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Cover photo: Sophomore Sarah Williams is borrowing money and working several jobs to help pay for college. She also sells her handmade jewelry in Pullman and on the internet to raise money to cover her school supplies. *Photograph by Zach Mazur.*

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first words

The way we read now

It wasn't long ago that I would have roughed out a draft of this column with a #2 lead pencil on a yellow legal pad. Next would come a revised copy of that draft typed on my old Royal, followed by a series of revisions, marked in pencil and retyped, until I either called it done or gave up. The typed manuscript would then be turned over to the typesetter, who would type those words yet again, while the designer pasted up the publication on boards, and after a number of other archaic procedures, voilà.

Since those days, I have gone through phases, alternately romantic and self-deceptive, in which I bemoan the downhill slide of my thinking and writing process. For a while I had myself convinced that the click-click-click of the typewriter somehow set an imperative rhythm for my writing, and I'd never be able to write as well on the relatively unresponsive computer. Of course, that was about the same time I was convinced I'd never be able to write as well without smoking.

Regardless of the quality produced, it doesn't take a whole lot of reflection to conclude that the thinking reflected by the yellow tablet is different from that reflected by my iBook. Fortunately, I've learned that the human brain, even an adult one, is marvelously malleable, and the logic and narrative and structure come about in spite of the tool, if perhaps through a different circuitry.

From the reader's point of view, however, the digital revolution in the media has potentially been even more dramatic than my creative struggle with technology. Increasingly, how the reader receives that communication has taken on a radically different form.

Although we will continue, for the foreseeable future, to visit you every three months with the tangible paper version of *Washington State Magazine*, you're going to see more and more suggestions within its pages that you visit wsm.wsu.edu. Although *WSM* has had an online presence since its beginning seven years ago, what you see there is essentially a mirror of the print magazine.

That is about to change. But first, a goodbye and a hello.

George Bedirian, our managing editor and a founding member of our WSM team, retired this spring after 27 years at Washington State University. Besides keeping things moving and editing judiciously, George did a masterful job of editing and managing *WSM Online* in its current form.

We re-thought his job outline and recently hired Larry Clark as our new Web editor. Larry, a 1994 alum, leaves Olympia and the Legislature to help build our new Web site. Larry brings expertise, experience, and vision to what we believe is an exceptional project.

But why redirect so much energy and focus to our web presence?

In spite of what I believe will continue to be distinct advantages, both functional and aesthetic, a paper magazine cannot do certain things. It cannot play music, for one thing. Not being able to deliver you the music of our extraordinary music faculty and students has long been a frustration.

Photographs. Yes, we already run a few galleries, but watch for more. We've got some of the region's best photographers documenting WSU and the state, and it's frustrating when we can run only one or two of their photos with a story that begs for many more.

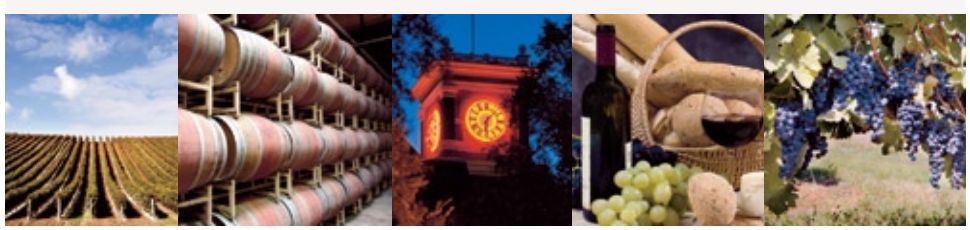
Links to deeper information. Calendars. News (which does not travel well via quarterly). Video.

And more from and by you. One new section that we're planning, we call "Our Story." It will be an informal, anecdotal history of WSU written by all of you who have stories to tell about this place and simply haven't had a chance to tell them.

Paper, a technology that has been with us for 2,000 years, and the Web each has its strength. The paper *WSM* will continue to deliver what it does best, thoughtful writing about the place we love.

Our new Web site will offer what paper cannot, and need not, do. It will be both supplement and complement, a place for engagement and participation, for entertainment and enlightenment.

Tim Steury, Editor



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WASHINGTON STATE UNIVERSITY
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letters

A bigger imposter

I enjoyed Hannelore Sudermann's article on WSU professor Debbie Lee's book, *Romantic Liars*. But perhaps Ms. Lee was constrained by book length, or perhaps not all of her subjects were profiled in the article. Because I find it very strange that no mention was included of the greatest romantic liar of them all: Lola Montez. Though her amazing career is largely forgotten today, during her approximately 20 years on the stages of the world (roughly 1840-1860), she was easily the most notorious woman on the planet. She was the Madonna of her time, and far more.

Born Eliza Gilbert in Ireland, and frustrated by her failure to achieve stardom at an early age, Eliza was advised to take up dancing. Too old to begin the study of ballet, she decided to try something less demanding, journeying to Spain as Eliza Gilbert and coming back as Lola Montez, the Spanish Dancer. Though she was soon recognized as Eliza, she vigorously denied her true identity, and began the habit that served her well the rest of her life: lying whenever it suited her. Her performances were deemed scandalous; Lola was constantly pushing the boundaries of female propriety and flaunting public standards of morality. Kicked out of London, then Paris, and then Berlin, she went to Bavaria, where in 18 months she soon captured the heart of Bavaria's King Ludwig I so completely that she changed the course of Bavarian history. Engaging in her long habit of gold-digging, she begged Ludwig for a monthly pension, then a lifetime income. She deeply offended the citizenry by asking Ludwig to make her a citizen, which he did, then outraged the populace by begging him to make her a countess, which he also did. He bestowed on her the meaningless title of "Countess of Landsfeld," which she continued to use the rest of her life. In 18 months, she caused such anger among the citizenry that she was forced to flee the country one step ahead of a howling mob. In three years, Ludwig spent $3 million on her, which does not include the $400,000 annual pension he had provided. She spent it all, and begged constantly for more… .

Eventually she found her way west to the California gold fields, then to Australia. Wherever she went, it was the same reception: Her very presence in town was considered an affront to public decency, and females were admonished that no respectable woman would attend one of her scandalous performances. Nevertheless, Lola, who was said to have a homicidal temper, always confronted her accusers, sometimes physically with the buggy whip she carried. And she always came out on top, playing to full houses throughout her long career… .

Lola was always her own best press agent, and probably the source of many of the notions about her scandalous behavior, and it was the constant web of lies she never abandoned that make sorting out the truth of her life difficult to this day.

Bill Scott '68
Nipomo, CA

Three special men

Reading the summer edition of Washington State Magazine, I noted the passing of Donald Pelton, a former professor who had a tremendous impact on my life. In the fall of my senior year, I was enrolled in a finance class of Professor Pelton's. At the end of one class he took me aside and asked me if I ever thought about a career in banking. I hadn't. He said he had recruiters from two banks coming over to his home for a social gathering to discuss careers in banking while they were recruiting on campus. I was intrigued and took him up on his offer. This led to interviews, with both banks offering a management trainee position upon graduation. I chose the National Bank of Commerce in Seattle, which has led to a rewarding 35-year (and counting) career in banking.

As one goes through life, certain people can be influential along your path. Professor Pelton was, and I never took the opportunity to thank him. It is something I now regret, but would like to take the time to share a small story, beyond the simple obit that he passed away at age 88, January 21, 2008, retired staff, Pullman. He meant much more to me and I would like to take the time now to pay tribute to him. He was one of many reasons I love my experience at Washington State University.

Steve Burnett '73
Sr. Vice Pres. and Sr. Managing Dir.
Bellevue Private Client Group
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I read with great interest Hannelore Sudermann s article "A Home for History," about the Westin Hotels Collection donated to Manuscripts, Archives, and Special Collections by J. William Keithan. During my career as a graduate student at WSU, I worked at MASC to help make ends meet. During several years there all of my time was devoted to processing the collection, all 375 linear feet of shelf space. The collection beckoned a diverse and interesting group of researchers, from private investigators to filmmakers planning a documentary on JFK. When I finally finished with the collection, my supervisor, MASC librarian and archivist Lawrence Stark, and I put together an exhibit at MASC including many of the objects pictured in the article. The poster for that exhibit still hangs in my stairwell. I've been thinking frequently of those years since having learned of Lawrence's death in February (p. 56, same issue). He was a very special man; I wouldn't trade the years I worked with him for anything.

John W. W. Mann MA '97, PhD '01
Eau Claire, WI

Richard (Dick) Oltman '52 was listed [erroneously] as the founder of "Olympia's Oysterfest" for his achievement. Twenty seven years ago, Richard Oltman formulated a plan for the Little Skookum Rotary Club to commence holding "The West Coast Oyster Shucking Championship and Washington State Sea Food Festival" held annually in Mason County, commonly referred to as "Oysterfest." This festival is known internationally and draws thousands of people each year. It also has become a "Catalyst For Community Involvement," returning over a half million dollars in the form of direct grants, scholarships, and literacy programs for youth.

Oltman distinguished himself in the United States Armed Forces as well. He rose from a Lieuteneant to a Lieutenant Colonel, did a tour of duty in the Korean War, two tours in Vietnam and received many medals for his meritorious service and gallantry.

Annette S. McGee '59
Shelton, WA

For more letters, visit wsm.wsu.edu.

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SECOND PLACE
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THIRD PLACE
Bio-Link
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DESIGN CHALLENGE
FIRST PLACE
Green Ridge
Lewis and Clark High School, Spokane

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Entering the Future Efficiently
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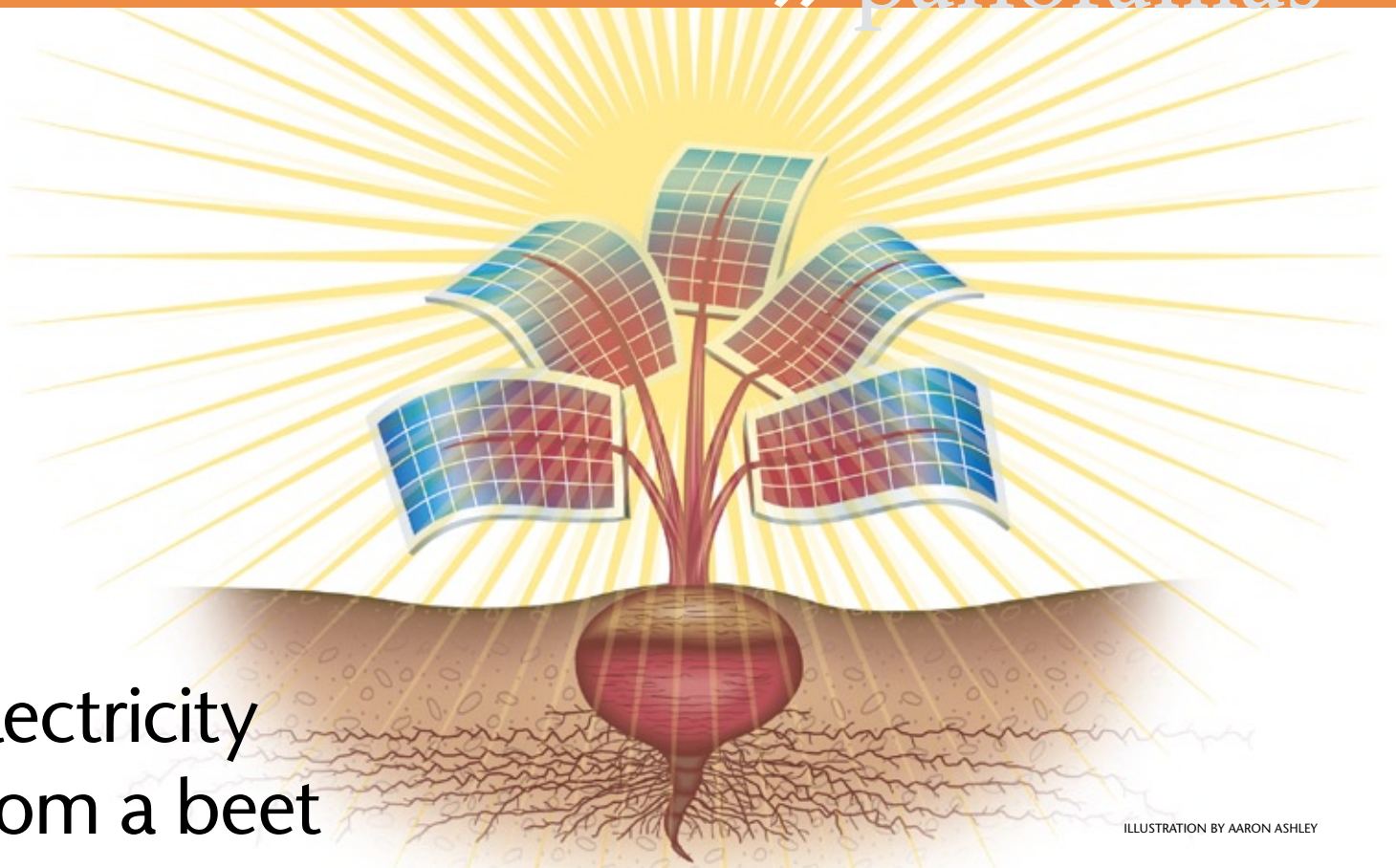

ILLUSTRATION BY AARON ASHLEY

Electricity from a beet

by E. Kirsten Peters :: Chemists around the world are looking to the plant kingdom for ideas about harvesting the energy of sunlight. Plants, after all, have been making a living exploiting sunbeams for almost four billion years. And part of what plants accomplish each day creates a tiny flow of electrons—a form of electricity.

The familiar solar-electric panels on the roofs of RVs depend on pure silicon crystals, which are produced in an energy-intensive manufacturing process. The crystals are semiconductors "doped" with special impurities to make them work—impurities that are often toxic metals requiring special mining to unearth. These first-generation panels certainly work, but the electrical power we can create from them is costly to us and to the environment.

Just a few years ago, hopes were high for second-generation panels made of thin flexible films. These devices now make up roughly 10 percent of the market for solar panels. They are often used for powering satellites because they weigh little. But the cost of second-generation panels has not dropped as engineers and investors alike had hoped, so the price of electricity from them is still far from economic.

Jeanne McHale, a Washington State University chemistry professor, and her team of students hope to better learn how molecules from plants can promote electron flow. If she is successful, a potential third generation of solar panels could be manufactured in wholly new ways and at vastly lower cost.

McHale's professional interest lies in fundamental science. "In physical chemistry, we don't usually produce 'deliverables,'" she says with a laugh. Her research includes manipulating materials on the nano-scale and studying them via advanced spectroscopy. But the work always begins quite simply—by going to the grocery store and buying beets.

The red color of beets comes from a molecule called betanin, a natural anti-oxidant. Anti-oxidants, as the name implies, moderate cellular processes of oxidation, or the loss of electrons. Betanin is also a natural dye that interacts with light. Dyes are strongly colored substances, the color stemming from which part of sunlight's spectrum they reflect while absorbing all the other wavelengths. Betanin isn't directly a part of beet photosynthesis; in fact, its function is to protect cells from too much light, like a natural sunscreen. But betanin does react to the photons of sunlight, the keystone to any hopes for solar power.

The fundamental trick for "dye-sensitive" third-generation solar panels is to get the dye molecules to give up an electron when they are hit by sunlight and then not instantly take it back, as they are wont to do. If they give without taking back, the dyes produce a tiny but steady stream of electrons.

It might be surprising that a chemical reaction in a beet can create a tiny electrical current. But, of course, it's a chemical reaction in the battery of a car that creates the current that flows to the car's starter motor. Chemical reactions are simply the rearrangement of chemical bonds, and bonds are formed by electrons. What's different about the dye-sensitive case is that the electron flow is powered by incoming photons of sunlight.

Dye-sensitized flexible solar cells. *Courtesy G24i Ltd.*

McHale and her team take the betanin from beets and put it onto a layer of a mineral called anatase. Nano-particles of anatase create a good surface to which the betanin can cling, and the anatase also acts as a semiconductor. The anatase sits on a conducting layer below.

When the photons from sunlight hit this layered sandwich, a little bit of net electron flow results. Even a small amount of electron flow is fine, because with manufacturing materials as cheap as beets and minerals, society can afford a great number of solar panels. Indeed, if this route to the third generation works out, making electricity via betanin could be cheaper than burning coal.

"And if dye-sensitized panels were 10 percent efficient, as we think reasonable, you could generate all the electricity the U.S. uses each year with about 2 percent of our land devoted to such panels," McHale says.

But there's a long row to hoe in the beet field before third-generation panels are covering roofs near you.

Complex organic molecules don't typically last for a long time if they are taken out of their natural realm, and the betanin in beets is no exception. So, for the moment, the beet-powered solar cells are up and running for only a few hours before they peter out.

"One of the challenges is to understand what's going on. We want the chemistry to be regenerative," McHale says.

A new college guide

by Hannelore Sudermann :: The market is full of books on how to get into and succeed in college, but few of those books are targeted at students who may be the first in their family to go beyond high school. Even fewer are targeted specifically to the needs of Native American students.

Two faculty members at Washington State University have sought to fill that need with a handbook titled *The American Indian and Alaskan Native Student's Guide to College Success*, published in 2007.

The book is for students, but it's also for "quite a range of stakeholders," says Michael Pavel, the author and associate professor in the College of Education. "It is being used by community leaders, others within the tribal government system, and teachers, to name a few."

He brings the insight of an education expert who has also overcome the challenges of being an American Indian in a traditionally Caucasian college setting. His co-author, Ella Inglebret, is an assistant speech and hearing sciences professor who for several years administered a program to recruit and support American Indian students. The two weave together their advice with students' own words, profiles of Native Americans who have gone through college, and lists of resources as well as advice on problem solving and a guide for understanding financial aid terminology.

Among the students they profile is Justin Jacob of the Yakama Nation who graduated from WSU in 1997 with a degree in science and mathematics and a teaching certificate. After teaching math at Wapato High School for four years, he returned to WSU for an engineering degree.

When he first came to WSU, Jacob felt out of place both socially and academically. "Socially, I was a brown kid in a sea of white kids. Fortunately, I was athletic, and that helped me fit in." Then, once he settled in, he struggled with believing he was capable of tackling the more difficult classes and balancing his social, academic, and athletic activities. Once he found that balance, everything seemed easier.

MICHAEL PAVEL BY ROSS MULHAUSEN

Other profiles include American Indians who attended Dartmouth, University of New Mexico, and the University of Oklahoma. One cites a high school counselor who told him "Indians don't go to college." Another tells the story of dropping out of college, and eventually finding his way back, discovering a love of language, and graduating cum laude to later be accepted to the Harvard Graduate School of Education.

Pavel and Inglebret tackle all kinds of issues, including homesickness, choosing a school, family support, and retaining a sense of cultural heritage while in an environment of assimilation. They offer simple advice, like to start saving for college while in high school and to push into more challenging classes. They offer ideas for visiting and choosing a college, and give cues about how, once in college, to maintain a sense of identity.

Beneath it all they weave a thread of giving back, how through education students can find a new role either at home or out in the wide world that will help their home communities.

At age 15, Pavel, a member of the Skokomish Nation, was charged by his elders to get a Ph.D. Pursuing a higher education was the furthest thing from his mind, he says. "I still had to figure out what Ph.D. meant at that time."

But he found his way to college, first attending the University of Puget Sound and later Arizona State University for a Ph.D. in Higher and Adult Education. He joined the College of Education at WSU in 1999, taking on teaching responsibilities as well as those of developing partnerships with community colleges and local K-12 schools serving American Indian and Alaskan Native students.

Last year, Pavel was given WSU's first Faculty Diversity award in recognition of his work mentoring and teaching students at WSU as well as his outreach to communities across the state and region.

60 minutes with Don Hewitt

by Hannelore Sudermann :: This spring, while a reporter from a Spokane TV station sat face to face with *60 Minutes* creator Don Hewitt, two Washington State University communications students waited quietly in the hall for their turn with the television legend.

Jamie Grosz, a senior who would soon be interviewing the CBS news veteran, used the time to run over her questions and switch into a pair of high heels for the on-camera interview. The

Don Hewitt grants an interview to Jamie Grosz and Brent Weisberg. *Photo by Robert Hubner.*

cameraman, Brent Weisberg, started unpacking his equipment.

They weren't missing much by waiting outside since the Spokane station interview covered many of same questions Hewitt had been answering over the past few years in the *New York Times*, on *Good Morning America*, and even in his own biography *Tell Me a Story*.

Trading quips with the professional reporter, Hewitt rattled off a few classics like the time he ticked off Frank Sinatra by allowing the interview to include his mafia ties and the time he urged Dan Rather to grab the Zapruder film of John F. Kennedy's assassination and run. After making the suggestion, Hewitt changed his mind and called the caper off.

A practiced story-teller, Hewitt didn't drop out of his shtick until the two students and their teacher, Marvin Marcello, moved in around him. Then he seemed a little more thoughtful, a little more relaxed. Their questions focused on his reason for being there—to receive an award with Ed Murrow's name on it for his lifetime achievement in the news business, as part of the Edward R. Murrow Symposium at WSU. Hewitt was very frank. Murrow wasn't the easiest guy to be around. He was moody. He could be self-absorbed. But he was also "a giant, a guy apart," Hewitt said.

"He was willing to wade in and take on a villain," said Hewitt, while Weisberg delicately pinned a mike on him. "Ed taking on Joe McCarthy was a milestone in journalism."

Murrow is very much alive in 85-year-old Hewitt's memories, since he worked as a director and producer for him at CBS. He brought him to life for the two students.

Hewitt credits Murrow for inspiring him to develop *60 Minutes*. "Some reporter called it low-Murrow and high-Murrow," said Hewitt of Murrow's two shows, *Person to Person* and the more serious and prestigious *See it Now*, on which a young Hewitt served as a director.

"It was not very well watched," said Hewitt of *See it Now*. "It went off the air because it couldn't compete with *Amos and Andy*."

So when it came to creating his own news show, Hewitt had very clear ideas. "I decided to do high-Murrow and low-Murrow in one show," he said, reverting to his classic line. "You can look into Marilyn Monroe's closet, as long as you look into Robert Oppenheimer's laboratory, too."

As he wrapped up his interview with the WSU students, he offered one last piece of advice. "The story teller is just as important as the story," he said. "Find people who can tell their own story better than you can." Grosz smiled a little. She knew she and Weisberg had done just that.

If you don't ask...

by Cherie Winner :: Tiffany Ludka '04 has a piece of advice for students with big bills: It never hurts to ask for help.

During her first year of medical school at the University of Washington, the Colfax native hit on the idea of asking the medical community in her hometown to consider paying some of her medical school bills if she agreed to go into practice there. She'd known for a long time that she wanted to practice in a small town, preferably the one she grew up in.

