

ARTS & SCIENCES



VAUGHN
VENNERBERG
SUCCESS BEGINS AT HOME





GARY LAWSON / UNIVERSITY MARKETING

playbill

2

On the Cover

OSU alumnus and successful oilman Vaughn Vennerberg credits his family for his accomplishments — and shows that age 50 is not too late to start his own family.

10

Political Play

A recent OSU graduate boosts her résumé with a communications internship in Oklahoma Gov. Mary Fallin's office.

12

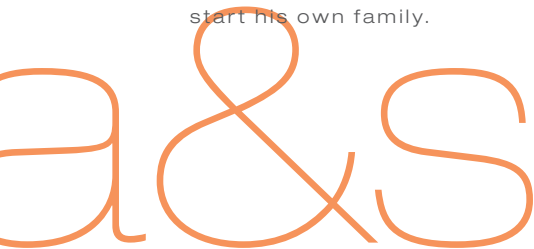
Leading the Way

Three OSU graduate students played leading roles in the relief and recovery efforts following the devastating May tornado in Moore, Okla.

28

Tracking Tolerance

An OSU professor is leading a research team focused on an extremely resistant alga (above) to see if its toxin tolerance can be shared.



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FROM THE Dean's Office

What an amazing year to have been at Oklahoma State! The Gamma Chapter of Phi Beta Kappa was installed, we surpassed \$1 billion in the *Branding Success: The Campaign for Oklahoma State University* drive well ahead of schedule — and the momentum for accomplishment shows no signs of slowing.

Students and faculty across the College of Arts and Sciences received numerous awards and honors for their scholarship, research and creative activities. J.C. Hallman was awarded a Guggenheim Fellowship, high school student Nicole Biddinger of Bartlesville worked with assistant zoology professor Punidan D. Jeyasingh to place first at the National Junior Science and Humanities Symposia, and music major Michael Barnes of Lawton traveled the globe over the summer after earning a place as percussionist in the National Youth Orchestra of the United States of America.

The campus and our college also experienced record enrollments this year. To support our growing student body, we welcomed 23 new faculty members and nine new endowed chairs and professors to our community. The expanding campus will also benefit from our renewed commitment to the arts and creative opportunities with the opening of two new facilities this fall: the Postal Plaza Art Museum in downtown Stillwater, and the Doel Reed Center for the Arts in Taos, N.M. We anticipate these facilities will be followed by a new performing arts center in the not-too-distant future. All of this means greater opportunity for involvement by alumni as well as students. We always have opportunities for alumni to get more involved — just ask me if you're interested!



In fact, alumni are already getting more engaged with our students overseas each year. A recent example includes the reunion of alumni and faculty in the United Kingdom, as we celebrated the 10th anniversary of our Cambridge Study Abroad program. Another example was the decision by two of our college's most steadfast supporters, Mike and Anne Greenwood, to accompany our wind ensemble and hear it perform at the Japan Band Clinic. So if you like to travel and you like OSU, be like the Greenwoods and our Cambridge alums and join our students to create an unforgettable, international experience for everyone. We're just a phone call away.

As you read this magazine, you'll get a glimpse into some of our students' capabilities since the interviews, writing and photography were done by a combination of staff, freelancers and student interns, many of whom are majors in or alumni of our media and strategic communication programs. I can only imagine what the future holds for our graduates!

Please don't be a stranger when you come back through Stillwater. I always look forward to meeting alumni and hearing your stories about your time at OSU and since. I am confident I will have a few wonderful stories to share with you as well.

Go Pokes! 🍷


BRET S. DANILOWICZ

DEAN, COLLEGE OF ARTS AND SCIENCES

family first

STORY BY Lorene A. Roberson PHOTOGRAPHY BY Matt Strasen

OILMAN VAUGHN
VENNERBERG CREDITS
HIS PARENTS AND A
STABLE CHILDHOOD
FOR HIS SUCCESS



COLLEGE OF
ARTS AND
SCIENCES

Much of who 1976 alumnus Vaughn O. Vennerberg II is goes back to his childhood.

He was born and raised in Midwest City, Okla., by parents who were products of the military. Mom was in the Women's Army Corps; Dad in the Army Air Corps. They settled in Midwest City, where his dad worked for Tinker Air Force Base as a civilian.

The family remained in the same house, allowing him and his sister to attend the same public schools all 12 years.

Today, the 58-year-old has a stellar reputation in the energy world. But oil and gas wasn't on his radar at Midwest City High School, where Vennerberg's dream was to study developmental psychology. He took intro psychology classes, served as co-editor of the newspaper and participated in intramural sports.

In 1971, he attended the American Legion's Boys State at Oklahoma State University.

"It was my first foray to Stillwater — one entire week in Stillwater," he says. "I was duly impressed with the campus and the facilities. That stuck with me when I later was making a decision on where to go for college."

Most of his high school friends were headed to the University of Oklahoma. He wanted to try something different than his older sister, Pam, who had chosen OU. (Pam Olson went on to become the first woman to anchor a primetime newscast in Oklahoma.)

“The things I was really interested in were at OSU,” he says. “The psychology department here has always had a great reputation.”

Vennerberg excelled at OSU. He served as president of the Interfraternity Council, Student Union Activities Board and Blue Key Honor Society. He was a senator for the College of Arts and Sciences and served on the college’s student council. He received the Bob Cox Award for Outstanding Senior of Delta Tau Delta fraternity and was a member of Omicron Delta Kappa, a national leadership honor society.

For eight months, Vennerberg traveled with the Kamms.

