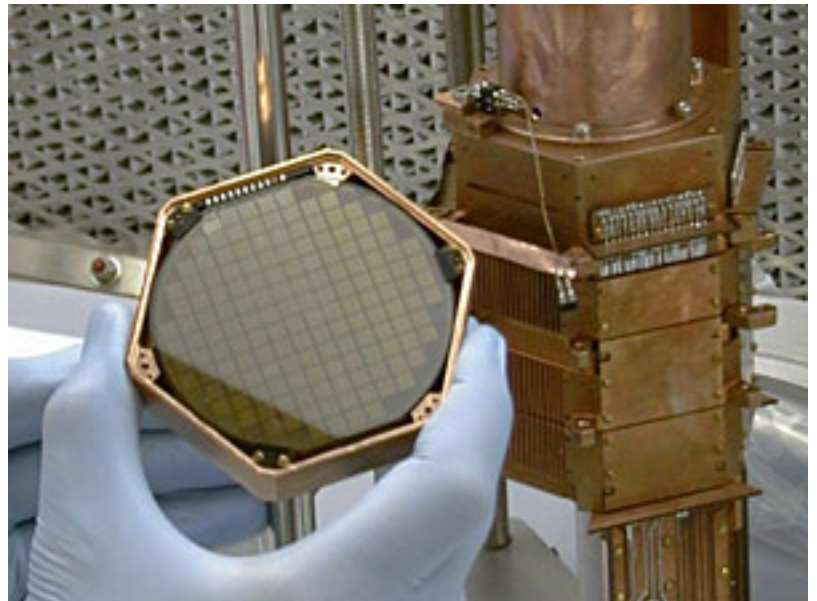
A glance at an average galaxy shows a flat spiral of stars. But galaxies, including our own Milky Way, are actually spherical, because most of their mass is a ball of dark matter. Dark matter is believed to have provided the gravitational power that made normal matter coalesce into galaxies, and Earth sails through billions of these particles every second.

"There's so much indirect evidence for dark matter, it is hard not to expect to find it," says Cushman.

The signals in question came from the [CDMS-II](#) (Cryogenic Dark Matter Search) experiment, going on half a mile underground in northern Minnesota's Soudan mine, where it is shielded from cosmic rays that would confound the results. In a nutshell, the experiment recorded what may be particles of dark matter "bumping" the nucleus of an atom of germanium, producing a detectable vibration.

"This is a very exciting time for our field," says Mandic. "The coming decade will likely see the direct detection of dark matter, even if our experiment may have only seen a background fluctuation."

For a brief discussion of dark matter and the experiment, see [Tracking the phantom](#).



Close-up of a CDMS detector, made of crystal germanium.

Photo: Fermilab

Home page image: The Sombrero galaxy, courtesy NASA/Hubble Heritage Team

An enlightening talk

Oleg Kamaev, a postdoctoral CDMS researcher, will present a special seminar on the experiment at 2:30 p.m. Friday, December 18, in Room 435 Tate Laboratory of Physics, 116 Church St. S.E., on the Minneapolis campus.



Vitamin D and weight loss

December 18, 2009

U researcher Shalamar Sibley discusses potential role of vitamin D in shedding fat

By Rick Moore

The world of weight-loss is rife with exercise gizmos and magic pills.

But a person’s level of vitamin D may actually be a predictor of his or her ability to lose fat, according to Shalamar Sibley, a researcher in the University of Minnesota Medical School.

In a clinical study of 38 people, Sibley found that higher baseline levels of vitamin D predicted fat loss, especially in the abdominal area.

“What is suggested here is that if you start out with an inadequate vitamin D level, it’s possible that this might inhibit or impede your ability to lose weight on a reduced caloric diet,” she says.

She is quick to point out that hers was an observational study, and there is no definitive causal relationship between vitamin D and weight loss. The next step is to design a follow-up study where vitamin D is administered in a controlled fashion and studied as an addition to standard weight-loss regimens in people who are vitamin D inadequate.



U researcher Shalamar Sibley was already involved with a weight-loss study when she decided to measure the baseline vitamin D levels of the participants. She found that higher levels of vitamin D predicted greater fat loss.



Sibley, who studies metabolic syndrome and obesity, took a special interest in vitamin D about six years ago. The fact that her recent

study yielded a potential breakthrough finding on weight loss and vitamin D is a stroke of serendipity.

“One day I ran across a publication by some other researchers showing that a particular hormone pathway—which when overactive can contribute to obesity-related problems such as high blood pressure—was inhibited by the active form of vitamin D,” Sibley says. “Interestingly, this same pathway (the renin-angiotensin system) also affects fat cell development and metabolism. I happened to be doing a weight loss study in which our only intervention was a reduced calorie diet, and came up with the question, ‘Is there any possibility that where someone starts with their baseline vitamin D level will predict their ability to lose weight?’”