Colfax, 13 miles north of Pullman, has a bustling downtown and is the county seat, but with a population just under 3,000, it's definitely small—which suits Ludka just fine. Seattle was OK, but she prefers the friendliness and lack of traffic in communities like Colfax, as well as the easy access to biking trails and trout streams. "I'm big on outdoor things," she says.

So she floated the idea with Dr. Kim Mellor, who knew her and her family and could vouch for her commitment to medicine and to small-town life. Mellor asked her to write up a proposal, which he took to the other members of the Whitman Medical Group and to Whitman Hospital and Medical Center administrator Jon Davis and the hospital's board of directors.

The proposal looked like a good deal for the town as well as for Ludka, says Davis. Physician recruitment has become difficult and costly all across the country, not just in small communities. "You have to think long-term when you do something like this," he says. "We want good doctors here, and this is one way of going about it—start with a known quantity, and go from there."

So the decision was made. Whitman Medical Group and Whitman Hospital contributed about $45,000, half of Ludka's medical school expenses for her last three years of medical school. In exchange, she agreed to practice in Colfax for three years.

TIFFANY LUDKA BY ROBERT HUBNER

Davis says Ludka's gender wasn't a factor in their decision—a male student with the same record and reputation would have gotten the same deal—but it was a bonus. Colfax doesn't currently have a woman physician, which is a problem since many female patients prefer to see a female doctor, especially for gynecological exams.

Ludka will join Whitman Medical Group in four years, after she finishes her residency in internal medicine and pediatrics. The combination covers everything in family practice but obstetrics. "Women and kids will be my forte," she says.

For Ludka the hardest part of the agreement was getting up the nerve to ask for help. Now a poised, outgoing professional, as a teenager she was so shy that she doubted her ability to be a doctor.

"I didn't know if I could handle working with people all the time," she says. She thought research might be a better fit, so while still in high school she worked in labs in the neuroscience department at Washington State University. At the same time, she participated in the Junior Miss program, where her daffy impersonation of Jim Carrey's character from the movie *Liar, Liar* helped her place second—and see herself in a whole new light.

"I was floored," she says. "I was up on stage yelling and acting all crazy, and I loved it. I thought, this is pretty cool."

When she came to WSU, her classes in the Honors College further boosted her confidence.

"You're sitting in your class of 20, and the professor says, 'Tell me what you thought of this paragraph,' and you have to speak up. You're kind of forced to come out of your shell," she recalls.

If she hadn't gotten financial aid from her hometown, Ludka says she might have had to take a job in a big city just to earn enough to pay back the loans she'd have needed to finish medical school. Compared to that, asking the Colfax medical establishment for help didn't seem so scary.

"It wasn't easy, but it was so practical," she says. "I figured, what better way [for them] than to find a home-grown person who's not going to be afraid to go back to a small town, who is willing and happy to come back? See if they can help me out and make that more possible?

"If I hadn't asked, I never would have known."

Powerful solutions from young minds

by Hope Tinney :: At Washington State University's inaugural high school energy competition on May 10, Bohler Gymnasium on the Pullman campus buzzed with the ideas and enthusiasm of more than 350 high school students.

Teams from across the state were invited to present ideas for sustainable living in one of four areas: technology, design, personal behavior, or society/public policy.

Eighty-six teams gathered to share ideas that ranged from specific proposals to encourage more recycling in one high school to schematic designs for a pedestrian-friendly community. One team proposed stackable greenhouses that would allow every community to "buy local," and another team designed a Lego-like car that could be reconfigured for different uses, eliminating the need for multiple cars. Some teams came with fully-developed projects that were up and running (a school-wide challenge to lower CO_2 emissions) and other teams came with impressive progress toward an elusive goal (using algae to sequester CO_2 emissions during concrete production).

"The whole thing is just amazing," said Jeff Johnson, a senior systems engineer at Microsoft and a judge for the competition. "The ideas, energy and passion—it's just inspiring, frankly."

Nearly $100,000 in prize money, contributed by seven premier sponsors, was handed out to individual teams and their schools. The grand prize—and breakfast with Denis Hayes, founder of Earth Day and president of the Bullitt Foundation—went to a three-person team from Lake Roosevelt High in Grand Coulee for their project, "Customizable Hydrogen Production."

"This definitely has been a life-changing experience for me," said Elizabeth Owen, 18, who led an effort to build a wind belt as part of her team's submission. A wind belt, which Owen saw on an internet video clip and figured out how to build, captures the energy created by a wind-powered flutter or vibration, rather than the rotation of a turbine, and is potentially much more efficient and less expensive than current wind technology.

Teammate Peter Rise built one solar panel from 35 solar cells and Catherine Kerns created a hydropower generator. Then, the energy generated from the wind, sun, and water was routed to an electrolyzer that produced hydrogen gas and then that gas was used to power a fuel cell. Finally, the fuel cell ran a small motor.

Owen said she knew her team had created something special when the judges gathered around the models. At one point, she said, there were about nine judges—WSU faculty members as well as industry experts—asking questions.

Talking with faculty members was her favorite part of the experience, she said. "I loved seeing their expressions when they found out about the wind belt," she said. "They were these really brilliant people and I got to explain something to them that they didn't know about."

Owen was the only senior in the group, and prior to the competition college was a distant idea—perhaps to become an art teacher—but not really a plan. Now, she said, all that has changed. Next year she hopes to attend WSU

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More than 350 Washington high school students came to WSU to present their solutions to energy problems.

JASON KRUMP

The east entrance view of Martin Stadium from Stadium Way

Stadium on the rise

by Jason Krump '93 :: In 1978, Sam Jankovich knew something had to be done about the football stadium.

With just 27,600 seats, Martin Stadium was much smaller than its counterparts in the Pacific-10 Conference. Because of a Pac-10 rule requiring guarantees of $25,000 to visiting teams, the Cougars had to truck up to Spokane to play certain opponents, namely USC, UCLA, and Washington, at the larger Joe Albi Stadium.

"If you could not bring in USC, UCLA, and Washington to Pullman, you could not bring the biggest attractions to where you get the biggest crowds," said WSU's former athletic director this spring when he stopped by Bohler Athletic Complex for a visit and the opportunity to mull over the latest stadium renovation.

Back in the late '70s, Jankovich reasoned that with their games in Pullman, the Cougars could be much more competitive.

Artist's rendering courtesy ALSC Architects / Grant Construction

The solution in his eyes was simple—expand the stadium to a capacity larger than Joe Albi's. It would address the issues of competitiveness and revenue and potentially avoid the problem of WSU losing a place in the Pac-10 if it didn't keep up with rest of the group.

"If you're not competitive, then you are not going to raise money, and you are not going to sell tickets," said Jankovich. "That, in turn, would affect the conference affiliation."

So he decided to push to expand the stadium. "I felt we had no other choice," he said.

Three decades later, Jim Sterk, WSU's current director of athletics, knows the feeling.

JASON KRUMP

That's why he pushed for the first part of a renovation, which includes new bathrooms and improved concession area that game-goers will see this season. And it's why he's seeking $42 million more for adding more seats and premium seating in Phase III, which he hopes will be underway in 2009.

For Sterk, it's a matter of ensuring that WSU's Pac-10 standing stays secure.

The Pac-10 Conference was born out of the Pacific Coast Conference, an entity formed by four west coast schools in 1916 and joined by Washington State the following year. In 1959, the organization was replaced by the Athletic Association of Western Universities, later named Pacific-8. That became the Pac-10 in 1978 when the University of Arizona and Arizona State joined the group.

It's a group of schools for whom football is an all-important tool for recruiting new students, connecting with alumni and donors, and putting their campuses on televisions in the homes of millions around the country.

The competitiveness Jankovich was seeking in this elite conference became evident with eight trips to bowl games by the program since the stadium expansion.

But while the Cougars were competitive with their Pac-10 counterparts, the venue they played in was not. When Sterk arrived at WSU in 2000, around the same time as President V. Lane Rawlins, he and the president noted that, in comparison the rest of the conference competitors, Martin Stadium was not up to Pac-10 standards. Portions of it were contained by chain link fence, and through the fence you could see portable toilets, which were necessary to bring the number of restrooms up to a sufficient level.

The president, who along with Sterk had seen much better facilities at the away games, didn't need much persuading to agree improvements were needed. Often the football stadium is the front door of the institution, says Sterk. WSU's is even more so since it is situated at the center of campus.

Jankovich feels the same. "If you are going to have an athletic program, and especially a big-time football program, it is the responsibility of the program to bring the fans, the family, the alumni, the friends back to the campus."

However, in the collegiate athletics of the 21st century, competitiveness is measured not only on the field but also in the financial arena, and the revenue generated by WSU has not kept pace with the other programs in the Pac-10.

Above: View of the east end of Martin Stadium under construction. ***Below:*** Artist's rendering of Phase III showing the premium seating area at the top of the north stands. *Courtesy ALSC Architects/Grant Construction.*

The University's athletic budget in 2007 was about $24 million below the conference average. The next lowest, Oregon State, had $16 million more. Just three years earlier, the disparity between the two schools was just over $3 million.

In the intervening period, OSU's stadium underwent a renovation that added nearly 8,000 seats including premium seating. Furthermore, Stanford and University of Oregon have recently undergone stadium renovations of their own, which included the addition of premium seating as well.

While these Pac-10 schools have renovated their stadiums, Martin Stadium has stayed relatively the same since the 1979 renovation. Its seating capacity during the 2007 season was 35,117, the smallest of any Pac-10 school.

Sterk and Jankovich agree the significance of Pac-10 membership extends beyond the athletic arena. "Our affiliation in the Pac-10 Conference elevates the level and prestige of a graduate's degree," Sterk says. "I think that is very important. That's something to cherish and something we never want to lose."

The support Rawlins gave the project has continued under President Elson S. Floyd, who succeeded Rawlins in May 2007. "The stadium renovation is critical to strengthening the ties among members of the Cougar family as the University rededicates itself to meeting the priorities of the 21st century," says Floyd. "In addition, a renovated stadium will reinvigorate our ability to recruit top student-athletes and coaches, strengthening our ability to compete in the Pac-10 and enhancing our overall institutional reputation."

Phase III encompasses the addition of premium seating, including luxury suites, loge and club seats atop the north stands for a total of approximately 2,200 additional seats. The revenue from the additional seats will nearly be equal to what is produced by current ticket sales, says Sterk. "We generate about $4 million in ticket sales for a season. With this renovation, and our sales of those premium seats, we could generate close to that figure just with that small amount of seating." «

SHELLY HANKS

CUB's new, too!

This fall, visitors and alumni returning to Pullman will see that campus has changed all around the stadium renovation. In fact, a far bigger project, the $86 million renovation of the Compton Union Building, is wrapping up. The '60s and '70s décor is gone, but the 1951 architectural shell remains. Now it holds a brighter, more open student union and a very large bookstore to boot.

The CUB was closed in 2006, and for two years students had to go elsewhere for food, entertainment, and to just hang out. With six floors and 235,000 square feet to renovate, the project involved rebuilding stairways, removing walls, revising the entries, and installing a new state-of-the-art auditorium as well as an updated gallery and bathrooms. "It will be a very active place," says Jeff Lannigan '95, the project manager. "It's not nearly as boxed up as it was before." Prior to the renovation, "it was kind of a rat's maze."

Some things will stay the same, though. Clevenger Lounge remains in its traditional spot, student government is still on level 3, and the credit union and mail service will be available again below the main floor.

Instead of a cafeteria, the CUB will house a variety of private food vendors as well as a full-service restaurant and a coffee house.

For game-goers, the walk to Bookie will be much shorter, since there's an elevator and elevated walkway on the north side of the CUB near the stadium to take people up and in.

The grand reopening for the CUB will run from Sept. 2-6, with a ribbon cutting ceremony scheduled for Friday, Sept. 5 at 3 p.m.


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and would like to pursue a career in alternative energy technology.

Each member of the group received $5,000 in prize money, and the school received another $5,000. Ralph Rise, a science teacher, and Lee Argent, an industrial arts teacher, were advisors on the project. The team was also assisted by Stephen Dent, a WSU graduate student in engineering who works with high school students as part of a National Science Foundation grant.

"We are going to use the money as seed money for our next project," Ralph Rise said, adding that the group already has ideas about developing a solar-powered dragster.

More than 27 organizations contributed to the event, including premier sponsors BP Cherry Point, The Boeing Company, The Bullitt Foundation, Vulcan Inc., The Seattle Times, Washington State Department of Ecology, and Weyerhaeuser.

A memorial and a blessing

by Brian Dirks '82 :: At the western edge of the Makah Nation village of Neah Bay sits a tidy new park. It marks the spot where 216 years ago Spanish explorers built the first European settlement in the continental United States west of the Rockies and north of San Francisco.

Fort Núñez Gaona–Diah Veterans Park, dedicated in May, was built on property donated by Ed Claplanhoo '56, his wife Thelma, and two other Makah families in a unique partnership amongst the Makahs, the state, and the Spanish government.

Claplanhoo, a former Makah Tribal chair, had known of the historic significance of his property for many years, even marking it with his own sign. After a chance conversation about six years ago with Washington's lieutenant governor, Brad Owen, the idea of an official marker of some kind began to take root.

Owen had shared a similar conversation with his friend Luis Fernando Esteban, Spain's honorary consul in Seattle. Esteban suggested to Owen that he'd like to work with the Makah people to erect some kind of monument in Neah Bay to mark not only where the Spanish fort had stood for six months in 1792, but to acknowledge Spain's presence on the Northwest coast as early as 1774.

In 2004, when the Spanish government brought a prominent collection of Spanish royal art celebrating Spanish exploration from 1492 to 1819 to the Seattle Art Museum, Owen made sure the Claplanhoos received an invitation to the opening reception. The guest list included King Juan Carlos I and Queen Sofia of Spain.

The exhibit included drawings of the Makah people in canoes along with the Spanish ships of the day, something that impressed Claplanhoo. "I was overwhelmed by its significance," he said.

Many introductions, conversations, and negotiations later, Fort Núñez Gaona–Diah Veterans Park became a reality. It was co-funded by a state appropriation that had to first make its way through the Legislature (at Owen's request), a grant by the Spanish government, and support from the Makah tribe. Heading the construction was Bill Sperry, a businessman who for years has hosted fireside drum sessions with local Native Americans at his lodge in nearby Forks. Sperry volunteered his time and even joined Esteban in lending the project money while more than $100,000 in formal funding was being secured.

Claplanhoo, who enrolled at WSU in 1947, but was drafted into the Army in his junior year, suggested the project also be a tribute to Neah Bay area veterans. The name "Diah" is the historic name of that section of the tribal village. Fort Núñez Gaona was named after Admiral Manuel Núñez Gaona, for whom Spanish explorer Alferez Manuel Quimper also named the bay when he first reached it in 1790.

Built on waterfront property overlooking Neah Bay, the structure is constructed of six large cedar columns to resemble a traditional Makah longhouse. The columns are from a tree felled on the property. Along its western side is a tall fort-like fence of logs. The site bears the flags of the United States, Spain, the Makah Nation, Washington state, the Nuu-chah-nulth Native Peoples of Canada, and each branch of the United States military. A stone monument bears the names of Neah Bay area veterans who have served since World War I. The fact that all returned home alive is a source of Makah pride.

The dedication of the park began with a veterans' parade and a flyover by a U.S. Coast Guard rescue chopper under bright sunny skies. Just as the speeches were about to begin, a large flock of eagles suddenly circled overhead for a minute or two, then disbanded.

"The tribal people would say that is a blessing," Sperry whispered.

Fort Núñez Gaona–Diah Veterans Park "is a huge testament to our participation in international trade prior to becoming citizens of the United States," said tribal chair Micah McCarty. "It's a very interesting aspect of our history. It's important to know how some of the dynamics of history shaped the course of how we became Americans."

In fact, Makah artifacts from the 1700s brought back by the Spaniards remain on display at the Museo de las Américas in Madrid. The park dedication included the signing of a "Welcome Treaty" between Spain and the Makah Nation, which McCarty said he believes will lead to even stronger ties between the Spanish and the Makah people.

Brian Dirks '82 is communications director for the Office of the Lieutenant Governor of Washington.

A new memorial in Neah Bay, built on land donated by Ed Claplanhoo '56, his wife Thelma, and two other Makah families, commemorates area veterans and the presence of Spain on the Northwest coast as early as 1774.

Reconsidering the oyster

Coast Seafoods CFO Kay Cogan '79 visits oyster beds frequently in Willapa Bay. Coast is the largest oyster producer in the country.

by Tim Steury :: photography Bill Wagner

FOR AN OYSTER LOVER, speeding down the Willapa River in an open boat toward Willapa Bay and its oyster beds must be like approaching the Celestial City. Even if it is cold for May, and gray, and spitting rain, everyone in the boat is smiling beatifically.

Approximately 15 percent of the oysters consumed in the United States come from Willapa Bay, just north of the mouth of the Columbia River. Ten thousand acres of the bay are devoted to oyster farming. Coast Seafood, whose CFO Kay Cogan '79 and operations manager Tim Morris are escorting me to oyster heaven, is the largest oyster producer in the country, providing nearly 400,000 gallons of shucked oysters per year, not only from Willapa Bay, but also Grays Harbor, Puget Sound, and Humboldt Bay in California. Coast produces better than 25 percent of the state's oysters.

As we emerge from the river's mouth into the bay, Morris notes a workboat beached on a tidal flat off to our left. There are no waves of greeting from the crew, who must be disgusted with their skipper, who apparently misjudged a channel and the tide. There's no money to be made until the tide refloats their boat and they can reach the bed they'd come to harvest.

As we turn south, we pass a large exposed sandbar populated by scores of seals, all eyes on us, a few waddling into the water, but mostly waiting for the same sun we're all expecting to break through the heavy overcast any minute now.

Morris pulls our boat up to the shore of a 15-acre oyster bed exposed by the low tide, and we climb out. Cogan gives me some pointers in walking over the oyster flats. The main goal is to not get both feet stuck at the same time. Keep the main pressure on the balls of your feet, she says.

Long parallel lines of oyster clusters strung on yellow rope stretch across the exposed mud beds. The first thing I'd noticed after the "South Bend: Oyster Capital of the World" sign the night before was the mountain of oyster shells along the highway. These shells will be the mother shells for the babies. Coast has hatcheries in Quilcene, on the Hood Canal, and near Kona, Hawaii. The larvae from Kona are sold to third parties or shipped back to Quilcene. Bags of shells, called "cultch" in the trade, are trucked from the processing plant in South Bend to Quilcene, where they are immersed in tanks with the young oysters, which attach themselves to the shell. The "seed" is moved to Coast's nurseries at Quilcene on Willapa Bay, or Humboldt Bay in northern California for 3-8 months to grow and mature a bit before being transferred to the beds where they'll live out their lives.

Coast is moving much of its oyster production to a "long-line" versus a "bottom-culture" farming system. Bottom-culture is just that, the young oysters spread across a suitable bed. Long-line raises the oysters off the bottom, greatly increasing productivity. The mother shells are threaded onto lines, which are strung on PVC pipes stuck into the bottom. According to Coast figures, long-line requires 136 seed bags per acre to yield 6.7 gallons of oysters per bag, totalling more than 900 gallons of oysters per acre. Hanging the oysters off the bottom makes it easier for the oysters to feed and reduces predation by crabs and other oyster lovers.

But not by us! Morris slips his oyster knife into a cluster of oysters, pries one open, and hands me an oyster on its half-shell, as fresh as it gets.

I recall an earlier instance in which, in the throes of enjoying an Olympia oyster (*Ostrea conchaphila*), I dismissed the Pacific oyster (*Crassostrea gigas*, literally "big oyster") as inferior. I now take that back. Olympias are wonderful. But they are quite different pleasures. Now, slowly chewing a Pacific while standing in the bay from which it came?

This oyster is plump and rich and briny. It is so good.

I actually read an assessment of the Pacific recently in which it was criticized for exactly these qualities. Oh, and for being too "creamy." I believe this criticism came from an admirer of the relatively scrawny, metallic, and austere Eastern oyster.

Easterns were grown here in the early twentieth century, with uneven success, and I understand they're making a minor comeback. The native Olympics had been nearly wiped out by oystermen who had yet to learn that everything is finite—and that oysters prefer oyster shell on which to grow. The Olympics were dredged up and shipped to California and points east, their shells unreturned, until they were no more, except for a few hidden here and there in unnoticed inlets. They are, fortunately, reviving in areas around the Sound. (See "Eating Well to Save the Sound," wsm.wsu.edu/stories/2006/May/eatingwell.html.) Tasty as they are, however, they are slow-growing and generally unprofitable.

As a replacement, the Pacifics were introduced from Japan, back in the days before anyone worried about introducing exotic species into an ecosystem. Fortunate for us oyster-philes. Also fortunate is the fact that they love it here. They do prefer a little warmer water in which to spawn. But that's what hatcheries in Kona are for. This could, it occurs to me, also be a natural curb on their dominance of the ecosytem.

Coast, which sells its oysters under the "Hilton's Willapoint" brand, also grows the plump and fruity Kumamoto (*Crassostrea sikamea*), also from Japan, as well as Manilla clams and mussels. But the piece de resistance for the lover of the oyster who has no patience with the travails of procreation is the triploid oyster.

You've no doubt heard the truism that oysters must be eaten only in months that have an "r" in them. There is a grain of truth in this, but not for the health reasons commonly imagined.

Oysters spawn in the summer months (no r's), in the process of which they produce millions of sperm and eggs (one of the reasons, perhaps, for the oyster's reputation as an aphrodisiac). As a result they become watery and flaccid, losing as much as a quarter of their mass. In other words, during the non-r months, they aren't as tasty as they are the rest of the year.

Enter the triploid. Coast uses a simple heating process to increase the number of a larva's chromosomes. The result, a triploid, is sterile. In other words when all the other oysters in the sea are wasting themselves in rampant reproduction, the triploids are doing nothing more than they do the rest of the year, getting fat and sweet. There is indeed such a thing as progress.

In spite of the good time we're having, Cogan and Morris are actually doing inventory. With records of past yields of a bed and an accounting of its seeding, Cogan can calculate the next crop. What they're doing today is checking simply to make sure the bed's health and growth meet their expectations.

Cogan has been with Coast for 21 years, Morris for nearly the same time. They both clearly love their work. Morris hands me another oyster.

These are beautiful, says Cogan, surveying the object of her inventory, the long-lines of *Crassostrea gigas* stretching across the beds in perfectly sumptuous symmetry. «

Let the invasions begin

by Cherie Winner :: As Beijing prepared to welcome athletes and spectators to the Olympic Games, a quieter and much less welcome influx was already under way.