“We visited every city in Oklahoma, went to every county fair and every Rotary lunch,” Vennerberg recalls.

The pay was low, yet the experience incredible, he says. After the campaign, he intended to return to grad school to finish his master’s in psychology. There was one problem: no money.

Some folks Vennerberg had met on the campaign trail urged him to apply for a job at Texaco, which was hiring people with a liberal arts background. He was offered a position as a landman in Tulsa, Okla. — an offer too good to pass up, he says.

“And that is how I entered the oil and gas business.”

In 1987, he moved to Fort Worth, Texas, to work for startup XTO Energy Inc., where he oversaw contract negotiations, regulatory relations, acquisition and divestment strategy, land, gas marketing, property management and human resources.

In 2010, Vennerberg helped negotiate the sale of XTO Energy to ExxonMobil Corp. — called one of the largest energy mergers in history by *The New York Times*. The \$31 billion stock sale gave Exxon the equivalent of about 45 trillion cubic feet of natural gas throughout the United States.

Vennerberg is discovering life after the sale.

In the spring of 2012 Vennerberg received an honorary doctorate from OSU, where he was one of the commencement speakers.

Earlier this year, he and three partners formed MorningStar Partners, a company in Fort Worth that focuses on oil production in West Texas and New Mexico.

Meanwhile, Vennerberg is dedicating time to his three sons, whose ages range from 6 to 8 (**Story, Page 4**). Trey, the oldest, has bought a new aspect to his life. The boy was born with a rare chromosomal disorder that remains unidentified.



The things I was really interested in were at OSU. The psychology department here has always had a great reputation.” — Vaughn O. Vennerberg II, with his sons Trey (from left), Luke and Zach

He earned a bachelor’s degree in psychology in 1976 as one of the College of Arts and Sciences’ Top 10 Seniors. A month later, he started grad school at OSU.

During that first graduate year, Robert Kamm, the former OSU president and Arts and Sciences dean, called Vennerberg. Kamm, who had entered the Oklahoma senatorial race, wanted Vennerberg to hit the campaign trail with him and his wife.

XTO had an emphasis on giving back. In 2008, Vennerberg — by then president and director of XTO — partnered with the company to establish three endowed faculty positions at OSU, which were the first of their kind in the microbiology and molecular genetics, art and psychology departments.

“My philanthropy now is three little boys and keeping them active,” the Dallas resident says. Vennerberg hopes to instill in his three sons the same values his parents taught him and his sister.

“Our parents had a lot of humility and drive, and were hard workers and solid citizens. My sister’s and my successes are a true compliment to them.” &



Family at 50

FOR MORE THAN 30 YEARS, OIL AND GAS EXECUTIVE VAUGHN O. VENNERBERG II'S LIFE FOCUSED ON HIS CAREER.

"I worked all my life, extensively, 12-hour days, six and seven days a week," Vennerberg says. "During that period of my life, I watched many of my friends with children. I watched their kids grow up, and it was a wonderful thing.

"I knew if I was going to have children, I needed to do something soon, or it wasn't going to happen."

So at the age of 50, Vennerberg decided to start a family, using the help of surrogates. Today, the 58-year-old has three biological sons: Trey, 8; Luke, 7; and Zach, 6. The boys are biological brothers.

Vennerberg didn't start out planning to have three sons. But a curve ball came with the first one, and it was devastating.

He still remembers the obstetrician's first words to him after Trey was born prematurely: "I know this is not the news you wanted to hear."

Trey, born with a rare chromosomal disorder, spent his first eight weeks in a neonatal intensive care unit. He was not expected to survive. Family and friends helped, staying by Trey's side night and day while Vennerberg continued to work full-time for XTO Energy.

"Trey was in severe condition, and it was hit or miss," he says. "I wouldn't wish this upon any parent, but I learned from the experience."

What he learned, in part, is that genetics is one of the greatest frontiers in science, and money is desperately needed for research.



The oilman sought out the best geneticists in the country. They mapped out Trey's chromosomal disorder, finding no chromosomal abnormalities in the family tree. Trey's genetic disorder just happened, and nobody can say why. The syndrome is so rare that it doesn't carry a name, only a number. The long leg of his chromosome No. 1, band 31.1 through 32.1, is missing. So far, Vennerberg has found only one, perhaps two, other children in the world born with the same genetic deletion.

Trey is now 8 but has been walking for only two years. Younger brothers Luke and Zach keep close watch on their older brother, who cannot talk. Trey has frequent seizures and regular trips to the emergency room.

In 2008, Vennerberg and XTO gave \$1 million (matched by Boone Pickens and the state of Oklahoma to make it a total \$4 million gift) to OSU to create three endowed faculty positions in microbiology and molecular genetics, psychology, and art.

The Vaughn "Trey" O. Vennerberg III Chair in Bioinformatics and Molecular Genetics, held by Robert L. Burnap, is named for Vennerberg's oldest son. Vennerberg also chose subjects dear to him for the other two chairs: the Vennerberg Professorship in Developmental Disabilities in Psychology, held by Larry L. Mullins, reflects the oilman's bachelor's degree in psychology. And he is an art collector, hence the Vennerberg Professorship of Art, held by Rebecca Parker Brienen, an art historian who specializes in 17th-century Dutch art and museum collections and history. All three posts are the first endowed chairs in their departments.

Still, it's the chair in genetics that is closest to Vennerberg's heart.

"I want to give other families hope," he says. "I want this gift to improve the quality of

"I want to give other families hope. I want this gift to improve the quality of life for individuals with genetic disorders, as well as give hope to their families."