“What’s interesting about our study is we did not recruit people to be vitamin D inadequate; we recruited people who were overweight or obese for our weight-loss study. And they happened, on average, to have inadequate vitamin D levels, so it tells you how prevalent the problem is.”

Indeed, Sibley notes that “vitamin D deficiency is its own epidemic,” and the numbers bear that out. According to one estimate, 36 percent of otherwise healthy young adults in the United States are lacking in vitamin D, and that number jumps to near 57 percent for general medicine inpatients. Increasingly, a deficiency in vitamin D is being linked to a host of health conditions, including higher blood pressure, cardiovascular problems, kidney disease, and a higher risk of certain cancers, including breast and prostate.

More recently, research at the U found that in a group of 150 patients showing chronic musculoskeletal pain, a whopping 93 percent were vitamin D deficient. (Read more about the study [here](#).)

Taking it all in

Vitamin D can be obtained through sources like fatty fish—herring, salmon, catfish, and tuna are examples—as well as fish liver oils and fortified milk, cereal, yogurt, and bread.

In addition, our bodies naturally produce vitamin D through exposure to the sun. Unfortunately, those of us in northern climes can be left out in the cold; vitamin D is only synthesized from UV radiation between April and early autumn, and while it remains in our bodies for a time, there may not be enough to last all winter.

That makes Minnesotans naturally more susceptible to vitamin D deficiency. “But some of it is also modern lifestyle,” Sibley notes. “People work indoors all day. They like to use sunscreen and they should, because they don’t want skin cancer. That’s fine, but we still need to find a way to have adequate vitamin D levels.”

Sibley says that supplements make sense for people who know or suspect that they’re lacking in vitamin D. “In an adult, 1,000-2,000 IUs (international units) as a supplement is a very reasonable thing to do for maintenance,” she says. “If people are vitamin D inadequate, they’re going to need a higher dose for a short period of time to build up their levels.”

But she cautions against going overboard with vitamin D—there are levels where it can become toxic in the system—and reiterates that there is still no definitive link to weight loss.

“Our results are not saying that everyone should go out there and take extra vitamin D to lose weight,” she says. “But if someone is vitamin D inadequate, then supplementing vitamin D to achieve normal levels might, in fact, help augment his or her weight loss success, [coupled] with standard approaches.”



Just rewards?

December 29, 2009

Bankers should be liable, as well as rewarded, for their risks

By Bill Magdalene

Reckless decisions by bankers led to the financial crisis of 2008. It's often suggested that if bankers were stripped of their bonuses, had their salaries capped and were paid in stock that couldn't be cashed for several years, this would motivate them to act responsibly.



Not so, according to University of Minnesota law professors Claire Hill and Richard Painter. They say such measures miss the heart of the problem.

Bankers are reckless because they feel too safe

In a recent paper, Hill and Painter argue that bankers will act recklessly as long as the risks they take don't expose them personally to real financial hardship.

The bankers whose decisions led to the 2008 financial crisis did lose all their stock and stock options. But they kept everything else. Millions from other investments, summer mansions, jets.

"Once five or ten million is squirreled away from firm creditors," Hill and Painter say, "the rest is funny money." To solve the problem, they propose two ways to make bankers personally liable for their banks' debts.

First way: require bankers to enter a partnership agreement

Bankers who earn over \$3 million per year would be required to enter a partnership agreement with their bank. That means if the bank becomes unable to pay its debts, the banker is personally liable. Hill and Painter would let the banker protect \$1 million in personal assets.

The core idea is old. Before the 1980s, most investment banks (that is, banks that raise capital, trade securities and manage corporate mergers/acquisitions) were general partnerships. Today, investment banks are in corporate form, with limited liability. Hill and Painter would revive the partnership form, but only for key employees.

Second way: pay bankers in assessable stock

All of a banker's yearly income beyond \$1 million would be paid in assessable stock. That means if the bank becomes unable to pay its debts, the banker must pay an amount equal to the value of all the stocks received. The value of each stock holding is defined as whatever it was on the day the banker received it.

Again the idea is old. Before the 1930s, some commercial banks (that is, banks that provide checking/savings accounts, etc.) issued assessable stock to directors and officers.

The goal is to protect the public

You've probably noticed that in both proposals Hill and Painter let the banker protect \$1 million. That's because their goal isn't to bankrupt bankers. Rather, it's to motivate responsible investment decisions that will protect taxpayers and all who innocently get hurt when financial crises arise.

Note: the word "banker" has been used here to refer loosely to various kinds of employees who play key roles in various kinds of financial institutions ("banks"). In their paper, Hill and Painter go into detail about what institutions and employees would be covered by their proposals, and about legal aspects such as what events would trigger liability and how to enforce it.

But the point is straightforward. Some form of personal liability is needed.

"Bankers who profit enormously from their occupations in good times," Hill and Painter say, "should be prepared to share in the costs borne by the public when the risks they take do not pan out."