According to a new study by Washington State University ecologist Richard Mack and four Chinese colleagues, China's explosive economic growth and ambitious public-works projects have allowed non-native species of plants, insects, and other organisms to spread throughout the country and inflict more than $14 billion of damage on the nation's economy—and the Olympic Games could provide an opportunity for even more biological invaders.

Mack and his co-authors combed through trade and economic data to discover that China's economic boom has been accompanied by a boom in biological invasions.

Students helped to plant millions of trees and shrubs in and around Beijing as the city prepared to host the Olympic Games. *Courtesy Beijing Organizing Committee*

"They're compressing the whole Industrial Revolution into about 40 years—and on a bigger scale," says Mack. In the past 30 years, for instance, the number of international ports of entry in China has doubled and the total length of express highways has expanded by 40-fold. Over the same period, the number of invasive species in the country has more than tripled.

The movement of introduced species across the nation has occurred at breathtaking speed and enormous cost. The American vegetable leaf miner, *Lyriomyza sativae*, was first detected in Hainan Province in December 1993. By early 1995 it had spread to 20 other provinces. It now occurs throughout the whole country and causes at least $80 million in damages to vegetable crops every year.

China's waterways have also become distribution systems for biological invaders. The Three Gorges Dam and a major canal project diverting water from the damp south to the drought-prone north could provide easy migration routes for aquatic invaders such as water hyacinth and alligator weed. Both plants periodically block waterways in southern China and have the potential to clog power turbines and water-intake pipes.

The Olympics add another challenge to Chinese ecosystems: the entry of untold numbers of non-native seeds, spores, and insect eggs that will hitch a ride with the thousands of visitors and cargo containers converging on Beijing this summer.

Mack says the Chinese government recognizes the potential of the Games to lead to further problems with invasive species and is working on ways to detect and eliminate them before they gain a foothold. However, he and his colleagues also found that between 2002 and 2004, the Chinese government imported more than 31 million woody seedlings and 130,000 pounds of seeds to be planted in and around Beijing to beautify the city in advance of the Games. Some of those plants may themselves become invasive, and even well-behaved imported plants may carry invasive insects or parasites.

According to Mack, the most critical phase of the effort to deter Olympic invaders will come after the human visitors have moved on.

"The most likely way that any of these organisms are going to come in is in a resting stage—eggs, seeds, spores," says Mack. "That means they're not going to be prominent at all when they first come in. So the Chinese will need to be alert with follow-up inspections."

Programs to detect newcomers should continue for more than a year after the Games end, he says—the longer the better, because spores and seeds may not start growing right away. Mack told Chinese scientists about one of the first such inspection efforts, which occurred in Philadelphia following the city's big Centennial Exposition in 1876.

"The city assembled a group of local botanists to walk the grounds of the exhibition halls for four years after it was over, looking for new species that would have come in. I consider that incredibly insightful," he says.

Seeing red (and far-red)

by Cherie Winner :: Ask crop scientist Michael Neff about plant growth, and he won't talk about rainfall or fertilizer. He'll talk about what the plants see.

"What I've been interested in forever is how plants use light as a source of information," says Neff. "Plants have photoreceptors that are completely independent of photosynthesis and chloroplasts, that read their environment and say, 'I am in full sunlight, I'm in the shade of another plant, I've got plants that are growing too close to me,'" and so on. The photoreceptors then trigger a host of hormonal reactions that influence how tall the plant will grow.

Neff thinks it's possible to boost crop yields by manipulating that system. He's especially interested in shade avoidance, the tendency of plants to grow away from shade. When a seedling in the shade grows long and leggy or a young tree leans away from its larger neighbor, that's shade avoidance. It comes into play with crops, because plants that are grown close together shade each other to some extent.

That's bad news, because shaded plants grow taller, and as a stem lengthens, it also weakens. Add the weight of a seed head or fruit, some rain, and a brisk wind, and the plant can fall over. In very bad cases, whole fields of crops can end up on the ground. They become hard to harvest; if conditions are right, they may even rot.

"And then you've lost your crop," says Neff. "Even though you *had* a potentially big yield, you've lost it."

For decades, largely due to the work of Washington State University wheat breeders Orville Vogel and Bob Allan, wheat farmers have relied on dwarf and semi-dwarf varieties that were genetically selected to stay short. But most crop species aren't available in dwarf varieties. Neff thinks the light-sensing system might provide a solution. If we can figure out how to reduce shade avoidance in a species, he says, the crop could be planted closer together but still remain short and sturdy.

To do that, he first has to understand how shade avoidance works. There's a lot more to it than a simple "grow toward the light" strategy. The light under a tree or among crowded crop plants isn't just dimmer than light in the open. It's also a different color. Sunshine is full-spectrum light. It includes all the visible colors, plus some

Left: Although they don't see as we do, plants perceive their environment in the red and far-red end of the light spectrum. If we saw things in the far-red spectrum, it would be similar to this infared photograph. (The sky has been colorized for effect.) *Photo by Daniel Schwen.* ***Above:*** Michael Neff, *courtesy same.*

For time-lapse video of plants in action, visit http://plantsinmotion.bio.indiana.edu.

that humans can't see. Plants use the blue and red wavelengths of light for photosynthesis. Light that has passed through or bounced off of leaves has lost much of its blue and red light and has relatively more green and far-red light. We can see the green light—that's why leaves look green to us—but we can't see the far-red.

Plants can see it, though. A photoreceptor protein called phytochrome B (PhyB) detects red light, far-red light, and the relative amounts of each.

"It's a great photoreceptor for reading whether you're under the shade of another or near another plant, because that light that is reflected off your neighbors is enriched in far red," says Neff. When PhyB senses a greater proportion of far-red light, it signals the plant that it's in shade. That spurs the plant to grow taller in an effort to get beyond the shade to a sunnier spot.

PhyB would be a good target for crop breeders to tinker with, except for one thing: Plants with dysfunctional PhyB do the opposite of what's wanted. They *always* shade-avoid, growing long and leggy even when they're in full sunlight.

So Neff and his students have taken a different approach. They start with a plant strain that has a nonfunctional form of PhyB. Then they randomly create mutations in the plant's other genes and look for one that compensates for the lack of PhyB. Such mutations are easy to identify: You collect seeds that might carry one, let them sprout, and look for seedlings that are shorter than the others. The short individuals are not shade-avoiding as much as their parents. Whenever Neff identifies such a mutation, he and his students study it to figure out why it doesn't shade-avoid and whether it's a good possibility for plant breeders to work with.

His team has already identified dozens of genes that are involved in converting the signal from PhyB into growth instructions, and they're making good progress on developing candidate genes that could be introduced into crop plants.

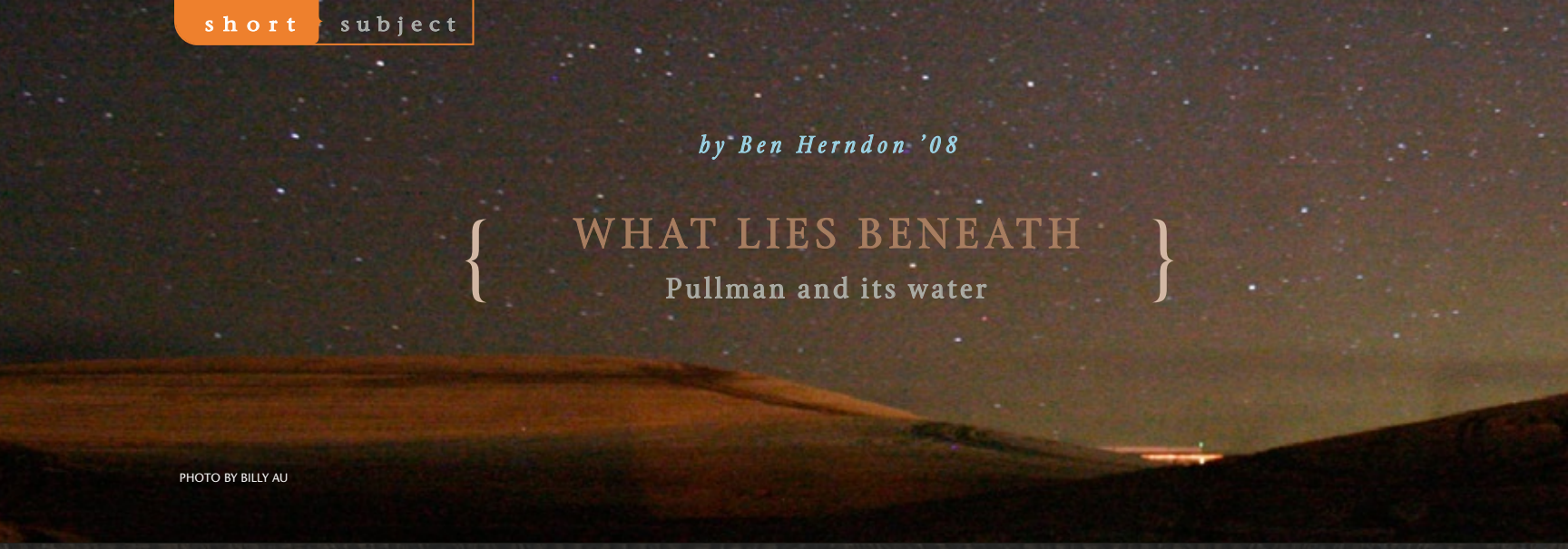
Neff makes sure his students know that they carry the legacy of Vogel and Allan, who developed many of the dwarf and semi-dwarf varieties that are now the mainstays of the wheat industry.

"They should all understand that. I certainly like to impress upon them the hallowed ground that they are working on here," he says.

At the same time, they catch his enthusiasm about the revolutionary insight that plants, do, in a sense, *see*—and they see the world differently than we do. Neff loves to show students and visitors landscape photos shot on infrared film, which records the far-red wavelengths of light we can't see.

"All the plants look silver, like you need sunglasses to look at these things," he marvels. "What a plant sees, with its photoreceptors, is *blinding* far-red light being reflected off of the other plants.

"That's what the plant sees of the plant world." «



by Ben Herndon '08

WHAT LIES BENEATH

Pullman and its water

PHOTO BY BILLY AU

FINANCIAL HARDSHIP, FIRES, AND SPRING FLOODS: In 1890 the community of Pullman was in desperate need of some good news. A hungry blaze had leveled the city's newly-rebuilt commercial district only three years after it first burned to the ground in 1887.

Then on May 24, 1890 word got out that a "gusher" had been struck. Fifty gallons of water per minute rushed up to the surface where contractors had been drilling a well for the Palace Hotel. They had accidentally discovered an artesian source, a well under pressure that once tapped was forcing water up. It was the turning point for an early struggling Pullman.

The story of the American West has always been a story of water, how much of it there is and who controls it. So for a small agricultural town in eastern Washington, free-flowing groundwater was almost better than striking gold.

By 1891, according to a yellowed copy of the *Pullman Herald*, every home in Pullman had clean running water. Well-digging had become a town spectacle. Information pamphlets touting Pullman's "ever-flowing springs of pure-abundant cold water" lured potential residents to the area. The discovery of artesian water had great impact on the future of Pullman and the arrival of Washington State College.

Bob Luedeking, a retired WSU chemical engineering professor and member of the Whitman County Historical Society, says if it weren't for the wells, the school might be somewhere else entirely. "I think [the wells] played a critical role in the decision of the location committee," he says, pointing to an 1890 photo of three men smiling in front of a gushing fountain. The men were members of a state- appointed committee to find a suitable site for Washington's new State Agricultural College.

Pullman used its artesian wells for nearly 80 years. At one time the city had more than 14 capped wells continuously funneling water to homes and businesses. One businessman used the water to power the equipment in his butcher shop. There was even an Artesian Hotel in town.

But in the 1950s the wells started running out. By the 1970s only a few artesian-powered drinking fountains remained in what was once the "Artesian City."

Luedeking remembers stopping for a drink at an artesian fountain while walking home from campus in the late '60s. "The big fountains had disappeared long before I came [in 1956]," he added. All that remains today is a replica of the ones that capped the wells that helped put Pullman on the map.

Back then, the townspeople didn't know how much water they had or how long it would last. Fortunately, when the artesian wells ran out, Pullman found a good water supply by tapping deeper, drawing water from aquifers buried deep below the surface.

Beneath hundreds of feet of prehistoric rock lies a volcanic reservoir so vast the experts have yet to determine its boundaries. Its 10,000-year-old water is considered pristine and, some say, unrivaled in taste.

The Palouse River Watershed, which includes Pullman and Moscow, Idaho (eight miles to the east), is one of the largest watersheds in Washington. It includes two aquifers: the smaller, shallower Wanapum and the deeper Grande Ronde which supplies most of the water to the more than 56,000 residents in the Palouse area.

On a typical spring day, the 700-horsepower pump on well No. 8 whines like a jet engine as it funnels thousands of gallons of water each minute through a 12-inch-wide pipe and out into the WSU water supply on the Pullman campus. No. 8 was drilled in 2003 after water levels had dropped too low for half of the campus's wells to reach.

Despite dozens of studies, scientists haven't been able to establish just how much water is in the Grande Ronde, which now supplies around 90 percent of the water to the Palouse basin and at the same time seems to be dropping each year.

In contrast to the declining Grande Ronde, the Wanapum is now recovering after water levels and water quality dropped dramatically in the 1950s and early 1960s when it was the region's main water source.

Ours is just one of a growing number of uncertain or diminishing aquifers across the United States. Aquifer water levels in Texas, Oklahoma, and Kansas have dropped by nearly 100 feet in some areas due to growing populations and heavy irrigation of farmland, according to the United States Geological Survey. Development in south-central Arizona, near Tucson and Phoenix, has caused aquifer declines ranging from 300 feet to 500 feet. Long-term pumping since the late 1800s is linked to a 900-foot decline in the Great Lakes watershed, the sole drinking water source for 8.5 million people in the Chicago-Milwaukee region.

Here in the Palouse, the community is learning a lesson from early Pullman, hoping to quantify and figure out what to do about the water supply before it gets too low.

The Palouse Basin Aquifer Committee is an inter-agency technical advisory group formed in the early 1990s after several years of data showed that the Grande Ronde Aquifer was dropping at least one-to-two feet per year. The committee is composed of delegates from the four major users of water in the Palouse, the city of Moscow, the University of Idaho, the

Right: One of Pullman's first artesian wells from Olson Street ca. 1891. *Image courtesy WSU Manuscripts, Archives, and Special Collections.*

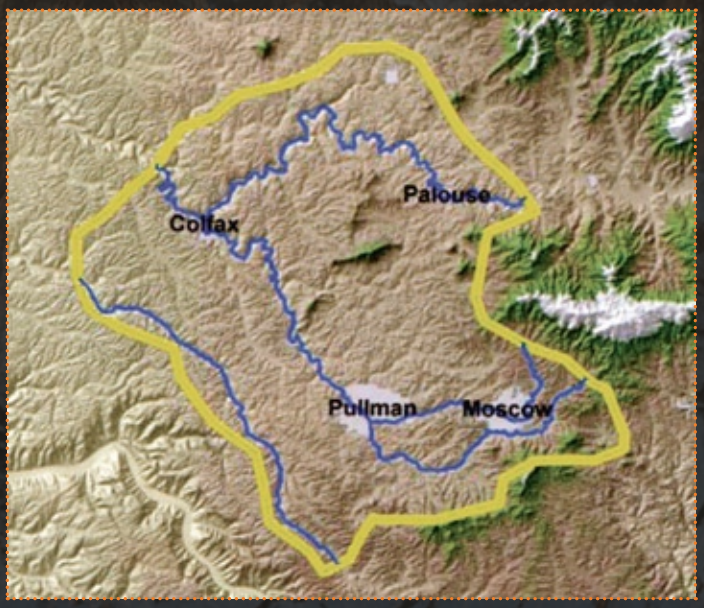
Below: The working boundary for the Palouse water basin. *Source: Palouse Basin Aquifer Committee*

city of Pullman, and Washington State University and from the city of Colfax, Whitman County, and Latah County.

Its purpose is to balance water use and supply to the Palouse, says Robert Corcoran, PBAC board member and executive director of WSU Facility Operations. "PBAC is unique in that it is a regionally managed basin," Corcoran says. "It is inter-state, inter-city, and inter-university."

In 1992 PBAC started a Ground Water Management Plan, which reduced overall pumping levels across the Palouse. The first year 3.09 billion gallons of water were pumped; by 2006 that number had dropped eight percent to 2.83 billion gallons.

PBAC has contracted with numerous specialists and scientists to study the aquifer. The group's support has led to a number of completed and ongoing research projects that may help address the aquifer's decline.



Their work includes monitoring water levels, determining interconnectivity of the aquifers, and detecting thickness and permeability of area soil and rock formations. At the heart of this research is an underlying need to get a centralized perspective of the aquifer, in size, shape, and flow patterns.

WSU hydrogeologist Joan Wu has spent years studying area aquifers and how they may be connected. With graduate student Farida Leek '06 she collected and compiled data on the aquifers to form hydrogeological maps, the first large-scale consolidation of well data for the area. They found evidence showing that there is virtually no change in overall geological elevation across the basin, meaning the chances of water levels declining because of a natural discharge are slight because there is no major slope where water could drain, says Wu. This means that artificial pumping is mostly to blame for the decline.

Their studies also show that vertical water collection in the Grande Ronde from surface water runoff is nearly nonexistent. Layers of basalt and compacted sediment prevent water from percolating through the ground and refilling the aquifer, meaning "recharge from precipitation is very limited," Wu said.

Other studies by retired UI geologist John Bush suggest the possibility of "lateral recharge," by which groundwater enters the aquifer from the side instead of the top by flowing through sediment layers off of Moscow Mountain.

Even though PBAC continues to fund important research, some critics say the committee should be doing more to characterize the structure and behavior of the Grande Ronde.

And it would help to know how well the aquifer is connected, said WSU hydrogeochemist Kent Keller. The solution? More test wells, he says. "You don't want to do anything more until you can monitor the effects of what you do."

Creative, and sometimes costly, solutions to the aquifer's decline have been kicked around for years and were again brought up at the 2007 Palouse Basin Water Summit held a year ago in Pullman. They include storing water from peak winter runoff or even diverting water from the North Fork Palouse River.

WSU has presented the Legislature a request for a waste-water reclamation project, which will be resubmitted for $16 million, to provide the University and Pullman 1.3 million gallons per day of treated effluent. Also, according to WSU Facilities Operations, intensive water-saving efforts have decreased consumption on the Pullman campus by 31 percent over the last two decades.

Alternatives like these need to be considered if water levels keep dropping, Corcoran says. "Conservation alone won't get you there."

PBAC's overall timetable for action is to have a plan to sustain or replenish the aquifer in place by 2010, and by 2020 to initiate a sustainable plan of action, says Corcoran. «

HIGHER

ZACH MAZUR

THE HIGH COST

Melissa Bughi '08 almost managed to graduate without debt. Through summer jobs and by working 20 hours a week on campus during the school year, she was able to augment her scholarships and finish school without having to rely on help from her parents.

by Hannelore Sudermann :: photos by Zach Mazur & Robert Hubner

TS OF COLLEGE

ZACH MAZUR

Riley Mengarelli, a WSU senior, keeps an eye on his cash cows. By selling calves from his herd every fall he avoids having to take out loans to pay for school.

RILEY MENGARELLI STARTED RANCHING CATTLE when he was 15. Just a skinny high school freshman, he had already figured he could use the livestock to help pay for college. He bought a few heifers, bred them, and sold their calves at an auction that fall. Then he did the whole thing again the next year.

Now a Washington State University senior, Mengarelli has used his cattle money and scholarships to pay his way through school and graduate without debt. By maintaining the herd and selling the calves, "I've made a few thousand a year," he says.

Keeping livestock in Toppenish while attending school 200 miles away in Pullman is, to say the least, a challenge. Though his mother and siblings feed the animals when he's gone, more than once Mengarelli has had to jump in his Jetta (which doesn't do much for his cowboy image, but has more fuel-economy than a truck) and race home to help.

"I love the work, though," says Mengarelli, who plans to keep the herd even after college. "Sure it's stressful to raise cattle," he says. "But it's also really gratifying to see healthy calves and to turn them out on green grass."

To supplement his calf money, Mengarelli works on the family farm in the summer. Like many WSU students before him, he has blended his wits with hard work to pay his way through school without too much trouble to his folks.

Some do the typical—sell blood at the plasma center in Pullman, offer themselves for psychology studies on campus, and find jobs in town.

Others, through time, have been more creative. During the Depression, Peter Kragt hitchhiked 400 miles from his home in Lynden to Pullman. Then he found a vacant lot, had lumber delivered, and in just three days built himself a cabin where he lived quite efficiently for the rest of the term. He recounted his efforts in an essay titled "How I make Both Ends Meet," which he entered in a campus contest in 1932.

In 1992, when Pullman was in the midst of a housing shortage, WSU sophomores Keven Hupp '95 and Dan Pearson '95 bought a 60-foot mobile home for $12,500. They paid $150 a month to rent their lot, which included sewer and water, and they heated it by burning wood they had brought from home. Because both came from farm families, they had a steady supply of meat and canned fruits and vegetables. Their only food expenses were eggs, milk, and bread.

By the time they graduated in 1995, housing was still at a premium in Pullman. The two put a sign in front of their home at noon one Monday and by 7 p.m. they had sold it for $17,500. "We each left Pullman with $8,750 in our pockets instead of a stack of bills," says Pearson.

Veterinary student Scott Smiley '05 bought an old school bus from a church for $1,000. He tore out all the seats and cleaned up the interior. Then he added a propane stove and refrigerator as well as a wood stove, bed, and table. He drove it to Pullman and at the start of school knocked on the doors of farmhouses just outside of town to find the right location and landlord. Some people thought it was a cute idea, he says. "Others thought I was crazy."

PAYING THE WAY

But not everyone can do it on their own. As director of Student Support Services at Washington State University, Francisco Salinas knows students who have blown through their financial aid the first two months of school, some who are juggling two jobs and five classes, and some who are a week away from being evicted from their apartments.