— Vaughn O. Vennerberg II

life for individuals with genetic disorders, as well as give hope to their families."

Today, Trey is doing well. In August, Trey's pediatrician commended the family for the extraordinary progress the boy has made through intensive therapy and stimulation.

"He is never down, never discouraged and never gives up," his father says. "And while he cannot talk, he can express his feelings, and he is always happy." Trey loves guitar music, other people's eyeglasses, riding in a car, swimming and the movie *Mary Poppins*, Vennerberg says. He is enrolled in a special-needs class at an elementary school outside Dallas.

Vennerberg is blunt about the enormous resources it takes to raise his special-needs son. Trey needs 18 hours of supervision a day, which includes three full-time nannies and others, he says.

The nannies, who happen to be three sisters, have a great bond with his sons, Vennerberg says. The family's support system includes his sister and her husband, two nieces and friends, as well as the boys' godparents, who are also family members.

Meanwhile, Vennerberg says, he is having fun watching his sons grow and develop — and just like any other parent, it's not always easy.

He continues to work at his newest venture, MorningStar Partners, but these days, it's on a more flexible schedule. His days now include dropping kids off at school, riding bikes and organizing birthday parties and swimming lessons. He's learned about Dora the Explorer and her adventures, thanks to Luke and Zach's summer camps, and the family enjoys attending Texas Rangers baseball games.

"Luke and Zach look out for their older brother every day," Vennerberg says. "They do not understand the details of his issues, but they do know Trey has special needs, and they know a family is a place where people take care of each other.

"Every once in a while, I get to close my door and have a little quiet time to myself," he says. But he doesn't care if he has much privacy these days. "You just plow in and make it work. It's hard to imagine what life was like without my sons. They are my greatest blessing." &

Energy Boom is a Boon for OSU Geology

“Ours is the first project to really go out and try to understand what are the reservoir types, how they are distributed, how you can find them and how you can produce them.” — *Michael Grammer, OSU professor*



Oklahoma State University’s partnership with 11 oil companies will give new life to old oil fields behind the booms of yore.

The companies, including Devon and Chesapeake Energy Corp., are working with OSU’s Boone Pickens School of Geology to better understand Mississippian midcontinent carbonates. The ancient seabeds of Oklahoma and Kansas limestone are believed to encase nearly 6 billion barrels of oil — just under what the United States consumes in a year.

Those fields have been in business for more than 40 years, says Michael Grammer, the OSU professor leading the effort. More than 14,000 wells, drilled with the conventional vertical method, pumped out billions of barrels before the accessible stuff was tapped out.

But energy companies now have new ways of getting previously non-recoverable oil and gas out of the ground with methods such as hydraulic fracturing, developed by engineers in West Texas, the Michigan Basin and elsewhere. With that in mind, the OSU group is looking at how the Mississippian reservoirs are built and what might be the best ways to get at what’s inside them.

“Ours is the first project to really go out and try to understand what are the reservoir types, how they are distributed, how you can find them and how you can produce them,” says Grammer, who helped start the partnership after his hiring at OSU in July 2012.

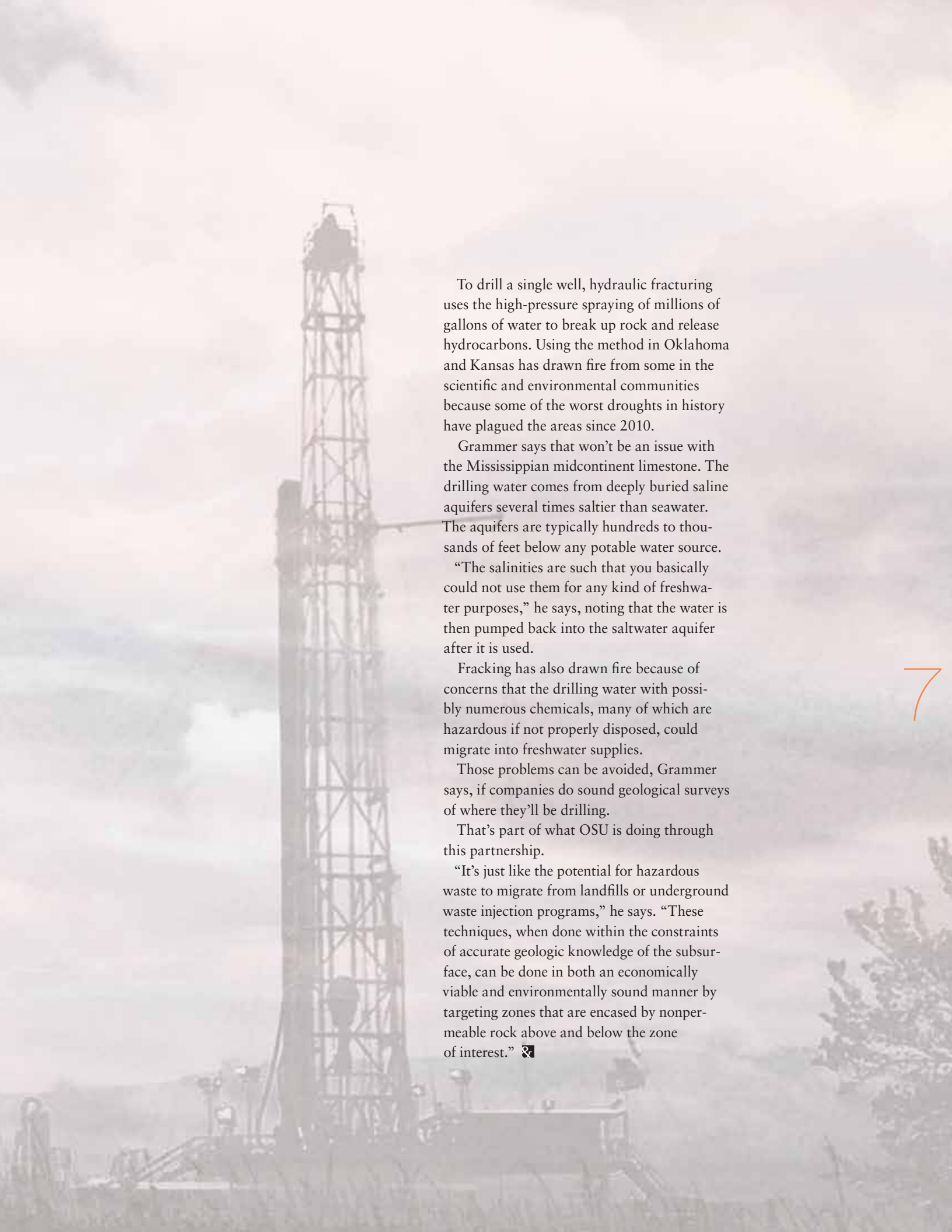
Oil companies, including one of the OSU program’s partners, SandRidge Energy, have jumped at the midcontinent plays.

But the region is not without its challenges. It’s a complex play, Grammer says, with very different characteristics across its reservoirs, ranging from how easily liquid moves through its rock to its seismic properties.

The companies will rely on Grammer and his colleagues Darwin Boardman, Jay Gregg, Priyank Jaiswal and Jim Puckette, for research and development. They’ll be using high-tech, three-dimensional modeling to show the companies the equivalent of a road map telling them where and how to drill.

Normally, companies buy such information on the open market. And because the Mississippian is booming, those costs would be astronomical. With the consortium, the companies benefit from the research efforts of OSU’s faculty and graduate students while providing new scientific data that will be published by OSU scientists.

It’s a win-win for all involved, Grammer says.



To drill a single well, hydraulic fracturing uses the high-pressure spraying of millions of gallons of water to break up rock and release hydrocarbons. Using the method in Oklahoma and Kansas has drawn fire from some in the scientific and environmental communities because some of the worst droughts in history have plagued the areas since 2010.

Grammer says that won't be an issue with the Mississippian midcontinent limestone. The drilling water comes from deeply buried saline aquifers several times saltier than seawater. The aquifers are typically hundreds to thousands of feet below any potable water source.

"The salinities are such that you basically could not use them for any kind of freshwater purposes," he says, noting that the water is then pumped back into the saltwater aquifer after it is used.

Fracking has also drawn fire because of concerns that the drilling water with possibly numerous chemicals, many of which are hazardous if not properly disposed, could migrate into freshwater supplies.

Those problems can be avoided, Grammer says, if companies do sound geological surveys of where they'll be drilling.

That's part of what OSU is doing through this partnership.

"It's just like the potential for hazardous waste to migrate from landfills or underground waste injection programs," he says. "These techniques, when done within the constraints of accurate geologic knowledge of the subsurface, can be done in both an economically viable and environmentally sound manner by targeting zones that are encased by nonpermeable rock above and below the zone of interest." ❧



Richard D. "Rick" Fritz says he found the geology program at OU "just too esoteric," but OSU turned out to be right for him.

Perseverance Pays

Rick Fritz followed his heart into the energy business

Though he knew he wanted to be a petroleum geologist even as a youngster, the 2013 Distinguished Alumnus for the College of Arts and Sciences Richard D. “Rick” Fritz experienced a few early tests of that conviction when it was time to enroll in college.

The first came in Norman in 1970, when he walked away from freshman orientation scratching his head.

“My family was excited about OU football, but I left the orientation session with the feeling that the geology program there was just too esoteric, so I stopped at OSU on my way back to Tulsa,” explains Fritz. “I was immediately impressed by the faculty at OSU because many had worked in the petroleum industry for years. Their approach fit my background, so I signed up. My parents soon became big OSU fans.”

His next test came during a meeting with a freshman adviser: “He told me, ‘Don’t go into petroleum geology — you will never find a job and will wind up pumping gas!’ I majored in geology anyway and by the time I had my master’s degree, I also had about seven [job] offers,” says Fritz.

He was just 13 when he started working in the oil fields of Osage County with his father, the late Charles Fritz, who came from a long line of farmers and oilfield workers.

“My dad was an independent pumper in the ’60s, and it was a good life. He and my mother Marilyn worked real hard, but they also taught me to have fun. While working in the oil fields, I met several geologists, and I liked ‘talking rocks’ with them and the fact that they were essentially exploring for buried treasure,” Fritz says.

He honed his treasure-finding skills at OSU and found some great wealth above ground as well, in the form of mentors.

“Drs. John Shelton, John Naff, Gary Stewart and Zuhair Al-Shaieb — not only did they teach us to work hard, but they taught us to love what we were doing.”

And as much as he still loves his work, Fritz counts his beloved wife Mary as his most valuable find ever. The couple recently celebrated their 41st wedding anniversary.

“Her name was Mary Carl, and she was my high school sweetheart. We married at the start of my junior year at OSU, and we enjoyed married life in Stillwater,” he says, adding, “Mary is my best friend and counselor. She grew up in Skiatook, and we were both looking to get out into the world.”

Following his graduation with his master’s in geology in 1977, the couple’s new world started with Exxon in Kingsville, Texas — specifically, the King Ranch of South Texas.