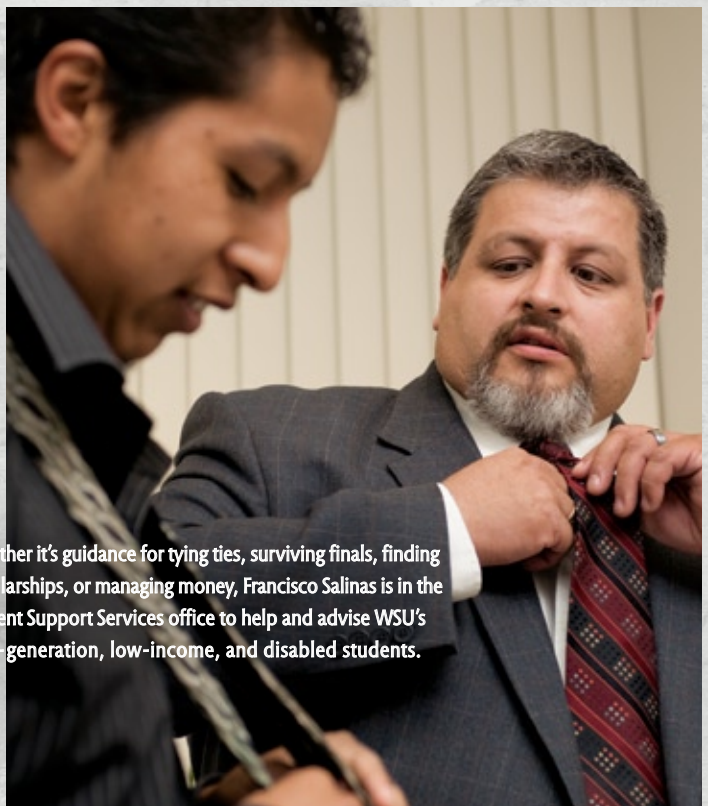
Salinas and his office are on campus to provide one-on-one counseling for first-generation, low-income, and disabled students who are working on their first undergraduate degree. As the first person in his family to finish college, Salinas knows the turf. It isn't easy if there isn't someone in your family who has been through this and can tell you what to do, he says.

Fortunately, students find the 30-something administrator approachable. They're not afraid to admit they're failing a class or that they don't have enough to buy groceries. On a day last spring, he coached a young woman with a disability through preparing for a test. The minute she left, another student, this one with money concerns, filled her seat. He was on food stamps and didn't have enough cash to cover rent. In addition, he was taking a tough class and hadn't met with his professor to discuss his grades. Salinas urged the student to approach the faculty member. Then they talked about sticking to a budget. Often, Salinas says, the issues of grades and finances are intertwined.

Just down the hall, program coordinator Elizabeth Wolfe picks through stack of returned textbooks that had been loaned out to low-income students during spring semester. As she sets *Guidance of Young Children* on top of a nutritional science text, she notes that the $7,000 she had to spend on books this year didn't go very far.

The office suite holds two private counseling offices with large green metal cabinets. The one in the office on the right contains clothes that students can borrow on a confidential basis. The other is filled with food. "If we have a student who comes in and hasn't eaten for a couple days, that's where we take them," says Salinas. "If we have a student who is dealing with the fact that they don't know how to budget their money or there was a shortfall in a financial aid award, then we look at a long-term strategy. We contact the Community Action Center and see if they're eligible for food stamps. We try to help them learn to manage their money."

ROBERT HUBNER



Whether it's guidance for tying ties, surviving finals, finding scholarships, or managing money, Francisco Salinas is in the Student Support Services office to help and advise WSU's first-generation, low-income, and disabled students.

Each day a river of students flows past and through the Lighty Student Services building, but only a few land at Student Support Services. And the office is there only because the university takes part in two federal programs that target support at certain student populations. "Our challenge is to take those populations and make sure they earn their four-year degree," says Salinas. He and his colleagues serve a total of 410 students. "But that's just a small percentage of the total enrollment," says Salinas.

And what about the rest?

"They are left to fill the gaps themselves," says Salinas. Sometimes they can do it with scholarships. Often they work. But as the economy changes and tuition and fees rise faster than inflation, it's probably the middle class families who are going to feel the pinch the most, says Salinas. "That's who I'm worried about."

STUCK IN THE MIDDLE

About $20,000 a year. That's Washington State University's estimated costs for an in-state undergraduate. That sum includes tuition of nearly $7,000 and mandatory student fees of another $900. It also factors in housing, food, books, and about $1,200 in traveling expenses.

Gone are the days when the in-state school was the affordable alternative, when the state covered most of the costs for an in-state student, and when students could make up the rest with summer jobs and a little help from mom and dad. In the past four years, tuition and fees at Washington's universities have risen by more than 29 percent, a staggering increase, though according to a recent report from the Washington State Higher Education Coordinating Board, it's still less than the national average of 34 percent.

If the country is headed for a recession, it could be more bad news for the price of an education. History has shown that during national recessions, states cut back on higher education appropriations and tuition spikes up. And in most cases, states haven't increased their student aid to meet the need, according to the *Chronicle of Higher Education*.

Rising costs and their causes are affecting schools country-wide. Many public schools, WSU included, have resorted to borrowing money to build dormitories and student recreation facilities—important lures for recruiting new students to campus, and often necessary improvements. Michael Blim, author and anthropologist, calls this the "expand or die" moment.

In essence, Blim argues, as universities compete for students, the ones with the newer buildings, state-of- the-art technology, and the fresh student facilities will do a better job of luring those traditional students who can pay their way through school.

But in many cases, students end up paying the costs of expansion through their housing and fees. For example, a student fee of $120/semester goes toward paying for more than half the debt of the $86 million renovation of WSU's Compton Union Building.

It's a nation-wide phenomenon. According to a recent College Board report, fees are rising faster than tuitions, as much as 11 percent at public four-year schools like WSU.

Sarah Williams is finding creative ways to augment her student loans and pay for her extra costs like class fees and art supplies. In addition to her part-time job answering the help line in the Student Learning Center, she was a nighttime dorm monitor for Cougar Quest, a summer program for 7th–12th graders.

insider's guide

TOTALING UP THE STUDENT FEES

services & activities fee (all campuses)

$502 per student/semester
$8,678,292 annual total

During the year, including summer session, portions of that money will support athletics ($951,149), the marching band ($89,600), ASWSU ($832,052), *The Daily Evergreen* ($25,000), the Compton Union Building ($1.14 million), Visual, Performing and Literary Arts ($81,500), and the Graduate and Professional Student Association ($357,880).

student health fee (pullman)

$120 per student/semester

The health fee provides free access to medical care at student health services, as well as access to the urgent care clinic, nurse clinic, and others. It does not cover emergency room or laboratory charges.

student recreation center fee (pullman)

$135 per student/semester

Students can use the recreation center seven days a week. The $39 million center, which opened in 2001, offers lap and leisure pools, a weight room, basketball courts, squash courts, an elevated running track, access to fitness classes, and more than 200 pieces of cardio and weight equipment.

transit fee (pullman)

$15 per student/semester
$421,552 (out of S&A fees)

Students have unlimited access to the Pullman Transit bus system.

stadium renovation fee (pullman)

$25 per student/semester
$329,793 collected annually

The fee helps pay for the first two phases of the Martin Stadium renovation, which include new bathrooms, improved concessions, and overall updating.

compton union renovation (pullman)

$120 per student/semester

This fee will eventually pay for 60 percent of the debt incurred on the $86 million renovation of the student union building.

In the spring of 2008, the WSU Board of Regents set the Services and Activities Fees for the 2008-2009 academic year at $502 for all full-time students, an increase of 5 percent from the previous year. The sum doesn't include fees for buildings and renovations (which students have voted to fund). Special course fees are an additional cost. In fall 2008 they range from $2 for an English class to $1,150 for Interior Design 277, an optional course that involves an out-of-state field trip.

SOURCE: WASHINGTON STATE UNIVERSITY

As she heads into her sophomore year this fall, she'll have some money saved. She's creating extra cash by making and selling jewelry. Her handcrafted necklaces, mostly made with hemp and beads, are a regular sight at events like the Lentil Festival. And Williams always thinks about how to expand her business. Last year she started offering her jewelry online at an artisan's site called ETSY. In the spring, she branched out again, bringing her work into Lily Bee's Consignment Shop on Main Street in Pullman.

But so far, all her efforts don't cover all her expenses. That's why she's borrowing through federal loans.

BORROWER BEWARE

Every dollar counts, says junior Christine Morgan, who met Francisco Salinas her freshman year. She walked out of the library to see him advertising his program for first generation college students. Since then, she has regularly visited his office for financial advice and help applying for scholarships.

Because of her family's income, she doesn't qualify for any extra federal support. That has been frustrating, says Morgan. She and her parents have had to take out loans. At the end of her sophomore year, she had debt close to $20,000. At this rate, by the time she's a senior, it could be more than $60,000, she says. "It's scary to think about."

More than half of WSU's seniors graduated with student loan debt. In 2007, they owed on average $20,000.

A lot of middle income family students are starting to feel the crunch, says Salinas. "The expected cost of attendance and the difference between that with the expected family contributions is leaving a gap."

Low-cost federal loans and private scholarships don't always cover it. "They have to work and they have to keep bugging mom and dad for money that mom and dad don't think they have," says Salinas. "Often times it's because they really don't have it."

Lending is changing in every sector. Families who would take out bank loans to help their children through school may not have that option in the next few years. And some private student lenders are changing policies or filing for bankruptcy.

To fill the gap between education loans and college costs, some families tap into their home equity. But as housing prices started to fall last year, people ended up owing more on their homes than they were worth and had nothing to borrow against. According to the Project on Student Debt, the mortgage market had been a resource for some student loan companies raising money to make student loans. Now that investors are more nervous about the economic future in real estate, there is less money available.

And then there are the private loans, which are used by about eight percent of WSU's undergraduate students. These loans are made based on the student's credit history and have high interest rates. And where predatory lending with home loans is now mainstream news, private student loans may be the next frontier, warn education experts.

It is a bit of a mess right now, says Wayne Sparks, director of the WSU Office of Financial Aid. Grants haven't kept up with the increase in college costs, and while there are some increases in scholarships, they haven't matched the increase in need, he says.

The University does take some measures to protect students who are borrowing money. Before a student can apply for a private loan, for example, he is required to fill out the free application for federal loans and grants. "We want to make sure they have exhausted the availability of lower interest loans before turning to a private lender," says Sparks. At the end of the spring semester, word came out that a new federal law

has increased the total amount of low-cost loans a student could receive from $23,000 to $31,000 and ensures loan access even if conditions in the credit market continue to deteriorate.

Even with the help of low-cost loans, this generation of students is facing new challenges. Sparks and his colleagues see a lot of young adults who come to Pullman with very little financial experience and a willingness to accept loans without fully understanding repayment and interest rates. They may have had jobs, but few have ever purchased a car or managed a large sum of money, says Sparks.

In the most extreme cases, WSU's advisors have seen undergraduates leave campus owing up to $100,000 in student loan debt, particularly when private lenders are used. But to leave owing that much is a rare event, Sparks is quick to point out.

"We tell our students, 'Live like a college student while you are in college so you don't have to live like a college student when you graduate,'" says Sparks.

The University's financial aid office has offered counseling to students to reduce loan indebtedness. In 2004 WSU received an EdFund grant to reach out to freshmen and their families during new student orientation and get them in the right frame of mind about college costs and expenses. They talked about whether you really need a car in Pullman, the benefits of using cash over credit, and the reality that daily lattes and weekly pizzas can add up to thousands each year.

With the right resources, the financial aid office could do more, says Sparks. Some schools are offering brief courses on personal finance and money management. Ohio State University, for example, tries to reach students during their first five weeks of college because that's when spending habits are set. Other schools call students in when their loan debt starts looking heavy.

Right now, WSU counsels students before they get their first loan and just before the leave. "The good news is our students at WSU have compiled a very good record in terms of repayment," says Sparks. "That bodes well for future students looking for aid."

MORE COSTS ARE COMING

Washington State has always had an allure for practical families looking for a good in-state four-year college education at a reasonable price. But as costs keep rising it will be more difficult for students like Melissa Bughi to pay for school through summer work and a part-time job on campus.

Bughi graduated in May owing about $5,000. If she hadn't taken a semester abroad, she would have graduated debt-free. The oldest daughter of a farm family in Walla Walla, she always knew she would go to college, and from age 12 worked the onion harvest at home. It's a job she still does every summer, helping fill burlap sacks with onions from six to noon every day in the early summer. She's reluctant to say how much she has made, but it was enough plus scholarships and a part-time job on campus in a research greenhouse to pay for almost all of school.

Taking money from her folks wasn't an option, says Bughi. They have a farm to run and her two younger sisters to think of. The only help she accepted was a loan from them for her first housing deposit and some money this year to buy groceries. "I felt if I could do it, I would take the burden off my parents."

But her careful plans didn't account for emergencies. Her lowest economic point came last winter when a fender-bender over Christmas break drained $600 from her checking account. By the time she returned to school and had to buy books, she realized she had only $9 left. "It was tight," she says.

It would have been great to have had everything paid for through college, says Bughi. But maybe having to work and having to figure her way out of financial hardship had its benefits. It forced her to prioritize her classes and be organized with her time. "And I think I did a pretty good job of doing everything well," she says.

Within two weeks of graduation, Bughi had been interviewed and accepted for her first full-time job. She's on her way to getting that last $5,000 paid off. ⊗

Following in the footsteps of generations of WSU students, sophomore Sarah Williams is finding creative ways to pay for school. She sells her handmade necklaces at a consignment store in Pullman, local festivals and craft fairs, and online.

ZACH MAZUR

JIAN YANG

by David Wang

新的虚拟

The New Virtualism: Beijing, the 2008 Olympic Games, and a new style for world architecture

SOMETHING SIGNIFICANT IS HAPPENING IN BEIJING. It has to do with proclaiming a new style of world architecture at the dawn of the twenty-first century. I call it "The New Virtualism," and because there are now enough of these buildings in existence, for the first time I can describe the "looks" of this new style.

It is not that New Virtualist architecture is found only in Beijing. As a matter of fact, unlike past architectural styles, which were always regional movements before spreading their influence further afield, New Virtualism is the first architectural style in the history of the world that is *immediately* global in emergence.

So why is New Virtualism significant, and significant now, in Beijing? Because the 2008 Olympic Games held here can be the event that historically marks the formal advent of New Virtualism. Much has already been written about these Olympic Games, and no doubt more will be; here I only address these Games as the harbinger of a new global architectural style.

There are rare moments in the history of architecture when the winds of technology, economics, politics, and that most elusive of all social phenomena, the communal spirit of an age, all align to birth a new architectural style. When this happens, the ideas embedded in the architectural forms endure to subsequent cultures. Sometimes an influential person brings this about; for example, the Abbot Sugar of St. Denis was instrumental in introducing the Gothic style of the French cathedrals in the twelfth century. To this day vertical church spires still express our yearnings for a transcendental realm. Sometimes political forces are the catalyst. During the Counter-Reformation in the sixteenth century, the re-design of Rome by Pope Sixtus V wooed people back to the Church via the grandeur of Baroque architecture. Since then, city planning for the promotion of political power can be seen in Wren's plan for London (1666), Haussmann's plan for Paris (1860s), not to mention L'Enfant's plan for Washington D.C. (1791). And sometimes a new architectural style is spurred by an international cultural event, like a world's fair—or an Olympic Games. One thinks of the Crystal Palace at London's Great Exhibition of 1851: the almost 2,000 feet long and 400 feet high glass and iron structure gave society in those days a new vision of the power of The Machine. Go to any suburban shopping mall today and you will sense some of the architectural genes of Joseph Paxton's Crystal Palace.

The Olympic Games in Beijing is more than just one of these catalysts. Of course it is an international cultural event. But it is certainly also part of a political vision for a new Beijing. Consider the message of its location: the Olympic Green extends the northern reach of the north-south axis of the old imperial city. On this axis sits the Forbidden City, where the Ming and Ching emperors ruled the Country at the Center of the World (*Zhong Guo*) from 1368 to 1911. On this same axis is Tiananmen Square, built by the current regime in the 1950s to rival Moscow's Red Square. On this same axis is the old Front Gate further to the south, towards the old Ching Dynasty city gate—all of this a part of the ancient axial apparatus that forced visiting dignitaries to traverse several miles, through seven gates, for an audience with the emperor in the Hall of Supreme Harmony, also on this axis.

Put more simply, it is beyond doubt that this Olympics is a statement of the re-ascendance of China as a world political and economic power.

Besides the New Virtualist structures of the Olympic site to the north, clustered about this enormous axis now are the new National Theater, just west of Tiananmen Square, and the CCTV tower to the east. These

structures as well as others all contribute to Beijing's Olympic moment, and they are representatives of The New Virtualism.

*{**The National Theater** (**1**, opposite page) is an enormous domed structure which houses several theaters and is surrounded by a continuous moat of water. Beyond it is the **Great Hall of the People**. The architectural contrast between this New Virtualist structure and the Soviet-influenced Great Hall cannot be starker. Also compare the **CCTV headquarters building** (**2**) nearing its completion.*

To comprehend the looks of buildings in the New Virtualist style, one must first appreciate that architects are increasingly inspired by the power of cyber networks. In other words, the *look* of New Virtualist buildings do not reflect physical realities, but virtual ones. Classical architecture, like the Parthenon in Athens, was inspired by the proportions of the human body. Paxton's Crystal Palace was inspired by the idea of the machine as an extension of the human body's powers. But the architecture of The New Virtualism is not inspired by anything physical. One can say it expresses the powers of the human mind, but even that is not an exact fit. There is something *alien* about the New Virtualism, at least to my twentieth century eyes, at least in the ways I outline below.

Consider these two images: **3** illustrates the level of cell phone use around Rome's Termini train station on a typical day, a reality that can now be visually mapped by means of computer technology; **4** is the National Stadium, the track and field venue affectionately dubbed the Bird's Nest, on the Olympic Green in Beijing:

Similarities between the two forms should be apparent: both sport curvilinear and continuous strands of *something*. The cell phone web is wispy and ephemeral, hovering like an alien entity over Termini station. The Bird's Nest is also wispy and mysterious. It is as similar to its Beijing surroundings as the phone web is similar to its Rome surroundings —which is not at all. That is because neither is spawned from its physical environment, but rather from ephemeral matter out of "the Cyber Sea."

The Cyber Sea is a term my son coined to describe the virtual world of cyber reality: wireless technology, cell phone "texting," GPS, internet sites floating invisibly about us until they materialize on our computer screens, just to disappear at the click of a mouse. In the Cyber Sea swim increasing numbers of virtual identities, building sim-lives with sim-families, living in sim-homes in sim-cities, traveling virtually to faraway venues, venturing into vast networks of alien gaming-worlds, and so on.

Now note how the architects of the CCTV project describe their design: "This iconic new addition to the Beijing skyline combines the entire process of TV making—administration, production, broadcasting—into a single loop of interconnected activity." A single loop of what? Interconnected to what? Iconic of what? *It is a cyber loop interconnected in the Cyber Sea—that's what the CCTV is iconic of.* And yet here it sits in our world, an object that looks unlike anything else on the Beijing skyline, in fact, unlike anything else in the history of Chinese culture. The CCTV tower is one "look" of The New Virtualism.

Here is a key: This Cyber Sea is not only all around us, *more and more it is the nature in us.* And true art and design always ushers forth out of the nature *in* the artist/designer. Great architecture has always been and ever will be transformations of "nature"—differently understood depending upon the age—into physical form by architects attuned to the spirit of their times.

(And this, by the way, is the only true goal of design education: When nature in the form of art emanates *from* a student, he or she stops being a copier and starts being a creator).

Next to the Bird's Nest is the Aquatic Center on the Olympic Green, **5**, and shown at night in **6** and **7**. Its bubbly walls might as well represent the waters of the Cyber Sea rather than any actual wateriness. Like the CCTV and the Bird's Nest, it sits as an alien whole in the physical confines of this world, at once strange but curiously attractive. Artist depictions (read: *computer* depictions) of this building bring out the mysterious appeal of New Virtualist forms: People, as if mesmerized, walk towards its glow not unlike in scenes from *Close Encounters of the Third Kind*.

I NOW PROPOSE four general stylistic traits of The New Virtualism. These traits characterize the designs that are "coming out" of architects in tune with the spirit of our times.

First, the architecture of The New Virtualism is *a-somatic*. That is, the forms do not derive from the human body, neither in proportion (classical) nor in extension (machine). New Virtualist buildings thrive on being disconnected from common human experience. Never mind Greek columns proportioned to human proportions or anything so erudite; *just try to find the front door to a New Virtualist building*. I found no clear entry to the Bird's Nest, to the National Theater, or to the CCTV; and the entrance to the Aquatic Center is squashed very low, as if it is an act of condescension on its part to actually let people in. (For those of us in Washington, we don't have to go to Beijing to experience such affronts. Just go to the Seattle Public Library, also designed by the architect of the CCTV project, and take in the miniscule scale of the front door—after you find it, that is.) Because they are a-somatic, New Virtualist buildings connote a sense of inconvenience for human use. But that is not why we like them. We like them because…

Second, New Virtualist buildings *arouse feelings of the sublime*. The sublime is experienced when we are confronted by enormous or strange displays of power or force, and yet feel safe in their presence. Anyone who has stood at the edge of the Grand Canyon should recall an experience of the sublime. New Virtualist buildings stir feelings of the sublime either in their massive scale or, more typically, in their strange forms. Again, these buildings come from the alien world of the Cyber Sea. But by now we are all familiar with that Sea's strange powers: like crunching billions of numbers in a split second, like bombing Iraq by moving a joystick in Virginia. That's inhuman; that's unreasonably powerful; that's downright scary. And yet the Cyber Sea is a sea of our own making. As a matter of fact, because the waters of that sea now flow so much in us, we experience pleasure when confronted by these New Virtualist visitors who come from there. Even as they mystify us with their powerful strangeness, they look comfortingly familiar in a strange sort of way.

We Washingtonians are again blessed with an example. Consider: Forty years ago, had someone tried to get a building permit for the Experience Music Project in Seattle, that person would have been laughed out of the room, or at least kindly directed to a psychiatrist's office. Today, every city in the world wants a Frank Gehry building as an emblem of its world presence. Who ever heard of Bilbao, Spain, until Frank Gehry's Guggenheim Museum graced its skyline? And in Seattle, the EMP stands as a nearby example of New Virtualism's strange sublimity.