“One-point-two million acres to explore! It was an exciting time. My team proposed and Exxon drilled almost 100 wells in a 2½-year period,” says Fritz.

Over the next 20 years, Rick and Mary Fritz would truly see the world, mostly with Masera Corp., where Fritz became vice president in 1989, supervising major exploration projects in the U.S., the Middle East and Africa.

He accepted the executive director position with the American Association of Petroleum Geologists in 1999 and for 12 years provided oversight for numerous programs in the U.S. and around the world. He supervised the opening of AAPG offices in the U.K., Bahrain

and Singapore. One of his proudest accomplishments was helping raise more than \$35 million for the global support of geoscience through the AAPG Foundation. It was also during his time at the association that Fritz worked with OSU’s most generous alumnus, Boone Pickens, on a special project.

“We were trying to build a connection between AAPG and OSU. Mr. Pickens pledged \$10 million for a groundbreaking consortium including OSU, AAPG and the industry to develop GIS [geographic information systems] projects related to geology,” explains Fritz. “By 2004, we had re-established the OSU Geology Alumni Council with the goal to make the Boone Pickens School of Geology one of the top schools in the nation, and with Mr. Pickens’ help, we’re well on our way.”

As much as he appreciated his time at AAPG, Fritz was ready to go when he was offered a chance to explore liquid resource plays in North America as senior geologist with SM Energy in Tulsa in 2011.

“Petroleum geology is my work and passion, but my family is my life and my comfort,” says Fritz.

He and Mary have two kids: Ian, 21, is studying to be a geologist and mechanic, and Zoe, 13, is “a daddy’s girl and very talented in sports and music,” Fritz says.

“Faith is my core and what keeps me strong,” concludes Fritz. “I have faith in God, in my family, in this country, and of course, OSU. Go Pokes!”

Jim Mitchell 

MATHEMATICS LEARNING SUCCESS CENTER BY THE NUMBERS

The new Mathematics Learning Success Center opened this summer on the fifth floor of the Edmon Low Library on the OSU-Stillwater campus. The center is available to all students in lower-level mathematics courses looking for resources in addition to the classroom.

Math department head and Regents Professor William Jaco says the center is a cornerstone to building OSU's program of student learning and success in mathematics.

"Mathematics is the key to opening doors to opportunity and careers for students. It is the foundation to the STEM subjects (science, technology, engineering and mathematics)," he says. &

To learn more, visit www.math.okstate.edu/mlsc.

President Burns Hargis cuts the ribbon celebrating the completion of the **OSU Mathematics Learning Success Center** in April. From left: **William Jaco**, math department head; **Chris Burnett**, president, Nabholz Construction Services Operations; **Bret Danilowicz**, dean, College of Arts and Sciences; **Sheila Johnson**, dean, Libraries; **Hargis**; **Calvin Anthony**, OSU/A&M Board of Regents; **Robert Sternberg**, then-provost and senior vice president; and **Chris Francisco**, associate head of lower division mathematics.

9 hours of low-cost tutoring for area high school students each week

5 tutoring rooms for small-group tutoring

10 laptops available for check-out

3 SMART boards for presenting examples and storing online for future student use

2 large tutoring areas for 1000-level courses and calculus classes



40 percent improvement in student success rates in college algebra and precalculus since the Success in Undergraduate MathematicS (SUMS) initiative began

20 hours of free tutoring for math placement exam the week before classes begin

27 student employees in fall 2013

14 different classes supported

62+ hours that the MLSC is open per week

126 computers available in the computer lab

1985 the year the Mathematics Learning Resource Center, one of the first of its kind in the country, opened

3,800 students used the facility this summer for computer training during new student orientation

7,500 square feet of space devoted to tutoring

8,000 students per year take classes that the MLSC tutors

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12
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Political Play

OSU graduate puts a Capitol internship on her résumé

A recent OSU graduate shadowed some of Oklahoma's political leaders this past spring while taking part in her dream internship.

Laura Lopez, a native of Altus, Okla., spent the last semester of her collegiate career serving as a communications intern for Gov. Mary Fallin at the state Capitol in Oklahoma City.

Lopez, a public relations major, says her love for politics sparked her desire to pursue the position at the Capitol.

"Growing up, I was always much more interested in politics and governmental affairs than most of my friends and classmates were," Lopez says. "Coming to study journalism at OSU only increased that interest. I quickly found that the best way to get involved with the field of politics would be to use my writing skills to my advantage."

Some of Lopez's duties included attending legislative sessions to take notes and listen to the announced administration of bills, as well as writing press releases about events at the Capitol. She also shadowed Meg Dubray, communications director at the Capitol, while occasionally working with Fallin.

Lopez considers the letters she drafted for the governor as her most important contribution as an intern. She outlined documents addressed to the Oklahoma

Academy, the Peoria Tribe and the audience at a National Cowboy and Western Heritage Museum gala.

Lopez says writing in Fallin's words was a challenge at first, but it eventually became second nature to her.

"It's not every day that you get to draft a letter for the governor of Oklahoma," Lopez says. "It was nerve-wracking at times, but my supervisor was great to work with and was able to help me learn throughout the process."

At OSU, Lopez built a strong set of leadership skills and academic achievements.

While at Oklahoma State, Lopez served on the Arts and Sciences Student Council, Student Alumni Board and OSU Leadership Conference. She also was a member of the President's Partners and the OSU French Club.

Lopez earned spots on the Dean's and President's Honor Rolls as well as several different scholarships.


Lopez's accomplishments at OSU solidified her status as a determined, hard-working leader. She also displayed impressive time management skills by becoming fluent in Spanish in her spare time.