Architecture has ever been in the business of wowing us with the power of ideals. I can still hear the words of an art history professor of mine as he bellowed out to hundreds of undergraduates in his audience: "Not what man is, but what man *ought* to be!" That was the reason for

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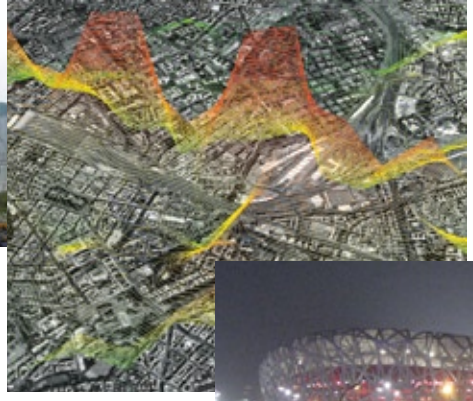

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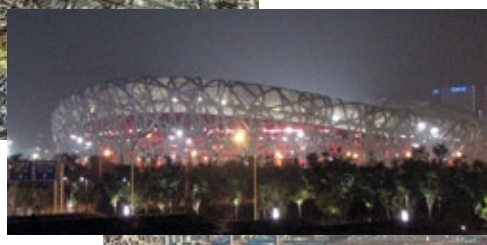

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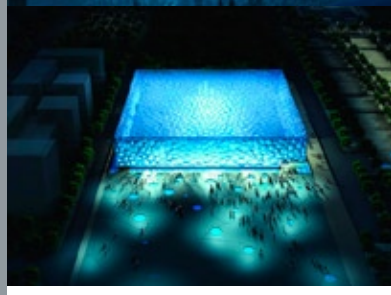

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Postscript

I am grateful to my students in Arch 525 (Architectural Theory) for their help in crystallizing my ideas on The New Virtualism. In alphabetical order, they are: Amanda Black, Kathryn Casey, Timothy Dickerson, Maria Gacula, Gulden Kalafat, Matthew Kimball, Mike Langston, Sam Manning, Deborah Napier, Isil Oygur, Ryan Pharmer, Derek Smith, Joshua Williams. —*D. Wang*

David Wang is professor of architecture at Washington State University Spokane. His article on Thomas Kuhn, "Kuhn on Architectural Style," is forthcoming in Architectural Research Quarterly.

Joshua Wang coined the term "Cyber Sea."

For more images and the architect's description of the CCTV project, visit *Washington State Magazine Online*, wsm.wsu.edu.

1 & 2 David Wang :: 3 courtesy Real-Time-Rome, SENSEable City Lab, MIT 2006 (image by Andres Sevtsuk) :: 4 David Wang :: 5 courtesy Foiltec :: 6 & 7 Beijing Organizing Committee

the sublimity of Renaissance buildings. New Virtualist buildings also overpower us with a vision of what human beings can be—or at least of the powers human beings can have—and that is an appealing prospect even in the presence of their alien-ness.

Third, New Virtualist buildings are *multiplexic*. This word is a hybrid of the words multiplicity, complexity, and dexterity. Objects of the New Virtualism are never single-function entities. Take for example my cell phone (like any legitimate style, New Virtualism is not limited to the design of buildings): My cell phone is also a camera, a watch, a calendar, an address book; it can send written "text" messages, it can store thousands of songs; and all of this is before it links me to the internet for the latest news. Form does not follow function in New Virtualist objects. They can look disconcertingly simple like my cell phone. Similarly, the National Theater is "just" a metallic dome **1**, but inside are multiple theaters. Or New Virtualist buildings can be strikingly complex, like the CCTV towers **2**. (Is it one tower or two?) In sum, New Virtualist buildings are ambiguously complex. Rarely are walls distinguishable from roofs. Rarely are doors and exits clear. Rarely are windows simply windows. Rarely are rooms rectangular. New Virtualist forms are not so much forms; they seem more like *organs*. Which leads to this:

Fourth, New Virtualist buildings connote *sentience*. New Virtualism is not only about the creation of buildings, but of beings. Indeed, New Virtualist buildings connote gestation and womb-like-ness. It is no accident that Beijing locals have dubbed the National Stadium the Bird's *Nest*, the National Theater the Bird's *Egg*; even the CCTV towers are the Bird's *Legs*. Sentience is in the air. Why is this? Think of it in this way. Prior to the Industrial Revolution, cultural objects were often made with an eye towards control and conquest (of nature and people). After the Industrial Revolution, cultural objects aimed for comfort and convenience (elevators, air conditioning, etc). But in the Cybernetic Revolution, cultural objects emphasize *creation* and *communication*. The computer grants a kind of creative power to a democratically wide range of people, and the ability to disseminate those creations instantly all over the world. The very term "virtual reality" suggests a taken-for-granted ability to replace present reality with creations of our own making. All of this prizes the organicism of life, life that is re-producible.

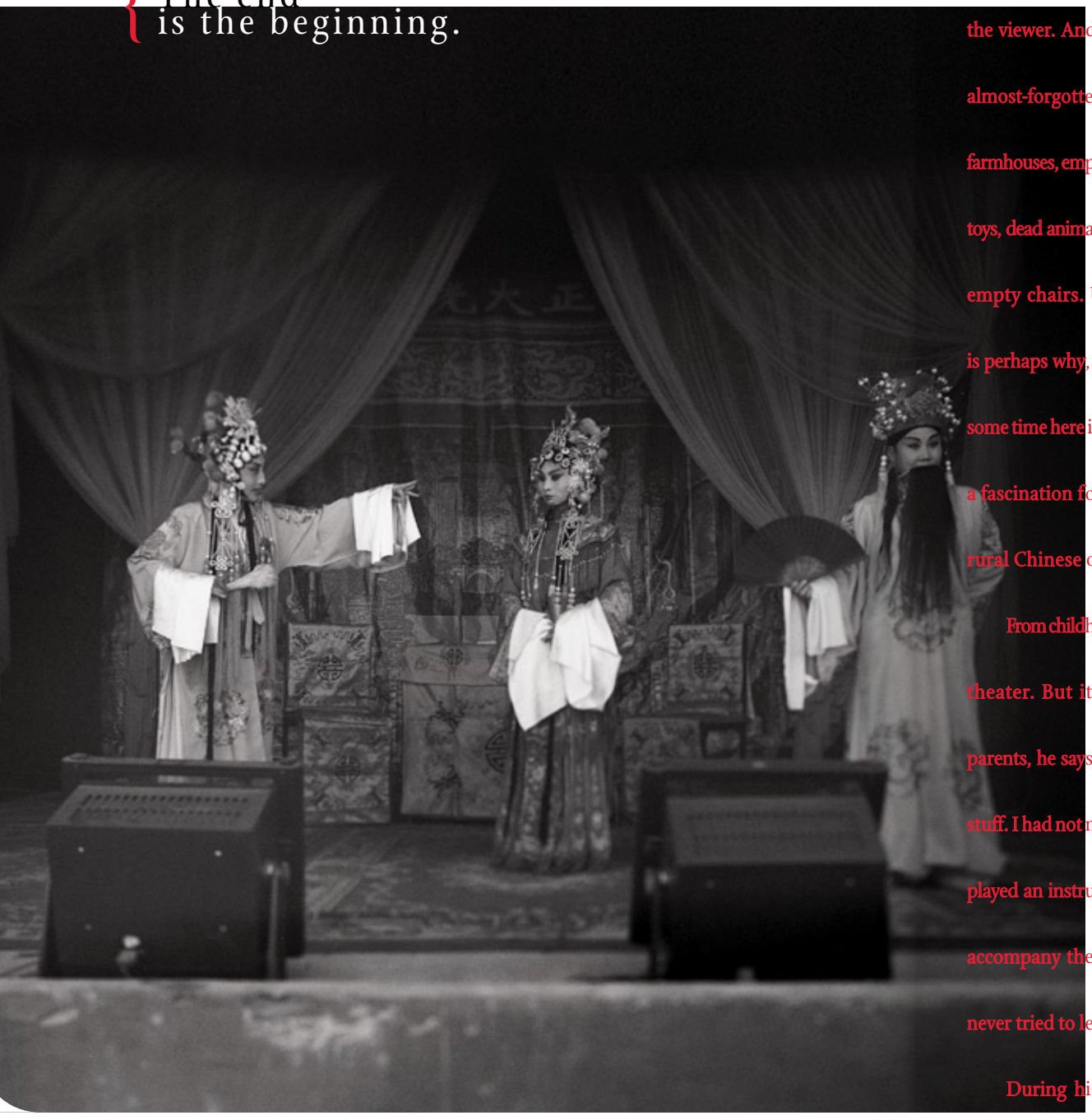
The seduction of art has always been that it promises the creation of something living. It has been said that the composer Igor Stravinsky, when complimented after the performance of one of his ballets, responded: "Ah, these ballerinas, they just go up and down, up and down … but the whole thing won't truly be beautiful until one of them goes up *and never comes back down*…" That was at the beginning of the twentieth century. Today, at the beginning of the twenty-first century, cyber power has given art-objects—at least architecture-objects—ever more the illusion of being alive. New Virtualist buildings seem to be able to go up and just fly away, as it were, or do something else that was un-programmed, motivated by their own sentient powers.

IN THE 1970s the influential philosopher of science Thomas Kuhn placed the term "paradigm shift" into the common vocabulary. He used it to explain progress in scientific knowledge. For example, when Copernicus and Galileo recognized that the earth revolved around the sun and not the other way around, that was a paradigm shift. Students of history know that paradigm shifts do not happen easily. Dominant paradigms, says Kuhn, are preceded by difficult transitional periods filled with competing ideas. In Galileo's case the transitional period was downright life-threatening; folks back then didn't like the idea that we revolved around the sun. But a time comes when the dominant theory takes over, and then everybody thinks in the same scientific fashion (which blinds them, by the way, to the next Galileo; but that is another conversation).

I have remarked elsewhere that architectural styles work in somewhat the same way. Those of us who have college-age children grew up during the architectural stylistic period known as Modernism. When our children were growing up, Modernism eroded into a host of competing styles. Now as our children graduate from college and come into their own—each one of them more comfortable with cybernetic gadgets than we are—architecture just might be coalescing into the dominant style that I call The New Virtualism.

And the 2008 Beijing Olympics may well go down in history as the international cultural event that marks its formal emergence as the first ever global architectural style. ⊗

The end is the beginning.



by Hannelore Sudermann :: photos by Jian Yang

Fine Arts graduate Jian Yang '08 knows all about the in-between. As a photographer he lives in a world between the subject and the viewer. And through his art he focuses on almost-forgotten spaces and things: abandoned farmhouses, empty barns, railroad tracks, broken toys, dead animals on the side of the road, and empty chairs. Understanding the in-between is perhaps why, on a visit home after spending some time here in graduate school, he discovered a fascination for the disappearing tradition of rural Chinese opera.

From childhood, Yang was aware of Chinese theater. But it was something more for his parents, he says. "To me it was just traditional stuff. I had not much feeling for that." His father played an instrument, the erhu, that's used to accompany the performers. "Now I regret I never tried to learn it," says Yang.

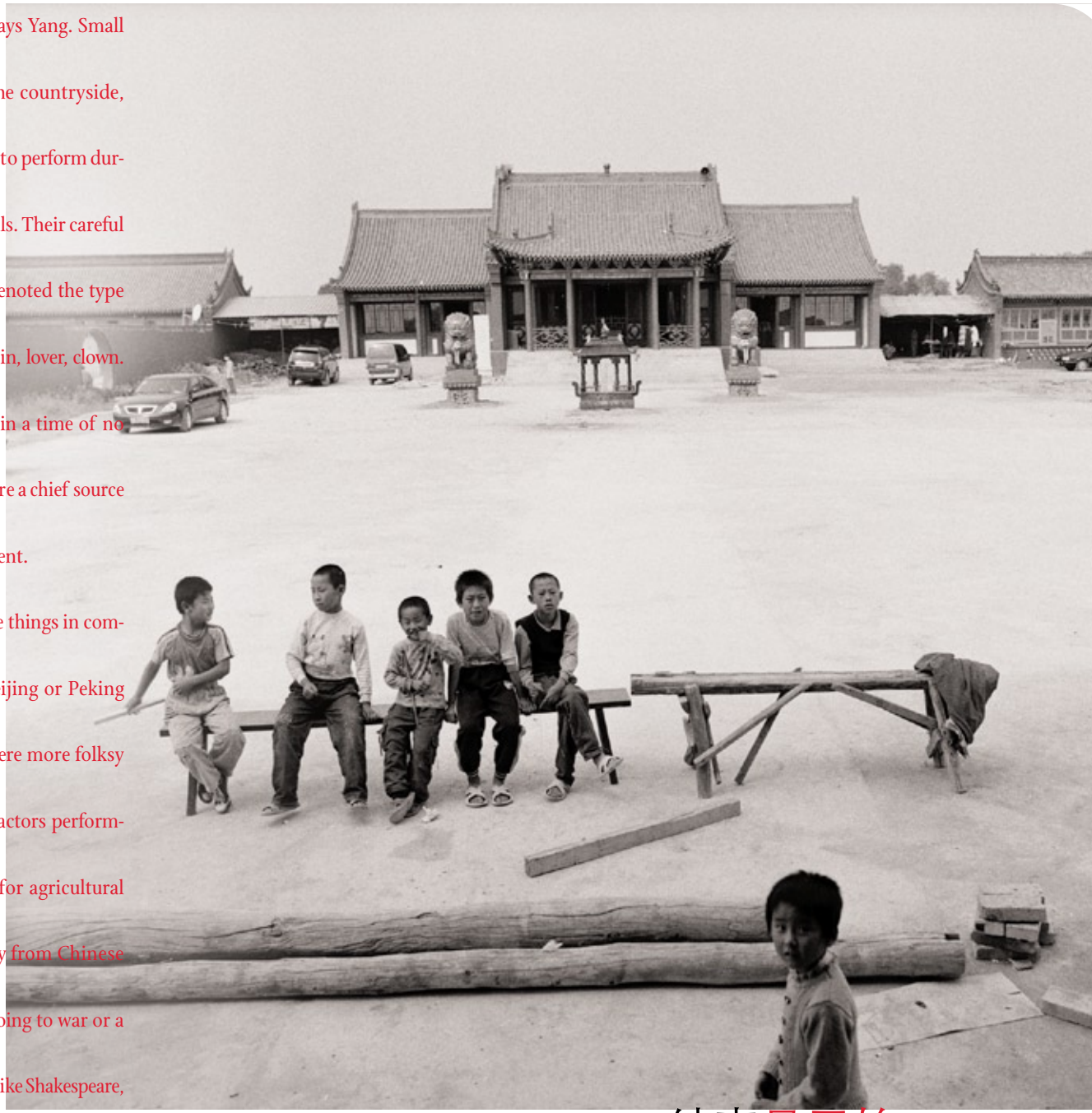
During his visit he caught a poorly-attended performance at a Buddhist temple. He was captivated. The stories, elaborate costumes, and ritualized performances

charmed him. “Finally, I understood why my parents liked it,” he says.

Chinese rural theater comes from several thousand years of tradition, says Yang. Small troupes of actors would travel the countryside, stopping in towns and temples to perform during religious holidays and festivals. Their careful makeup and bright costumes denoted the type of character they played—villain, lover, clown. For many in the small villages, in a time of no television and few books, they were a chief source of information and entertainment.

The rural operas had some things in common with the better-known Beijing or Peking operas. At the same time they were more folksy enterprises, with many of the actors performing when they weren’t needed for agricultural work. The story lines are mostly from Chinese history—the tale of a general going to war or a well-known romance. It’s not unlike Shakespeare, where the stories are already widely known, says Yang. The operas are sung, often with instrumental accompaniment.

The actors often perform to an empty theater. This day Yang found only a small group of boys in attendance. More often, he saw just a few of the village’s older residents who came to recall the past.



结束是开始

A hundred years ago, the costumes were adorned with real jewels. Today they're still handmade and very elaborate.

The opera, and in fact all types of traditional Chinese music, disappeared or was subverted in the 1960s during the Cultural Revolution when any cultural work that did not support the ideology of the communist leaders was banned. Fortunately it was only a decade-long hiatus. The operas had a revival in the 1970s after Mao Tse-Tung died. For years they continued to be popular in the villages and towns where the actors toured.

"But now, nobody cares," says Yang. People his age and younger are too focused on western culture, rock music, and contemporary art. Without their interest, fewer new artists are learning the traditional art form and fewer will carry it on. Now he feels driven to record it before it vanishes altogether.

A friendship formed back in China has opened the rural theater world to him. Yang met a Buddhist monk who managed the Wenshu Chansi temple in the area of Huai Ren. The two liked each other and the monk invited Yang to become one of his students. He also opened the temple, a large complex that during traditional festivals serves

thousands, for Yang to photograph. They agreed to the project with the hopes that in documenting the life and sights of the temple grounds, they might share the culture with others.

When he was last in China, Yang met the members of a Chinese rural opera company, a touring group of actors and musicians. At the temple with the monk's permission, Yang shot black and white images of the troop with his Mamiya medium-format camera. He captured their live performances as well as the scenes backstage.

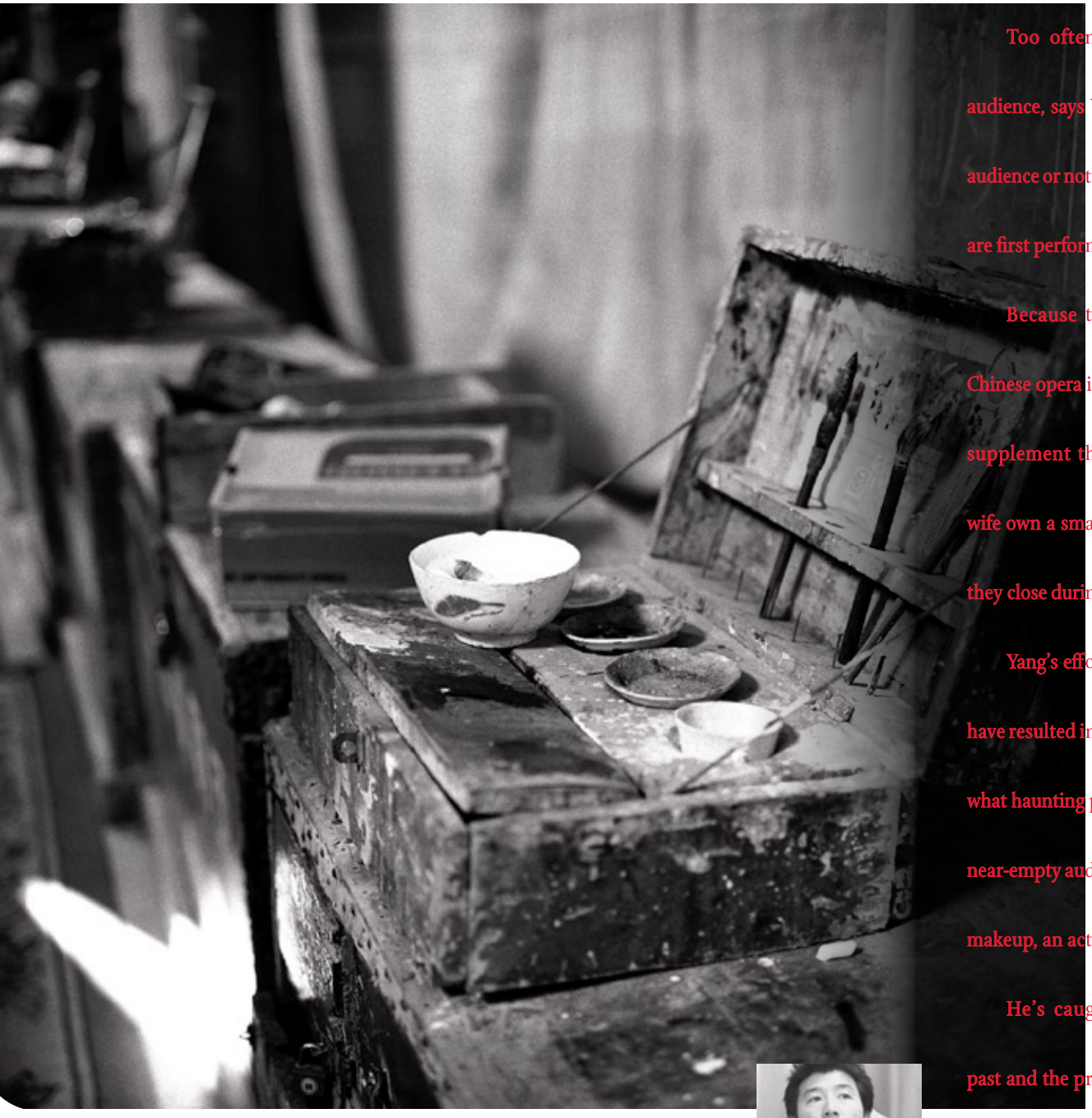
The troop is usually at a location for a week to 10 days. When they're booked at the Wenshu temple they live and sleep there. "There are always empty rooms," says Yang. "There's also a kitchen where they can make themselves food."

This particular troop warmed to Yang, pleased at his interest in their work. They let him photograph them getting into costume, resting after performances, and waiting behind the curtains for their cues.

The troop rarely drew a crowd. Many times, they were performing only for the older members

The performers are usually accompanied by a small group of musicians. Here a boy plays a sanxian, a traditional three-stringed instrument.

A well-used makeup box waits backstage. In Chinese theater, even the makeup is an art form. It conveys all sorts of details about the character including age, gender, and social status.



Jian Yang

To view more photography by Jian Yang, visit his Web site at www.photojian.com.

of the community, those who remember seeing the operas as children, before the Cultural Revolution.

Too often, they performed without an audience, says Yang. But whether there is an audience or not is irrelevant, he adds. The actors are first performing for Buddha's pleasure.

Because the popularity of traditional Chinese opera is waning, the actors all have to supplement their income. One actor and his wife own a small restaurant, says Yang, which they close during the theater season.

Yang's efforts photographing the troupe have resulted in a collection of beautiful, somewhat haunting photographs: a trio on stage, a near-empty audience, an actress touching up her makeup, an actor having a snack.

He's caught something in between the past and the present, a precious tradition in a precarious state.

I want to go back and shoot again, says Yang. "To me, this is just the beginning." ⊗

CHROMOSOME IMAGE COURTESY CESKA / BACKGROUND ART BY DZGNBIO

TO ERR IS HUMAN

:: by Cherie Winner ::

AS WOMEN NEAR 40 YEARS OF AGE, their chance of having a miscarriage or a child with a serious disability or birth defect increases more than ten-fold. Most of those problems are due to defects in the baby's chromosomes, the strands of DNA that carry a person's genetic inheritance. Down syndrome, for instance, results from trisomy 21—three copies of chromosome 21 (there should be just two).

Most such problems arise in the egg, and the older a woman is when she conceives, the more likely it is her eggs will have abnormal chromosomes.

But amid all the talk about the biological clock, we often overlook a bigger story: that even with young mothers, chromosome abnormalities are the single most frequent cause of miscarriage and birth defects.

"Somewhere around 25 to 30 percent of *all* fertilized human eggs don't have the right number of chromosomes," says Terry Hassold, a human geneticist at Washington State University. "A huge number is selected [out] in very early pregnancy. It comes across as a missed period or a late period. But it's actually a conception."

The high error rate seems to be peculiar to humans. In other mammals that have been studied, the figure is at least 10 times lower. Hassold shakes his head in wonder.

"As many times as we've talked about this, it really is kind of astonishing."