"The whole learning Spanish thing has actually become one of my most valuable assets," Lopez says. "I definitely feel like it's something that will be able to help me in my professional life."

During her internship, Lopez also saw how valuable certain aspects of her education at OSU were in a professional setting.

For instance, a political storm over gun control at the legislature gave her an opportunity to face a real-life crisis and use the basics she learned at OSU, including crisis management, government relations, and ethical guidelines.

Lopez plans to take the skills she's developed to law school in Denver, where she'll work toward her dream of becoming a lawyer.

"I expect to work for more government organizations and it's possible that I'll try to intern at another state capitol," says Lopez. "I know I've got a long way to go before becoming a lawyer, but I'm ready to test the waters and be fully prepared for my professional career." 



RELIEF AND RECOVERY LEADERSHIP

OSU graduate students step up
in aid efforts after Moore tornado

Jonathan L. Lacaba / STORY

AFTER THIS YEAR'S TORNADO DEVASTATED MOORE, OKLA., THREE GRADUATE STUDENTS FROM OSU'S FIRE AND EMERGENCY MANAGEMENT PROGRAM PLAYED AN IMPORTANT ROLE IN THE OKLAHOMA CITY SUBURB'S RECOVERY.

The students played prominent roles on their relief teams, helping the community begin to recover from the tragedy.

While on site, they put into practice what they had learned in the classroom, with each of them responsible for one of the three phases of disaster recovery. Here are their stories.

14

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As a training major for the **Midwest City Fire Department**, **Rodney Foster** is often one of the first responders to disasters such as the Moore tornado.

1

STAGE 1 — EMERGENCY AND FIRST RESPONSE

As one of the first to arrive in Moore after the tornado hit on May 20, Rodney Foster helped rescue people from under the rubble and contained a natural gas leak that could have led to a disaster of its own.

Foster is a training major for the Midwest City Fire Department. He develops curriculums and trains emergency response personnel to help people when a crisis strikes. He makes sure that firefighters adhere to guidelines, including those from OSHA, the Occupational Safety and Health Administration.

Foster also steps in when his fellow firefighters are not at the station.

“I often take their place on the fire engine, and that was the case on the day of the tornado in Moore,” he says.

Foster has been involved in five major disaster relief efforts, including the May 3, 1999, tornado that hit Moore.

Despite having seen the destruction of that 1999 tornado in Moore, Foster was in awe from the latest strike.

“I had a feeling of what I would see when I was called out, but I was still shocked. The looks in victims’ eyes were compelling,” he says.

A desire to help people in need combined with a team environment and a taste for the rush of adrenaline common for first responders led Foster to choose this line of work.

Foster earned a master’s degree in fire and emergency management administration this summer from OSU. The program has encouraged him to view his work with a holistic approach and consider all aspects of a disaster. He better understands how victims react and what they’re going through in trying times, he says.





2

STAGE 2 — BACKUP COMES IN

After the first responders arrive at a disaster site, officials determine whether the disaster is beyond the scope of their agencies.

If more help is needed, they call the Oklahoma Medical Reserve Corps. The program is administered by the Oklahoma Department of Health and coordinated by Debra Wagner, who oversees and supports 34 volunteer coordinators and more than 5,200 volunteers in the state.

Wagner, who is certified in volunteer administration, is working toward a master's degree in fire and emergency management administration at OSU.

"I started with the Medical Reserve Corps as a clerical volunteer handling logistics in a post-disaster simulation in July 2005 at the Cox Convention Center in Oklahoma City.

"The drill opened my eyes to wanting a career that would give me the opportunity to be in the middle of things and make a difference," she says.

When disaster strikes, state and local agencies and relief organizations contact the Medical Reserve Corps for backup. The organization brings in additional volunteers

— such as medical and mental health professionals, as well as non-medical volunteers.

Wagner's animal response and triage plan started out as a class project at OSU. It was put into action following the May tornadoes — veterinarians and vet techs were the first teams Wagner dispatched to the affected areas. The Medical Reserve Corps doesn't typically respond within the first operational period of a disaster, but the animal needs were immediate.

The health and well-being of everyone in a family, including animals, is among the many responsibilities Wagner addresses.

3

STAGE 3 — LONG-TERM RECOVERY EFFORTS

Rebuilding homes and lives doesn't occur overnight. Often, organizations unite to create long-term plans to help the people who are affected by disasters.

That's where John Ricketts comes in.

Ricketts is the manager of disaster services for Feed The Children, overseeing the organization's plan to help those in need following a disaster. He is working on his master's in fire and emergency management administration.

One aspect of the Oklahoma City native's job is his involvement with the Voluntary Organizations Active in Disaster alliance, made up of organizations and governmental agencies on local, state and national levels that collaborate to help disaster survivors and their communities. Ricketts was named the organization's chair-elect in January, a role he will assume in 2015.

As Feed The Children's national representative to the alliance, he's one of the first people to know about recovery efforts. Ricketts was involved with the relief efforts following the 2010 earthquake in Haiti, flooding in Nashville, Tenn., the 2011 tornadoes in Joplin, Mo., and in Alabama, as well as 2012's Hurricane Sandy.

For the disaster in Moore, Ricketts was called to the State Emergency Operations

Center at the Capitol. There, Ricketts and representatives from the Red Cross, Salvation Army and other nonprofits teamed up to begin helping people.


"Several organizations were coming together to make sure that activities don't overlap and that we help as many people as we can in the fastest way possible," Ricketts says.

Shortly after first aid supplies and services were provided to the residents of Moore, Ricketts and his teams began distributing supplies and food to the disaster survivors as they began rebuilding their lives.