HASSOLD, BEARDED AND GENIAL, is one of three researchers at WSU who have devoted their careers to tracking down the sources and effects of chromosome abnormalities. Pat Hunt, his research partner, is a developmental biologist with a wry sense of humor and an elfin gleam in her eye. They married while training in one of the world's top chromosome labs, and have been studying chromosomes ever since. Lisa Shaffer ('84 Biology), a human geneticist, came to WSU Spokane in 2002, after working in Texas for several years, because the Northwest is home. She grew up in Kennewick.

Many medical researchers choose their field because it relates to events in their own life. That's not the case with these three.

Hunt was driven by a fascination with "the nuts and bolts" of how eggs develop and what makes the process go wrong, especially in women approaching menopause. For Hassold, the initial draw was aesthetic. His doctoral research at Michigan State included an examination of chromosomes.

"And I fell in love with them," he says. "Just seeing human chromosomes, and—this is going to sound really saccharine, but—just being amazed by how pretty they were."

Shaffer caught the chromosome bug when she was a sophomore in high school. One day her biology textbook opened to a picture of a child with Down syndrome. "I decided right then and there, that's what I was going to work on," she says. "I had never even met anyone with Down syndrome. I saw that and it fascinated me that having *more* of our genetic materials—having an extra chromosome—actually causes problems. You know, everyone's always telling you 'more is better.' But when it comes to genetics, more is not necessarily better."

GETTING IT RIGHT

Having the wrong number of chromosomes, a condition called aneuploidy, is almost always fatal to an embryo. (Even trisomy 21; about 80 percent of embryos with that abnormality miscarry. "So those infants that are born with Down syndrome represent a rare group of survivors," says Hassold.) Our systems are set up to run with two copies of each chromosome, one from each parent. Think of it as the Goldilocks principle—you don't want too little genetic material and you don't want too much. "You want it just right," says Shaffer.

Getting it just right for a new embryo requires perfect execution of precise steps in the developing eggs and sperm. Each has to reduce its chromosome complement by half, retaining one member from each of the 23 pairs of chromosomes. That way, when egg and sperm get together at fertilization, the resulting embryo will have a perfect set.

As Hassold describes it, the parceling out of chromosomes in developing eggs and sperm looks like a dance involving dozens of couples. The chromosomes line up in the middle of the cell, each one alongside its partner. The partner chromosomes "cross over"—their arms literally cross each other—and swap segments of DNA. Eventually, when the cell divides, the partners move in opposite directions, so that each daughter cell will get one member of every chromosome pair.

This is where things are most likely to go wrong. If the partners stick together too tightly, they may not be able to separate from one another, or they may break when they try to pull apart. If they stick too loosely or never find each other in the first place, they will behave as individuals rather than as a matched pair. About half the time, they'll go the same direction during cell division rather than splitting up. Such errors can produce an egg or a sperm with a damaged chromosome, an extra copy of a chromosome, or no copies at all.

Prospective sperm and eggs (spermatocytes and oocytes) go through most of the same steps, with one big difference that might explain why eggs are much more likely to have chromosome abnormalities. Sperm development starts at puberty, and once spermatocytes start the process,

For a closer look at Pat Hunt and Terry Hassold's work, an animated guide to meiosis, and a map of human chromosome defects, visit *Washington State Magazine Online* at wsm.wsu.edu.

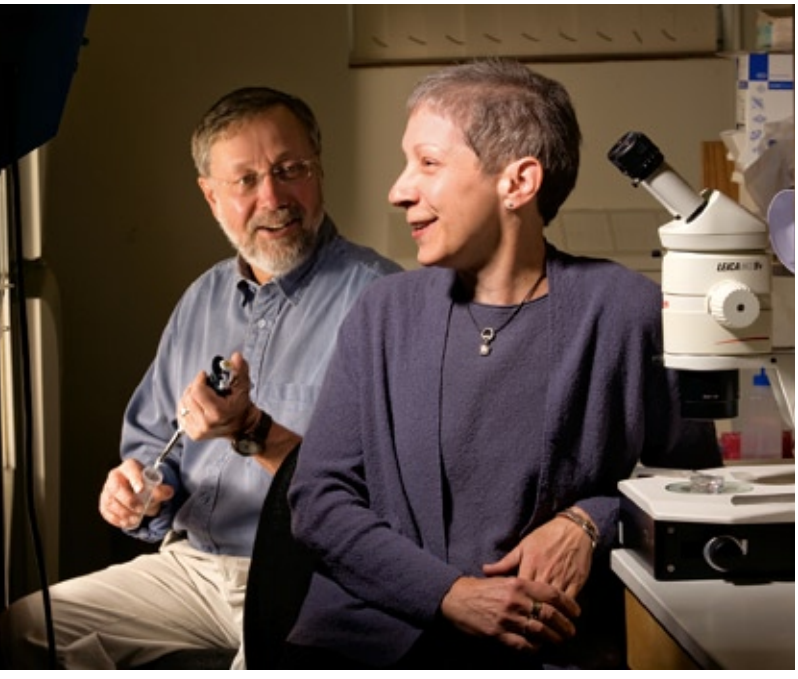
they go right on through to being functional sperm. Eggs start to develop when the future mother is an embryo. About 10 weeks into gestation, oocytes inside a female human fetus begin the long process of becoming eggs. Their chromosomes pair up and cross over. Then the oocytes arrest. They simply stop developing. Their chromosomes hold their positions, sometimes for decades, until hormones tell them to finish the dance and complete cell division. Every egg ovulated by a grown woman has been sitting in a state of suspended animation since the woman was an embryo about the size of an adult's thumb.

That delay may be the source of many chromosome problems in older mothers. Hunt and Hassold have found that a protein that holds the partnered chromosomes together might play a role in age-related errors. Mutant mice that make a defective form of the protein have a high rate of aneuploidy. In women, the protein might get damaged during the long period of arrest.

While they were doing the painstaking experiments to find what makes good eggs go bad in older mothers, something wholly unexpected turned up. Hunt's lab saw a sudden increase in chromosome abnormalities in eggs from young adult mice that were supposed to be the normal, control animals in a study.

"We ran the experiment one week and the control data were normal," recalls Hunt. "The next week, data from the same control animals were completely different and unlike anything we had seen before."

After ruling out every other factor she could think of, Hunt traced the problem to the cages the mice were housed in and the water bottles they drank from. Both were made of polycarbonate plastic, which is a polymer (long chain) of a small synthetic chemical called bisphenol A (BPA). The week before the mice started making defective eggs, the cages and bottles had been washed with the wrong cleaning agent. It damaged the polycarbonate, allowing BPA to leach out.



TERRY HASSOLD & PAT HUNT BY ROBERT HUBNER

The discovery launched Hunt on a crash course in BPA toxicology. BPA already had a reputation as a health hazard. It's a mimic of the female hormone estrogen, which allows it to affect many systems in the body. As a component of polycarbonate, it's all around us: in plastic food containers, sippy cups, toys, shampoo bottles, resins that line aluminum food cans, you name it. Over the past decade, low levels of BPA—levels many of us already carry in our bloodstreams—had been linked to low sperm production, altered brain structure and behavior, and some forms of cancer.

Hunt added to that list an effect on chromosomes—and on future generations. She exposed mice to BPA at different times of life and different stages of gestation. It caused problems in adults and in newborns. Most startling of all was its effect on embryos in which the eggs were just starting to develop. Forty percent of eggs that were exposed to BPA at that stage ended up with either too many chromosomes or too few.

"It's amazing," says Hunt. "We can disrupt everything with this little pulse of BPA in this critical window of development. You hit the mom, you're hitting her [embryonic] daughter or son; and if it's a daughter, you're hitting her developing eggs, which will be the [mom's] grandchildren.

"So by exposing the mom, you're affecting the likelihood that the grandchildren are going to be chromosomally abnormal."

It's likely that BPA affects humans the same way, says Hunt. That means that a girl fetus exposed to BPA might have normal chromosomes in most of her cells, but when she grows up and tries to have children of her own, *they* will have a high risk of being chromosomally abnormal, because the eggs they developed from were damaged by BPA way back when their mother was a fetus.

Hunt's work on the effects of BPA on developing eggs was the last straw in a pile of evidence that finally broke through into public awareness. Her findings made headlines all over the world, and *Scientific American* named her one of the top 50 researchers in the world in 2007. With awareness came action: Canada has banned the use of BPA in baby bottles, several U.S. states are considering similar measures, and a congressional committee has started an investigation of BPA. Baby-bottle manufacturers aren't waiting for new regulations; they're already shifting production toward materials that don't contain BPA.

The attention on her has been a bit much, says Hunt, who cites the contributions by the dozens of other scientists working on the dangers posed by BPA. What makes her new prominence palatable is her conviction that BPA is, in fact, very scary stuff.

"When you see the profound effect it has on the mouse, you think, wow," she says. "It gives *me* pause."

BPA has actually turned out to be a handy tool—a monkey wrench, Hunt calls it—that lets her tinker with early fetal events and get a better look at how chromosome abnormalities occur. Mice have never been a great model system for this problem, she says. "As young reproducing females, they have a really low level [of aneuploidy] compared to us. It's like one or two percent. With age it doubles. Big whoop." By increasing the incidence of aneuploidy, BPA makes mice a better model system for studying how the chromosomal choreography might go wrong in humans. She and Hassold have already found that BPA boosts the number of crossovers between partners, supporting their hunch that having too many crossovers makes the chromosomes more likely to stick together when they should be separating.

"It's so cool," says Hunt. "How would we *ever* figure that out [without BPA]? We wouldn't."

COMPLETING THE PICTURE

After working for several years on the causes of chromosome abnormalities, Lisa Shaffer now focuses on their consequences. She's especially interested in subtle abnormalities such as deletions, in which a small piece of a chromosome is snipped out and lost. Like aneuploidy, most deletions can be traced to mistakes during early egg development. Unlike aneuploidy, they seem to occur as often in young parents as in older ones.

They're also harder to pinpoint. Aneuploidy is fairly easy to diagnose: drench the cells in a chromosome-specific stain, put the stained cells under a microscope, and count the chromosomes. That technique can reveal huge deletions, but it rarely catches those smaller than 10 megabases, a length of DNA that could encompass dozens of genes.

Shaffer detects losses a fraction of that size with a technique called microarray analysis. A microarray is the size of a standard microscope slide. Spotted on it are known segments of human DNA. To run a test, the lab crew puts on the slide small samples of the patient's DNA and DNA from a known, control individual. Each sample carries a fluorescent label: green for patient DNA, orange for control DNA. The two samples compete to bind with their matching sequences in the spots on the slide. If the samples have the same number of copies of a segment, the matching spot will fluoresce yellow (combination of the green and the orange.) If the patient has a deletion—one copy of a segment instead of two—more of the control DNA will bind and the spot fluoresces orange. If the patient has extra copies of a segment, the matching spot fluoresces green. A tidy graph of the color of each spot shows clearly where the patient and control DNA differ.

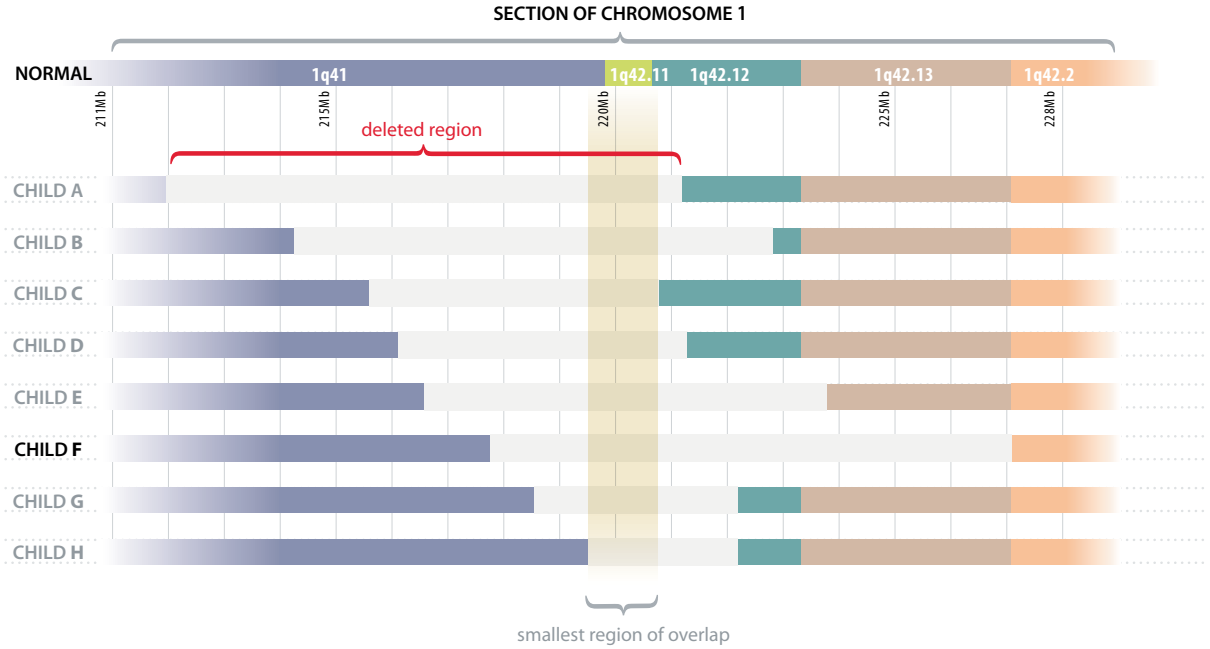
In 2003, Shaffer and fellow WSU Spokane geneticist Bassem Bejjani put microarrays to work diagnosing chromosome and genetic abnormalities for their new company, Signature Genomic Laboratories (see sidebar, "Trust your crazy ideas"). They do some pre-natal testing, but most of their clients are doctors who are treating a child with mental retardation or birth defects for which the source of the problems has not been identified. It might seem too late to run chromosome tests on a 6-year-old, but Shaffer says that's not the case at all.

"It's important to make a diagnosis," she says. "The first reason is because parents want to know what's wrong with their child. They also need to understand how it happened, because they may be at risk for it happening again, or their family members may be at risk for having a similar child. And then for some chromosome abnormalities, there are certain medical problems you need to anticipate. By anticipating them, the child can receive treatments and have a better quality of life."

A few years ago, she discovered that children with a deletion called 1p36 (loss of DNA from band 36 on the short arm [p] of chromosome 1) had poor hearing. That was a major finding, because many kids with a 1p36 deletion don't talk. "Maybe they don't *speak* because they can't *hear*," says Shaffer. "If they have hearing problems, let's get them hearing aids so they can hear, and hopefully they'll develop speech."

She is now exploring 1q42 deletions (loss of DNA from band 42 on the long arm [q] of chromosome 1). The company's tests have identified nine children with this deletion. With the permission of their parents, Shaffer took a closer look at the symptoms and genetic characteristics of seven of them and one other child from a previous study.

{ *Finding what's missing* }



STAFF ILLUSTRATION

A big challenge for doctors treating individuals who have a chromosome deletion is not knowing what genes their patients are missing. Lisa Shaffer solves that by comparing DNA from patients with DNA from normal chromosomes. Here, she examined DNA from eight children who are missing different but overlapping segments of chromosome 1. Shaffer started with a map of the region from an intact chromosome 1 (*top*). Alongside it she lined up the corresponding maps from the eight children. One short segment (labeled "smallest region of overlap," above) is missing from all the children's DNA. Shaffer found that it contains just five genes. She is now exploring the normal functioning of those genes and how their absence contributes to the disabilities and health problems the children have. Child F has the most severe symptoms and is the only one who is missing a large segment of DNA to the right of the overlap region.

She found that although their deletions are in the same region of the chromosome, the kids aren't all missing exactly the same chunk of DNA. (*See illustration, opposite page.*) They also don't have exactly the same symptoms. All have mental retardation or developmental delay, but it ranges from mild to severe. All have defects in structures along the body's midline, such as cleft palate; but again, some have much more severe problems than others.

By diagramming the eight deletions and lining them up next to a map of the intact chromosome, Shaffer was able to identify what she calls their "smallest region of overlap" (SRO)—the piece all of them are missing. That piece accounts for the symptoms the children have in common. It contains only five genes, all of which have been identified. Shaffer also found that the child with the mildest symptoms is missing a big piece to the left of the SRO but little to the right, while the child with the most severe symptoms is missing a big piece to the right of the SRO but little to the left. That's a clue that at least one gene to the right of the SRO is involved in the more severe symptoms.

Shaffer is eager to find out more about the genes in and around the SRO. "That's really exciting, to bring all the pieces together," she says. "The genes are the final piece. We have the deletion, we're dealing with that—but what's missing, and why is it important? If we can identify the gene targets, maybe there's a treatment."

RISKY BUSINESS

Being able to alleviate the effects of a chromosome abnormality would be a huge benefit to the children and families involved, but the ultimate hope of chromosome research is that by understanding how abnormalities happen, we can find a way to prevent them or at least make them much less common. What can prospective parents do to reduce the chance that their child will have a chromosome abnormality?

Unfortunately, we don't know yet, says Hassold. Stacks of studies have been done looking for risk factors; none have resulted in solid guidelines.

That's not to say there *aren't* risk factors. It's just that with most chromosome abnormalities arising when the mother was a fetus, how do researchers even begin to trace what caused them?

Hunt's work with BPA offers the one firm piece of advice that holds for women—and men—of any age who want to lower their risk of one day having a grandchild with a chromosome abnormality: rid your life of as many BPA-containing products as you can, especially in the kitchen. Use glass or ceramic containers instead. If you do use plastic or polycarbonate containers, don't expose them to high heat. That means they never go in the dishwasher or microwave.

Beyond that, there's no prescription. Hunt, Hassold, and Shaffer all are convinced there is no single cause of chromosome problems, and no single measure that could prevent them. Chromosome abnormalities can't be chalked up to anything either parent did or didn't do—which can be comforting news to parents of a child who has a chromosome problem.

"I think it helps for families to understand that this wasn't [due to] anything that they did, and it wasn't something that could have been prevented," says Shaffer. "It's just something that happened, and we don't understand why, and it's a rare event."

Terry Hassold sums it up.

"Sadly, the risk factor is being a human female. That's the risk factor." ⊗

Bassem Bejjani and **Lisa Shaffer** of WSU Spokane started the first company to use microarray technology to diagnose chromosome abnormalities. »

BRUCE ANDRE

Trust your crazy ideas

When LISA SHAFFER and fellow geneticist BASSEM BEJJANI came to WSU Spokane from Baylor College of Medicine in 2002, they had an idea for a new company: they would use microarray analysis to provide faster, more accurate assessment of chromosome abnormalities than anything that was then available. Microarray technology had been standard in research labs for years, but had never been applied to clinical uses before.

"No one had taken it to the level of bringing it to the patient, so you could use it for diagnoses," Shaffer recalls. "We were the first to use array-based testing for chromosome abnormalities."

With a big initial investment from Spokane's Sacred Heart Medical Center, she and Bejjani launched Signature Genomic Laboratories in the summer of 2003. Now, five years on, the company has 68 employees, new office and lab facilities in north Spokane, and a growing roster of investors. To date it has analyzed DNA samples from more than 24,000 individuals from all over the world—a huge database that has led to the discovery of several previously unidentified syndromes and boosted Shaffer's ability to study a range of chromosome problems.

The company deals with families through their physicians, who draw the necessary blood samples and are informed of the results. Signature's genetic counselors are on call to talk with the doctors about what those results mean.

Shaffer says the company's ability to identify rare conditions has been a boon to parents who feel very much alone before learning that others are dealing with the same problems they are. Families have gotten in touch with each other through Signature, sometimes even holding "reunions" to share their experiences. Shaffer attends such gatherings when she can.

"I'm always telling them they know more than I do," she says. "They live with it every day. I'm learning from them."

She is nearing the end of a year-long leave of absence from WSU she took to work as Signature's CEO. She wants "to get the company to a point where someone else can take over and I don't need to be here every day"—and then get back into the lab.

"The reason why I went into science was not to run a business. It was to help people and to work directly with the families. Which Signature does, but I do more of the business stuff, so I'm removed from the part that I like."

In one corner of her office hangs a ceramic tile inscribed with an image of a light bulb and the words "Trust your crazy ideas."

"I thought it was perfect, because *I* was called crazy," she says. "I was told that there were too many hurdles to overcome; that you can't take [microarrays] to the level of the patient, that it has to remain a research tool. And I kept saying, 'Why? I don't understand why.'"

She and Bejjani were right, and now other companies are scrambling to catch up.

"Now we've got a bunch of people copying us, but that's OK. That's what happens. We're still the leaders."

HOW I MAKE BOTH ENDS MEET

PETER E. KRAGT

Freshman, State College of Washington

Arriving in Pullman three days before college convened after hitch-hiking nearly four hundred miles, I immediately began to search for a location to build a cabin. This spot I located within an hour and had one thousand feet of lumber delivered. Slightly less than two hours after coming to this city, in which I was a total stranger, I donned a pair of coveralls, borrowed a saw, square, level and a shovel, and started to erect my house. By working from five in the morning till seven at night, I had my cabin finished, except for the shingles, when school called on Monday. I finished the roof the following Saturday. My cabin has double walls which are paper-lined and an air space above the ceiling. These features make it very cozy. Several night ago a fifteen below frost failed to penetrate the wa[illegible] cold reduces my fuel expense to [illegible] per month. I covered the floor [illegible] clothes closet, a table, a bed, [illegible] furnishings cost twenty dollars. [illegible] dollars; consequently, the ent[illegible] four dollars.

The greatest expense w[illegible] but by shrewd buying and effi[illegible] monthly bill between four an[illegible]

How I Make Both Ends Meet

Cougs have a long history of figuring out ways to save money while attending school during tight economic times. In the winter of 1932, during the Great Depression, Washington State College president E.O. Holland organized an essay contest for students titled "How I Economized Last Semester." Peter E. Kragt, a freshman from Lynden, Washington, won the contest with his story about building a cabin on Route 1 right before school started. The student who took second place, Garrett C. Tewinkel, described how he saved on rent by moving off campus with a classmate, saved on food by bringing canned peas, beans, and cherries from home, and how he had no transportation costs because he hitchhiked between home and Pullman.

As the first place winner, Kragt received $15. The original essay is in President Holland's papers at WSU Manuscripts, Archives, & Special Collections.

For the full texts of the top winning essays from 1932, visit *Washington State Magazine Online*, wsm.wsu.edu.

HOW COUG ARE YOU?

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www.howcougareyou.wsu.edu

Katie Gordon Nelson

- 1998 Graduate *(B.S. College of Agricultural, Human & Natural Resource Sciences—Agricultural Economics)*
- Director of Marketing, Gordon Brothers Family Vineyards, Pasco, WA
- New member, WSU President's Associates
- ***Supports her alma mater by giving to WSU!***

WASHINGTON STATE UNIVERSITY FOUNDATION

Robert M. Williams '79

Vice President and Relationship Manager at Union Bank of California in Seattle.