Ricketts and his teams worked at several distribution points, including the Lowe's home improvement store in Moore and nearby Platt College. About 30 volunteers from Ricketts' group handed out boxes with laundry detergent, cleaning supplies and hygiene products to more than 250 people.

Since then, Ricketts and Feed The Children have provided aid to more than 50 organizations with 1.6 million pounds of in-kind donations through 184 shipments, he says.

Ricketts says he is in it for the long haul.

"Going back to normal isn't going to be easy for the citizens of Moore, but we're going to be there for them as long as they need our help." 



The Scientific Process

STORY BY Sylvia E. King-Cohen

Gilbert John took words of wisdom from a mentor for his career path and his service toward students

Gilbert John's love of science has taken him from his home on a Navajo Reservation in Arizona to all over the United States. Along the journey, the Oklahoma State University associate professor has worked hard to share his trek with other Native Americans.

"I didn't fit the characteristic mold of the stereotypical scientist," John, 50, says of his circuitous route to become both professor and science mentor. "My interest in science began with my love of animals."

His original plan at Colorado State University was to be a veterinarian.

"As I got closer to graduation, a mentor, an immunologist, talked to me about science and careers other than becoming a vet. He taught

me about the whole world of scientific research, teaching and service activities. It changed my career path."

That career change has benefited current OSU students who spend summers assisting in John's research. He heads Science Scholars: The Native American Path, a program that guides Native American students at OSU who are pursuing degrees in science, technology, engineering and mathematical fields. It is funded by the Society for



the Advancement of Chicanos and Native Americans in Science. Stillwater's student chapter is one of 40 in the United States and the only college chapter in Oklahoma.

"We want to give our minority students an opportunity to excel," John says. "SSNAP provides opportunities for our student to participate in training sessions focused on academic success and professional development."

In fall 2012, the society awarded OSU \$40,000 and is committed to funding the program for two more years. The society uses funds obtained from the National Institutes of Health to support SSNAP.

This summer, John and two students — Lindsey Burger and Amber Anderson — worked on his research project at the Brookhaven National Laboratory (BNL) on Long Island in New York. Both students are incoming seniors. Burger is a zoology major and a member of the Otoe Missouri tribe. Anderson, a Cherokee, is a biochemistry major.

"I study an enzyme found in bacteria that is found in the human intestine," John says. "The enzyme breaks down different dyes found in consumer products, the color you see in food, clothes and other things."

The common colorants are called azo dyes. He explains that some azo dyes could become toxic when broken down. A variety of azo dyes are used throughout the world. If they're accidentally

consumed through food or water contamination, some of these dyes can cause cancer.

"We're interested in how the enzyme works," John says. "I've been studying them for the past 15 years. BNL, they're experts. The structural biology department at BNL can help determine the structure of the enzyme through a technique called crystallization. When we know its structure, it allows us to do a lot to understand its function."

This summer, John's students learned the science that goes into the process.

"It gives them an indication of what scientific research is all about," says John. A question about whether his 15-year quest would scare most students away from a life in the sciences makes him laugh. "It takes time and a special individual to dedicate their life to cure a disease. And, it may take my lifetime. My 15 years is very small compared to what some scientists have dedicated in their careers."

The SSNAP funding also allows John to attend the SACNAS national conference. This year's conference is in San Antonio in October. More than 3,000 professional scientists of predominately Hispanic/Chicano and Native American origin are expected to attend. Because the conference is within driving distance of Stillwater, John says he plans to take all 22 students in the OSU program to the conference.

"We hope to make a major impact," John says.

By impact, John means participating in competitions that include peer-reviewed

poster presentations, where students are eligible for cash awards up to \$500. However, the conference offers more than cash awards.

"Our students meet with top-notch minority scientists who are dedicated to helping them," John says. "It is a low-key environment where Hispanic and Native American students can feel comfortable."

John hopes his mentoring and this program will draw more Native Americans into science fields. He offers concrete suggestions for parents who want to encourage their children toward science and math careers.

"First, encourage them to do well in school," says John, thinking back to his own parents. "Encourage them to go as far with their education as they can."

He says it is important to spend time talking with kids about the importance of education.

"You also need to do things with your kids, not just tell them not to play video games," John continues.

"And, if you're not that comfortable with math or science, find them a mentor who can help them. That is the missing link," he adds. "There are opportunities out there, but students are lost without mentoring. We have to be able to share that information."

John also has advice for those students who want to be considered for next summer's hands-on internship.

"You have to have the grades, a desire to learn, the ability to follow directions,"



says John, who also relies on advice from other faculty members. "Of course, my students have an advantage because I know a lot about them: their characteristics and character, interests, whether the program would benefit them."

Interestingly, John's own children aren't in scientific fields. His oldest daughter, 26, is completing a master's degree in political science, and his youngest, 22, is earning a doctorate in education.

"I consider that a testament to my letting them become what they wanted to be," he says. &

JOURNEY TO JAPAN

OSU WIND ENSEMBLE OFFERS
ENERGIZING PERFORMANCE



ABOVE

The **OSU Wind Ensemble** performs a joint concert with Japanese school band members in **Fussa City, CENTER**


MOUNT FUJI

Bridge (below) to the **Imperial Palace** in **Tokyo**. Shopping district (far right) in **Tokyo**.



EDGE
2014





The OSU Wind Ensemble received a standing ovation, 12 curtain calls and played four encores at the 44th annual Japan Band Clinic on May 19 before a crowd of about 2,700 at the ACT City Concert Hall in Hamamatsu City.