18+ year member of WSUAA's African American Alumni Alliance and member of the WSU College of Business National Board of Advisors.

Gray W Varsity Club member and four-year varsity letter winner in Men's Track & Field (1979 Team Captain).

Loves golf and trips to Cabo San Lucas.

Life Member of the WSU Alumni Association.

"I owe much of my success to the outstanding education I received at WSU and joining the Alumni Association is one of the ways for me to give back. I'm thankful for the help the WSUAA provides the Alumni Alliances to engage alumni of color in support of WSU and to expand educational opportunities for the diverse student population WSU serves."

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CLASS NOTES

1930s

Paul B. Hansen ('37 Chem. Engr.) lives in Neenah, Wisconsin with his wife Jane.

1940s

John M. Kuhlman ('48 Econ.) was recently featured in *The New York Times* for his work tutoring immigrants to read and write English. He lives in North Carolina.

1950s

John A. Sandor ('50 Forestry and Range Management) was awarded the Gifford Pinchot Medal by the Society of American Foresters for his 60 years of work in the field of forestry. He lives in Alaska.

1960s

John Abelson ('60 Physics) recently celebrated the publication of his book, *Uncle Phil and the Atomic Bomb*. The history is a story of his uncle Philip Abelson ('33), a scientist who worked at the U.S. Naval Research Laboratory on the atomic bomb project. Before the older Abelson died in 2004, his nephew was able to record interviews with him about his exciting career in science. Abelson, a member of the National Academy of Sciences, retired from teaching at Cal Tech in 2002 and lives in San Francisco.

Carolyn Burke Malnes ('60) was recently honored by the Music Teachers National Association as a MTNA Foundation Fellow at the 2008 MTNA National Conference in Denver, Colorado. She is a music teacher in Lynnwood, Washington.

Ken Brink ('61) and his wife **Helen** ('61) moved Port Townsend after graduation. Both taught at Port Townsend High School. They are active in many community projects and events, including the Elks and the Rhododendron Festival for which they are the 2008 Senior Royalty. They have four children and seven grandchildren.

Irene (Tichelaar) Silverman ('68 Pol. Sci.) has had a career traveling the world as a Navy supply officer. Now she has settled with her husband David in Liberty Lake, Washington.

Gaylon S. Campbell ('68 Ph.D. Soil Sci.) and his son **Colin Campbell** ('95 Ph.D. Soil Sci.) both work at Pullman-based Decagon Devices. This spring instruments they designed and built to test thermal and electrical conductivity were aboard the Phoenix Mars Lander. Campbell senior founded Decagon in 1983.

Lenny Kanner ('69) lives in California. He likes to keep healthy and is enjoying retirement. He hopes to contact class of 1969 friends, who can reach him by e-mail to lennykanner@yahoo.com.

1970s

Ronald F Marshall ('71 Phil.) recently published "Eaten Alive," an essay about the misrepresentation of the Biblical book of Jonah in children's literature. Marshall has been the pastor at First Lutheran Church of West Seattle since 1979. His wife **Jane**

MATT HAGEN

BJ Duft

Of meals and missions

by Hannelore Sudermann :: At age 24, BJ Duft found himself in Bill Marriott's private jet face-to-face with the CEO of Marriott International. They were headed back to Washington D.C. from Penn State University where Duft '86 had gone to do some on-campus recruiting for the company and Marriott had attended a ceremony in his honor. During the flight Marriott turned to Duft and asked if he could change anything at the international hotel company, what would it be? Duft was so nervous that he has no clue what answer he managed to stammer out. What he does remember is that Marriott took a Steno notepad from his shirt pocket and carefully wrote down what Duft had said. A few days later, someone from the head office called Duft to follow up. "I was so impressed with his candor and attention to detail," says Duft, who now is, it seems, a lifetime away from that experience.

When BJ Duft graduated from Washington State University with a degree in hotel and restaurant administration, he had his future all figured out. He had already been drawn into the Marriott Hotel chain, first as an intern and then as a full-time employee. Working in San Diego, Palm Springs, and then in the corporate office in Washington, D.C., he had management written all over him.

From that meeting with Marriott and from an understanding developed at the corporate office, Duft realized the value of minding the details and recognizing that workers may know more about certain parts of the business than the folks in the front office. But he wasn't ready to have a corporate job for life. "It was way too early," he says.

After five years, he cut loose from the hotel business to take a position managing the food service for a small Seattle-based Alaska cruise line. He gave that a few years, but still, the fit wasn't right. After 10 years in corporate-style hospitality, Duft made a radical change. He found a job with the Herbfarm, a small, yet world-famous

gourmet restaurant in Fall City, Washington, one of the first in the nation to specialize in using fresh, local, in-season food, some of it from the farm's own gardens.

It was like getting away, says Duft. "I went to the country … it was enchanting." Though he started at entry-level, he was content to plant greens and flowers instead of thinking about food standardization and cost control. "It was such an opposite," he says. His job evolved into one of coordinating the Herbfarm's wine and beer festivals and setting up classes. All the while, he listened to the owners' and chefs' philosophies for the business. He was most struck by the passion they felt for making the best meals with the freshest sustainably-raised food.

Then in 1997, a fire devastated the restaurant, causing it to close for five years. For a time Duft stayed on with the other managers, running the Herbfarm's outreach activities and helping marshal resources to rebuild and reopen. But by that point, he had his own ideas.

Blending the business approach he learned at Marriott and the passion and respect for food he picked up at the Herbfarm, Duft and two partners struck out on their own cafe and catering venture. But starting up a food business can be complicated. Early partners leave, often it fails. As things shook out, all that remained was Duft and catering. He renamed the endeavor Herban Feast and refined its mission to connect Seattle organizations and businesses with regional farmers and food. That goal wasn't too hard to meet since the Northwest offers a great variety of fresh and local meat, seafood, and produce, he says.

Duft made a name for the business with his willingness to seek out unusual, and especially local, ingredients. When he first started, he would meet a lettuce farmer at a park-and-ride on I-90 halfway between Seattle and the farm to pick up fresh organic greens. "I know how hard people work to produce their food," he says of the small-scale farmers, "all the hours, driving their produce to the markets, sleeping in their trucks."

In the summer, he takes his employees out to tour local farms because he wants them to know more about and connect with the food they're preparing and serving.

That notion of connection is why Herban Feast maintains a booth at the West Seattle Farmer's Market every Sunday. Though it's not a money maker, for Duft it's important to contribute to the community where he lives and works.

Furthering his mission of using his business to build relationships, Duft is in the process of moving Herban Feast from its headquarters in West Seattle to the industrial district south of downtown Seattle, now being called SoDo (South of Downtown).

The site, which Duft is calling SoDo Park, was built for the Stetson-Ross Machine Co. The business made equipment used for building wooden ships in the early 1900s. Step inside the brick archway and up the stairs from First Street and you're back in early Seattle. The two-story ceilings, exposed wood beams, and 12,000 square feet of space still fill Duft with awe and excitement. He talks about how well the location can be arranged to suit parties, weddings, corporate events, and because of the rustic and recycled materials, it doesn't feel the least bit pretentious.

The location is ideal because it is closer to many of his catering clients downtown, says Duft. The added benefit is that he's contributing to the revival of a neighborhood, and supporting the continued existence of an old warehouse on South First Avenue that at one point was in danger of being torn down.

One of the best parts about the site, he says, is that the events there will help bring new life into an old neighborhood.

Cougar Crew Days

The old crew's back in town

by Ben Herndon '08 :: Eight graying heads lean forward in unison and then back as 16 oars slide into the water and propel the boat forward. A racing shell of 50-somethings streaks by the Wawawai Landing as a crowd of more than three dozen Washington State University's men's crew alumni gather around the boathouse on the shores of the Snake River.

It is Saturday, March 15, and regardless of a chill wind and choppy waters, former team members have come from as far as Brazil for the annual Cougar Crew Days, a weekend event allowing current and former oarsmen, coxswains, and coaches, along with family and friends, to gather and celebrate WSU Men's Crew.

"They call it the 'Viagra 8'," says Tim Richards '81, DVM '84 jokingly about the boat in

L. Harty ('71 Music) has taught music at Pacific Lutheran University since 1978. They married in 1972 and have three children.

Jim Moll ('72 Comm.) was selected by the Oroville Area Chamber of Commerce as Business Professional of the Year. His office was also selected as local Small Business of the Year. Moll is branch manager of A.G Edwards/Wachovia Securities in Oroville. He has been an Oroville resident since 1974 and has been married to his wife Claudia for 32 years.

Rick Wayenberg ('73 Comm.) was inducted into the National Wrestling Hall of Fame this spring. He was honored for his lifetime of service to wrestling, his community, and to the young people he taught and inspired. After graduating from WSU, he taught wrestling in Idaho and Washington, and for nearly 30 years he officiated in national, regional, and Olympic trial events. After retiring in 2006, he moved back to Pullman.

Marcia Whitney-Shenck ('73 Comm.) will be teaching English in Cameroon, Congo, and Uganda for nine months beginning in September.

Richard Fulton ('75) has moved from Whatcom Community College to assume the post of vice chancellor for instruction at Windward Community College in Kaneohe, Hawaii.

Karla (Colbert) McNeilly ('77 Crim. J.) retired after 30 years in public service. She was chief of probation for the City of Spokane at the time of her retirement.

Frances Schlaefer ('78 Nursing) is administrative director for the Johnson Center at Lucile Packard Children's Hospital. She previously worked at Providence St. Peter Hospital and Everett Medical Center, both in Washington. After completing nursing school at WSU, Fran earned a master's degree in nursing pediatrics at the University of California.

Rich Tomsinski ('78 Bus. Admin.) lives in Olympia with his wife, Barb. They have eight children who live around the state as well as in Hawaii. Three of them are Cougars.

1980s

Sean Fenton ('81 Speech and Hearing Sci.) recently appeared in an AVIVA commercial and in an ad for Apple. He is teaching acting at Loyola Marymount University in Los Angeles. This summer he directed "The Dogs of Baghdad" at the Promenade Playhouse in Santa Monica. He has three children.

Bev Kalish ('81 Crim. J.) is controller for Sourced Solutions Group, LLC, an international consulting firm.

Dan Berger ('82 Const. Mgmt.) retired on June 7, 2008 from the US Army Reserves as a lieutenant colonel after 28 years of service in the Army National Guard and Army Reserves. He continues his career as a senior risk engineering consultant with Zurich Insurance Company, where he has been employed since 1987.

Jim Franklin ('83 HRA) is the general manager of Premier Resorts' The Point Orlando Resort. Franklin,

who lives in Ft. Lauderdale, Florida, most recently worked for Magna Hospitality in Rhode Island. He is single and enjoys hiking and bicycling.

Carla Stratfold ('83 Political Sci.) is CEO of OnRequest Images, a web-based enterprise that creates brand-aligned imagery for businesses. She works from the company's offices in Seattle.

Brian Seltzer ('85) is a certified public accountant with the firm of Puttman & Teague, LLP, in Portland, Oregon. He also earned an MBA in sustainable business from the Bainbridge Graduate Institute.

Christopher Bence ('86 Elec. Engr., '93 Engr. Mgmt.) recently assumed command of the 373th Air Expeditonary Wing at Manas Air Base in Kyrgyzstan.

James Ramskill ('86) has been chosen by the Office of the Director of National Intelligence to attend the Naval War College in Rhode Island. James has led data center planning for the intelligence community and is a GS15 Step 10.

Debora (Sheldon) Buffington ('87 Bus.) is vice president of MetLife, Inc. She oversees all aspects of regulatory compliance for the company's sales of life insurance and annuity products through third-party distributors. She lives in California.

Hiroshi Hasegawa x'88 retired in 2002 after teaching at Nihon University for 40 years, 21 of which he was the English chair. He has published several books, including works on Beowulf. He lives in Tokyo.

1990s

John Gottschalk ('91) was promoted to manager of engineering for Benton PUD, Kennewick. He resides in West Richland.

Sean McLean ('91 Comm.) and his father **Mick McLean** ('67 Econ., '73 Comm.) share an office and teaching duties at Arizona Western College and Northern Arizona University in Yuma.

Debra Cabrera ('92 Soc.) is dean of academic programs and services at Northern Marianas College. She is also the accreditation liaison officer for the Accrediting Commission for Community and Junior Colleges and the Accrediting Commission for Senior Colleges and Universities. She lives in Saipan in the Northern Mariana Islands.

John Oliver Gonzales ('93 Political Sci.) hosts a talk show on a TV station in the Northern Mariana Islands. He is also a candidate in the race to become the Northern Marianas commonwealth's first delegate to the U.S. House of Representatives.

James McPherson ('93 Comm., Ph.D. '98) celebrated the publication of his second book, *The Conservative Resurgence and the Press: The Media's Role in the Rise of the Right*, in July. He lives in Spokane.

Jennifer (Fenich) Burger ('95) welcomed baby Abigail Renae Burger on May 19, 2008. She weighed 7 lbs 0 oz and was 18.5 inches long.

Michael Eliassen ('95 Hist.) has been commanding Charlie Company, 1st Battalion, 506th Infantry

which he and seven other Cougar alumni briefly relived the glory days of Cougar Crew. "Getting back out there and pulling a blade gets the heart going," he says. And not just literally.

For many students and alumni, crew isn't something you let go of the day you graduate.

The annual event had lapsed for a time after the men's sport was moved from a university-sponsored sport to a club sport. "I remember thinking it'd be easier to raise the dead than get the alumni back together," says Richards, now chair of the Cougar Crew Alumni Association. "But we've gotten beyond that and moved forward." Team members and alumni affectionately refer to it as "the reconnection," a reestablishment of ties and the beginning of the Cougar Crew Alumni Association (CCAA). Composed of team members from as far back as the 1950s, the association helps manage the business side of crew responsibilities so the team can focus less on money and more on racing, Richards says.

This March, former crew members representing more than 30 years of WSU crew history turned out for Cougar Crew Days. *Photo by Ben Herndon.*

"You have tremendous respect for everyone because you know what they did for years, just like we did," says Danny Brevick '05. On top of more than 30 hours a week of practice time, men's crew is almost entirely self-regulated and funded. Members constantly balance roles as students, team officers, fund raisers, and, of course, athletes. And considering the club's operating budget for a given season is more than $110,000, what they have managed is a lot. The team continues to compete as a varsity-level sport while still technically classified as a club sport.

"Being a part of Cougar Crew meant you had to work extra hard," says Lisa Curtis, a coxswain for the team in 1979. "It instilled an incredible work ethic and pride." It's that bond between athlete and alumni, the determination, dedication, and hard work, which makes Cougar Crew Days so special.

This year, members representing more than 30 years of crew history turned out.

A CCAA-sponsored auction during Cougar Crew Days is just one way they help ease the team's financial woes. This year's auction brought in around $10,000. In addition, WSU University Recreation support accounts for roughly a fifth of the overall team budget at about $20,000.

Even with CCAA and UREC support, the team still bears much of the burden to raise funds for everything from coaches' salaries, plane tickets, and uniforms to boats and repairs. So the team does its own fund-raising. Commercials for "Rent-a-Rower" weekends can be heard often on

local radio stations with team members offering their brawn for services like moving furniture, raking leaves, and painting houses at the rate of $10/hour. The team also offers community learn-to-row sessions in the summer for all ages and skill-sets.

Besides help with fund-raising, the alumni provide valuable experience and mentor their successors. "It's all about relationships," says Brevick, who had pushed to reestablish ties with the alumni four years ago. "We were constantly fighting the same battles and if we were going to advance we needed the alumni's help"—alumni who had the wisdom, leadership, and management skills that the team needed, says Brevick.

"Without the alumni we wouldn't have the connection between present and past teams," said Lauren Curtis, Lisa's daughter, a second-generation coxswain. "That's something that has really helped us grow."

Dave Edler

"A real tough kid"

by Harris Meyer :: During his years as a Cougar baseball player, Dave Edler got chewed out many times by Bobo Brayton for his wild and headstrong ways. Once, Brayton caught his young star using marijuana. Edler told the coach that his father didn't mind.

"We'll see," Brayton said, and phoned Edler's father in Yakima. That resulted in "the fastest trip a guy ever took to Pullman from Yakima," Brayton recently recalled with a laugh.

Edler left WSU in 1978, a few credits short of graduation, when he was drafted by the Seattle Mariners. He says he learned lots of lessons from the legendary coach, among them that "the only thing fun about baseball is winning."

But despite Brayton's efforts to guide and reform him, Edler's years as a Cougar and as a Mariner were marked by heavy drinking and drug use. What started him on the road to recovery was a revelation while riding the bus with the minor leagues after which he felt compelled to seek out a Christian teammate. That and reading books about Christianity caused him to become concerned about the spiritual lives of the other men on the team. He even started a "baseball chapel" to provide services for his friends on the road.

In 1984, after a sporadic four years of playing for the Mariners, mostly at third base, Edler

COURTESY BASEBALL-ALMANAC

broke free of his addictions. He also left pro ball, angry after not landing a permanent spot on the Mariners' roster and determined to be a success at something else.

Since then, Edler has parlayed his athletic fame, eloquence, and charisma into becoming the head pastor at one of Yakima's largest evangelical churches as well as the mayor of his home town. His leadership style blends Bobo-isms, pop culture, Alcoholics Anonymous, and lessons from the life of Jesus.

He has also mentored a number of teens through Young Life, a nondenominational Christian youth program, and through coaching American Legion and high school baseball. His skill at working with young people led to the assistant pastorship at the Yakima Foursquare Church in 1994.

While he often speaks of the importance of faith and prayer, Edler isn't quick to make moral judgments and generally avoids mixing church and state. He jokes at his own expense and frequently brings up his own youthful struggles with addiction and with his alcoholic father. "We start to look for love in all the wrong places," he said in a recent sermon to nearly 400 people at the Yakima Foursquare Church. "I can sing you Mickey Gilley's song because I danced to it."

Now, having helped Yakima reduce crime, redevelop downtown, and improve its public image, Edler, 52, a Republican, is mulling his political future. He blends a pro-business stand with a willingness to consider new taxes, belief in the role of government, and support for legalizing undocumented workers. On the hot-button issue of illegal immigration, Edler says simply: "Building walls and deporting people—that's insanity to me. People have always come to this nation wanting opportunity."

"I think he has the potential for higher office and would have no problem getting elected," says

Regiment, 101st Airborne Division in Southern Ghazni Province, Afghanistan.

Gary Holcomb ('95 Engl.) has received the 2008's President's Award for Research and Creativity.

Jennifer (Miller) Brown ('96 Child, Cons. & Family) has a new book, *What Angry Kids Need: Parenting Your Angry Child Without Going Mad*. The book, written with Pam Provonsha Hopkins, was published in spring 2008 by Parenting Press in Seattle.

James M. Pjura ('98 Biol.) is the conservation and zoning code enforcement officer for the Town of Weston in Connecticut.

Josh Meek ('99 Engl., Ed.) and wife Courtney celebrated the birth of their second son, Mason Robison Meek, on April 1, 2008.

2000s

Jamie Armstrong ('00 Comm.) and husband **Scott Armstrong** ('98 Comm.) of Renton proudly welcomed their first son and future Cougar, Owen Michael, on June 4, 2008.

Cody Janson ('00 Civ. Engr.) and **Amy (Budge) Janson** ('01 Sp. Comm.) welcomed the arrival of Chloe Jane Janson, who was born April 27, 2008.

Phil Haberthur ('00 Soc. Sci.), an attorney with Schwabe, Williamson & Wyatt, was recently appointed to the City Council for the City of Battle Ground.

Carrie Holmes ('00) will take part in the first ever Mt. Everest skydive in Nepal in October.

Bernard Lagat ('01 Bus. Admin.) qualified for the U.S. Olympic track and field team at the trials in Eugene, Oregon, in June. He is slated to compete in the August games in the 1,500 and 5,000 meter events.

Jim Ross-Nazzal ('01 Ph.D. Hist.) celebrated the publication of his first book, *The US Veto and the Polemics of the Question of Palestine in the United Nations Security Council, 1972-2007*.

Elizabeth Talley ('01 Crim. J.) received her master's in social work from Eastern Washington University in December, 2007.

Karen A. Whelan ('02 Soc. Sci.) has been named deputy attorney general for prosecuting workers compensation fraud by the Office of the Nevada Attorney General, Bureau of Criminal Justice.

Richard Robbins ('04 Comm.) is the wine manager for Marine View Beverage in Sumner.

Dale Edberg ('04 Biochem.) was elected to the board of trustees for the Minnesota chapter of the National Multiple Sclerosis Society. He is employed by the Mayo Clinic and resides in Rochester, Minnesota, with his wife and two children.

Katie Feldhusen ('04) married **Brad Beeman** ('06) on June 14, 2008, in Spokane, Washington. The couple now resides in Bothell.

Shelley Broader ('06 Soc. Sci.) left her job as chief executive of Sweetbay Supermarket in Tampa, Florida, for a position as President with Michaels

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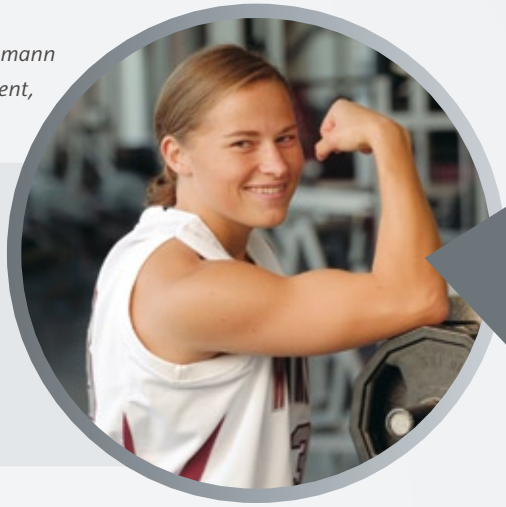

This year's Fleischmann Scholarship recipient, Katie Appleton, is a senior health and fitness education major and a guard on the Cougar women's basketball team.

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Stores, Inc., the craft, home décor, and art supplies store. Broader is credited with saving the Kash n' Karry supermarket chain by overhauling its image and way of doing business. She is also a board member of Raymond James Financial, Inc.

Jeannette Tracie Johnson ('06 Intnl. Bus.) and **Scott Allen Mason** ('05 Bus. Admin.) were married in Kennewick on June 7, 2008.

Molly O'Neill ('07 Lib. Arts) is meetings coordinator for the American Association of School Administrators in Arlington, Virginia.

IN MEMORIAM

1930s

Doris Clymer ('31 Engl.), 99, May 18, 2008, Issaquah.

Helen Phillips ('37 Ed.) , 90, April 4, 2007, Cashmere.

George Poole Allison ('38 Elec. Engr.), 94, April 10, 2008, Towson, Maryland.

Georgia Rae "Jo" Camp x'38, 95, November 19, 2007, Spokane.

Lewis Bernet Meenach ('38 Bus. Admin.), 93, June 6, 2008, Spokane.

George Earl Davis ('39 Ag.), 91, November 21, 2007, Usk.

Julia Elsie (Neuman) Renner x'39, 89, April 13, 2008, Coeur d'Alene, Idaho.

1940s

Walter C. Bayne x'40, 87, May 6, 2008, Spokane.

Lee Frank Koberstein x'40, 87, December 6, 2007, Pullman.

Luther Rueben Moe x'40, 87, May 30, 2008, Stanwood.

C. Gus Grant ('41 Elec. Engr.), 89, May 23, 2008, Carefree, Arizona.

H.K "Tobe" Saunders ('41 Fine Arts), 88, April 5, 2008, Kennewick.

Gerald E. Stack ('41 Mech. Engr.), 89, April 10, 2008, Spokane.

Margaret Ann Kunkle ('42 Home Ec.), 88, June 6, 2008, Echo, Oregon.

Inez Schroeder Peacock ('42 Phys. Edu.), 88, May 21, 2008, Colorado.

Carl Walter Brandt x'43, 87.

Howard Hopkins ('43 Ag.), 86, November 19, 2007, Clarkston.

Shirley Ott Kiehn ('43 Home Ec. & Ed., '67 M.A.T. Ed.), 86, April 5, 2008, Pullman.

Richard James McWhorter ('43 An.l Husb.), 86, November 15, 2007, Benton County.

Donald E. Walter x'43, 83, April 14, 2008, Odessa.

Victor H. Rutz x'44, 82, December 11, 2007, Mesa , Arizona.

Harry Lydiard ('47 DVM), December 1, 2007, Port Angeles.

Marvin J. "Joe" Koegler ('47 Pharm.), 90, May 15, 2008, Spokane.

Mary Eldora Damewood Sigler ('47 Bus. Admin.), 83, June 7, 2008, Everett.

Clark G. Ferguson, Jr. ('48 Ag.), February 10, 2008, Fresno, California.

Don (Jim) Gillies ('49 Elec. Engr.), 87, June 9, 2008, Sandy, Oregon.

Donald G. Vawter ('49 Pol. Sci.), 87, January 9, 2008, Twin Falls, Idaho.

1950s

EMitch M Brown ('50 For.), 82, June 17, 2008, Vancouver.

Honor B. Carey x '50, 75, November 24, 2007, Spokane Valley.

Alan Carlson ('50 Elec. Engr.), 82, May 8, 2008, Spokane.

Robert Doornink ('50 Phys. Ed., M.S. '54), 82, March 1, 2008, Los Angeles, California.

Clinton N. Charlson ('52 Phys. Sci.), 79, April 25, 2008, Edmonds.

George William LeCompte ('52 Elec. Engr.), 77, February 5, 2008, Tucson, Arizona.

Dwight Pool ('53 Phys. Ed.), 77, October 20, 2007, Gig Harbor.

John H. Nordheim Jr. ('55 Ag.), March 10, 2008, Walla Walla.

Gayle Gardner x'54, April 7, 2008, Mercer Island.

Gerald R. Ott ('56 Ag. Ed.), 75, May 6, 2008, Silverton.

Richard Daniel ('59 Elec. Engr.), 76, December 18, 2007, Kiezor.

1960s

Charles C. Capen ('60 Vet. Med.), 72, March 1, 2008, Westerville.

Harvey S. "Pete" Rice ('60 Anthro., '84 Ph.D.), 73, May 30, 2008, Beverly.

John Arthur Pinner ('63 Civ. Engr.), 71, January 13, 2007, Bellingham.

Michael Allen Casey x'65, 59, August 25, 2007, Lake Forest Park.

Bonnie Lynn Gilchrist ('67 Bus.), 63, May 8, 2008, Leavenworth.

Susan Janette Secrist ('69 Off. Admin.), 59, January 21, 2007, Lacey.

1970s

Tyler Sherman Hansell ('70 An. Sci.), 61, June 19, 2008, Hermiston, Oregon.

Wanda Boyd ('72 Soc.), 57, May 3, 2008, Bellingham.

William Goode ('72 M.S. Env. Sci.), 71, May 12, 2008, Ohio.

Leon Antonio Rousseau ('72 Ph.D. Ed.), 74, April 19, 2008, Seattle.

Steve J. Killian ('78 Bus. Admin.), 51, May 2007, Rockwall, Texas.

Kristie Sue Rollag-Royce ('79 Home Ec.), 52, April 26, 2008, Oak Harbor.

Yakima County Democratic Party chairman Paul George, who served with Edler on the city council. "I would hope he'd run as a Democrat."

Edler has eschewed partisan politics during more than four years on the city council, the last two as mayor. He believes the U.S. political system is "broken" due to excessive partisanship, and that is blocking the nation from solving "the huge issues of our time."

COURTESY CITY OF YAKIMA

"If anyone could change partisan politics, it would be Dave," says fellow council member Neil McClure, a 1980 WSU graduate. "He has great presence and is a real calming influence. His strength is standing back and saying, 'Where do we want to go and how do we get there?'"

Edler came to WSU after a stellar career in American Legion and high school baseball, including pitching his team to the 1975 American Legion World Series championship. As a pitcher, infielder, and outfielder for the Cougs, he helped the team win the Northern Division championship all four years he played. In his second year, he helped the team advance to the College World Series. In his fourth year, he led the PAC-10 in hitting.

He wasn't so successful in his studies. He drifted from hotel management to general business to general studies. He admits that "much of my college experience was partying" and that he was "the leader of the wrong crowd."

Brayton says he was surprised and pleased that Edler went into the ministry and then politics, but that "the potential was always there." He recalls young Edler pitching a playoff game against Arizona State, on a 116-degree scorcher of a day, to determine who would go to the College World Series. Edler threw a complete game, losing a 4-3 heartbreaker. "Dave was a tough competitor, a real tough kid," he says.

For his part, Edler has fond memories of Brayton, who visited Yakima this May to be honored with a Bobo Brayton Day proclamation. The event was a more pleasant occasion than one decades earlier when Brayton threw a fungo bat high in the air and bellowed at Edler because he defied a rule against pitchers throwing during batting practice. On that day Brayton charged up to him yelling and spraying spit all over the front of Edler's uniform. "I looked down to see how wet I was, and he started laughing," Edler recalls. "He wiped me off and said, 'Quit throwing in the cage.'" «

1980s

Ada May Smith McCormack ('82 Comm.), 47, June 12, 2008, Portland.

Robert W. "Robbie" Westover III ('82 Bus. Admin.), 48, April 29, 2008.

Terry Flynn ('85 Adult Ed.), 53, June 14, 2008, Spokane.

James C. Parrish ('85 Comm.), 46, September 30, 2007, Loveland, Colorado.

1990s

Nancy Lynn Dougherty ('93 Apparel Merch.), 36, December 30, 2007, Wayzata, Minnesota.

Rochelle Klopfenstein ('93 Bus. Admin.), 37, June 23, 2008, Bellevue.

2000s

Debora Lynne (Raynor) Dombroski ('00 Nursing), 41, April 13, 2008, Spokane.

Aron Louis Linares x'08, 27, May 16, 2008.

Faculty & Staff

Elaine Acuff, 78, June 17, 2008, Pullman.

Wallis Beasley, 93, retired administrator, May 20, 2008, Pullman.

Richard William "Dick" Dingle, 90, retired staff, June 1, 2008, Pullman.

Maria (Galvan) Gaona, 60, former staff, June 8, 2008, Everett.

Warren S. Gramm, 87, retired economics professor, December 3, 2007, Spokane.

Melvin R. "Gib" Gibson, 87, retired professor, May 15, 2008, Spokane.

Vivian Marie Fallgreen Hamm, 92, retired staff, April 16, 2008, Tualatin.

Gerald Kinkade, 80, retired Staff, May 2, 2008, Bovill, Idaho.

Frederick Koehler, 85, retired staff, May 22, 2008, Spokane.

John Michael Lane 50, retired custodian, December 2, 2007, Pullman.

Peggy Lee, 76, retired staff, June 4 2008, Pullman.

William Lynd, 91, retired staff, June 16, 2008, Palouse.

William McDougall, 83, retired professor, June 16, 2008, Coeur d' Alene, Idaho.

Dorothy Spencer, retired staff, May 12, 2008, Olympia.

Shinichi Watanabe, 90, exchange professor in 1979, 2008, Japan.

Vivian Wescott, 90, retired staff, February 9, 2008, Idaho.

Edith White, 72, retired staff, September 1, 2007, Scottsdale, Arizona.

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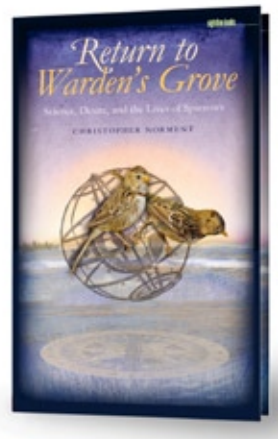


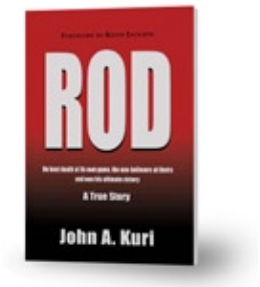
Return to Warden's Grove: Science, Desire and the Lives of Sparrows
by Christopher Norment '82 UNIVERSITY OF IOWA PRESS, IOWA CITY, IOWA, 2007 :: *Review by Michael S. Webster* :: Warden's Grove is a tiny cluster of spruce trees in the generally treeless expanse of the north Canadian tundra, and Christopher Norment—who received his master's degree from WSU in 1982—spent three long summers there studying sparrows; this excellent little book is his account of those summers. Readers expecting a tale of high arctic adventure will be disappointed—there are no attacks by ferocious grizzlies, no horrifying acts perpetrated by men made desperate by starvation, and no daring escapades by intrepid explorers of the last frontier. Instead, Norment delivers a tale of patient waiting and watching, of detailing the daily lives of tiny birds, and it is riveting.

The story that Norment tells is an unusual glimpse into the mind, and heart, of a field biologist. Those of us who follow this bizarre career path don't do it for fame or fortune (there is little of the former in this work and even less of the latter!). Instead we do it for one simple reason: We are driven by curiosity about the natural world. Norment captures this intense curiosity beautifully—he clearly cares deeply for the little birds he studies and the land that they live in. The book describes nicely the mix of excitement and drudgery that is field biology: banding and measuring birds, endless searching for nests, sitting for hours swatting mosquitoes while watching parent birds deliver food to their nestlings. As Norment himself points out, the science in this book is decidedly low-tech. Nevertheless, it is important in a subtle way: "The best end to my efforts lay in illuminating something of the life of a small bird and that this light, however feeble, helped connect me, and by extension, others, to the great world."

This book also succeeds because Norment can really write. He grapples with some weighty topics—our place in nature, the relationship between science and art, the meaning of a man's life—and it would be easy to slip into pretentious armchair philosophizing, but Norment never goes there. He is philosophical, to be sure, and thinks deeply, but he is never preachy and instead comes across as a thoughtful friend kicking around a few ideas. Norment's words draw the reader in, making even the most seemingly mundane topic interesting. He gives us an entire chapter on the differences between scientific writing and "normal" writing, another on shooting birds for research collections, and many pages on the lives of his favorite birds. And through it all Norment keeps you glued to the page and wondering: Why do scientists write that way? How *should* we feel about "collecting" birds for research? And what on earth ever happened to Mrs. Green's fledgling after it left the nest?

Finally, Norment's book captures the splendid isolation of the wilderness. In a world rapidly filling with humans, it is difficult to find a corner that doesn't have a Starbuck's. The arctic tundra is one of the few remaining exceptions. With only himself and a single field assistant for companionship, Norment both revels in and fears the solitude, and you feel it with him. This is a beautifully written little book, and one that will carry you to that tundra solitude. ⊗

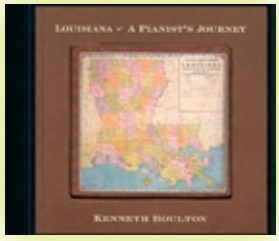
—Michael S. Webster is an associate professor in the WSU School of Biological Sciences and director of the Conner Museum. He specializes in evolution and behavioral ecology.



ROD: A True Story *by John Kuri* SEVEN LOCKS PRESS, SANTA ANA, CALIFORNIA, 2008 :: *Review by Eric Apalategui* :: Rod Retherford '84 triumphed as an undersized athlete, but until now his plucky comeback tale has always been told in spaces that were too small to fully contain it. There were plenty of headlines in 1980 after a bullet ripped through the football player's shoulder and lodged permanently in his neck, nearly killing him. And media interest soared after Retherford mounted a miraculous comeback and terrorized opposing offenses.

When he left Martin Stadium behind, the story surfaced a few times more, including a segment in the *Legends of the Palouse* film series by Jeff McQuarrie '98. That in turn spurred a *Washington State Magazine* story (Fall 2005) that this reviewer wrote after witnessing Retherford's tearful reunion with former teammate Junior Tupuola, the accidental gunman.

Book signings for Rod *will be held in the Bookie before two home games: Sept. 6 (Cal), 9:30 a.m.–11:30 a.m. and Sept. 27 (UO), 9:30 a.m.–11:30 a.m. Rod's former head coach Jim Walden will appear at both signings at 10:30 a.m.*



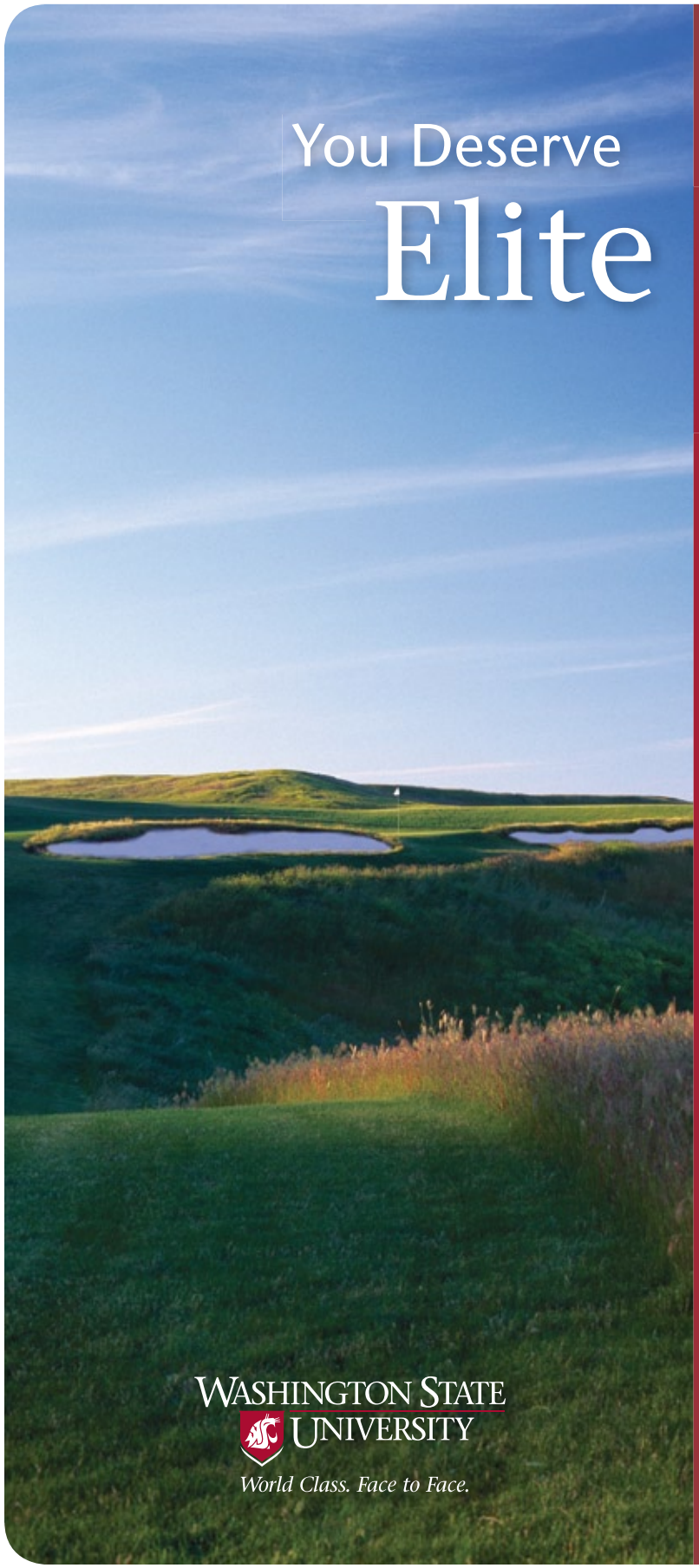
Louisiana—A Pianist's Journey *by Kenneth Boulton '84* CAMBRIA MASTER RECORDINGS, LOMITA, CALIFORNIA, 2007 :: *Review by Jeffrey Savage* :: Kenneth Boulton's recording and accompanying booklet effectively encapsulate Louisiana's rich cultural history and transport the listener to a graceful era in American music. This innovative two-CD set presents works by both American and European composers, and most of the music presented by Boulton '84 is reminiscent of vocal or dance music in early America (ca. 1850-1925).

The strongest music in the collection comes from the best-known composers—Louis Moreau Gottschalk and Virgil Thomson. Gottschalk's "La Savane, Ballade Creole," unfolds with subtle colors and shading that are brought to life by Boulton's sensitive and tender pianism. Thomson's "Suite from Louisiana Story," with the most daring harmonies and jarring rhythmic patterns on either disc, exemplifies the connection of these works to American music in the 20th century.

The recording's success, with its Grammy® Award nomination in the category of best instrumental soloist performer (without orchestra), evinces Boulton's artistry and his refreshing new contribution to the body of recorded work.

Where the Fins Meet the Frets *by Ray Troll '81 and the Ratfish Wranglers* RECORDED AND MIXED AT NARROWS PERCH STUDIO, KETCHIKAN, 2008 :: *Review by Jason Kardong '95* :: If life imitates art, then for Ray Troll, so does music. More specifically, his music imitates his art. This debut CD from Ray Troll and the Ratfish Wranglers contains 16 original songs that one could say leap directly from Ray's artwork, which is playful, humorous, and dripping with double entendre.

From the first song, "Bombastodon," you know you are in for an experience. The opening notes greet you about as gently as an alarm clock at 5 a.m. after a late night out on the town. Guttural throat singer Stephen Fandrich chants as guitars, drums, and organ slowly build to a rhythmic, primal beat. "I wanted to fire a warning shot across their [the listeners] bow to let everyone know what they were in for," Troll told me. "If they could survive Bombastodon, then the rest of the CD will be a breeze."



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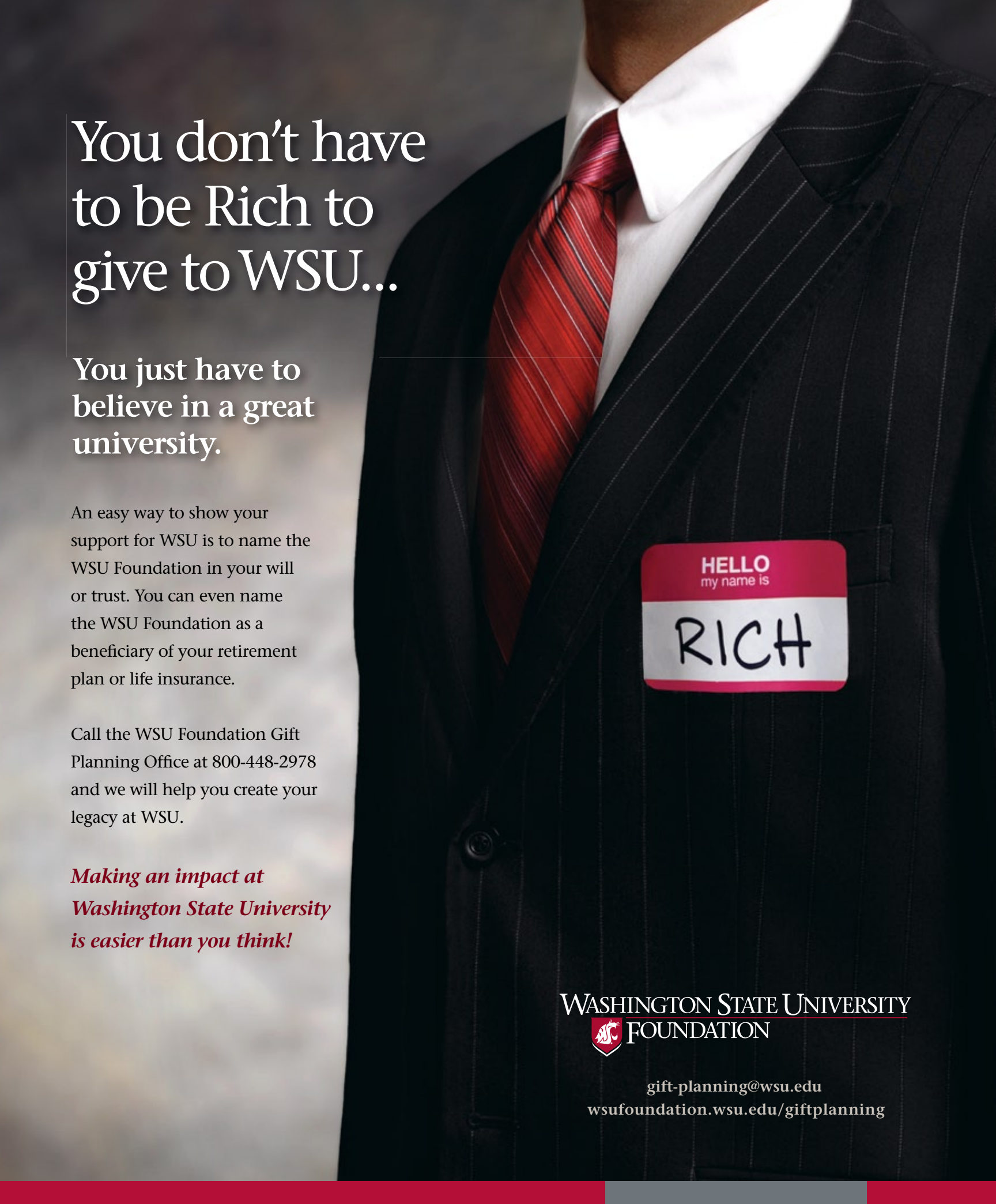

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