“There are rare performances where the audience and performers seem to completely feed off each other’s energy. This concert was such an experience,” says Joseph Missal, OSU music professor and the ensemble’s conductor.

Selected to perform by juried invitation, the ensemble was making its second trip to the conference since 2006. Only OSU and Indiana University have performed twice at this conference.

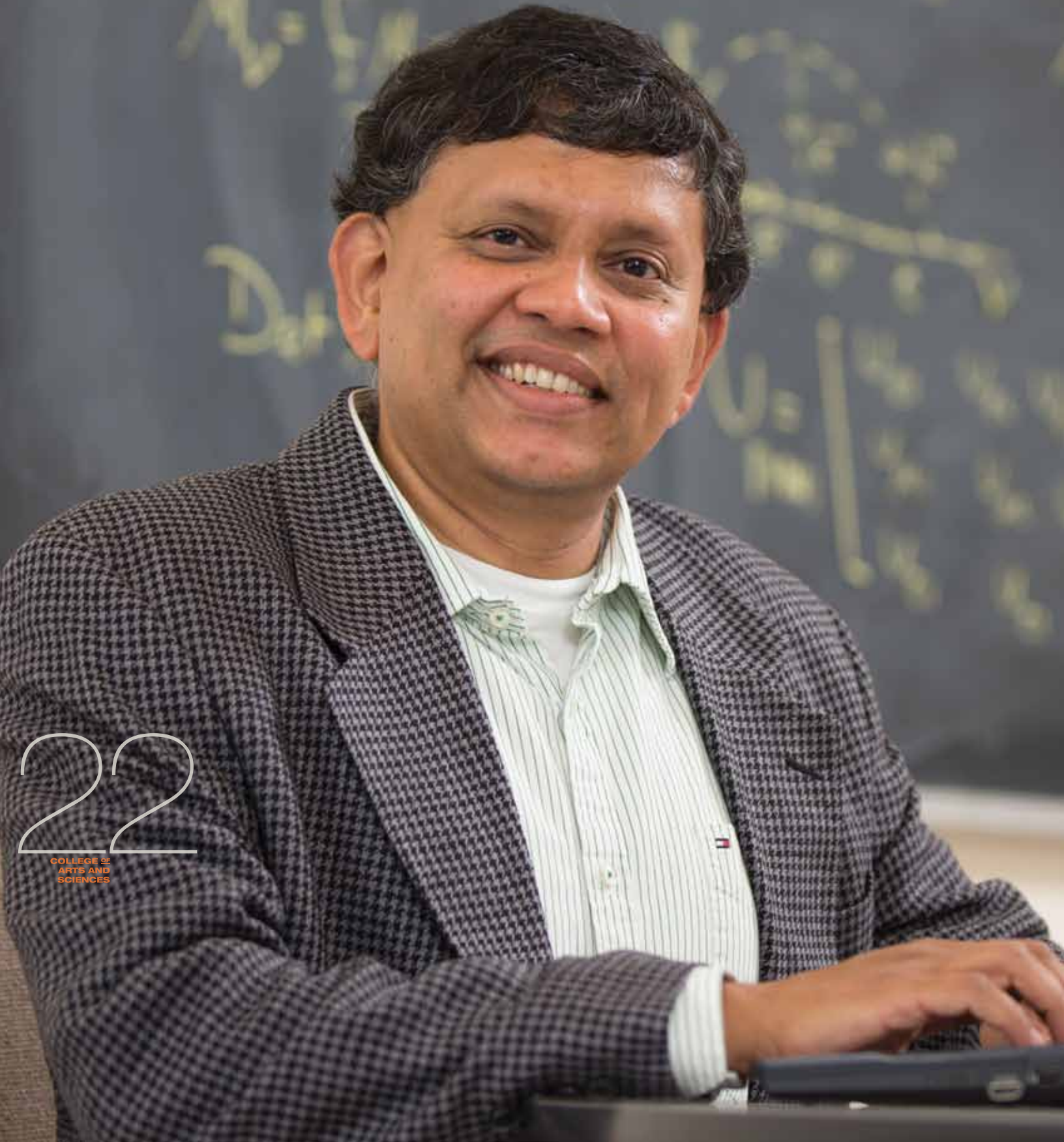
A total of 52 graduate and undergraduate students and four faculty members made the eight-day trip, which included stops in Tokyo, Fussa City and Hamamatsu City. The ensemble joined Japanese school band members for a joint concert in Fussa City and held several open rehearsals for public school band teachers and their students in Tokyo. The band clinic included selections by Bach, Shostakovich, Grainger, Sousa, Mackey, Bryant, Wagner, Lindroth and others, as well as the world premiere of “Peace and Light Rising” by Edward Knight.

President Burns Hargis and Dean Bret Danilowicz of the College of Arts and Sciences covered the largest share of the financial obligations.

OSU donors and philanthropists Michael and Anne Greenwood accompanied the ensemble to Japan. ☒



REGENTS PROFESSORS



22

COLLEGE OF
ARTS AND
SCIENCES

High-Energy Research

STORY BY Matt Elliott

OSU Regents Professor Babu is lending a hand to set up a national lab

One of the newest Regents Professors in the College of Arts and Sciences is getting a unique opportunity to help set up a national laboratory — 5,000 feet underground.

Kaladi Babu is part of a team of researchers attempting to turn a South Dakota gold mine into a virtual gold mine for high-energy physicists who study rare phenomena.

Babu helps a team of 364 researchers from about 10 countries. If the lab is established, Babu will provide the Sanford Underground Research Facility the theoretical background for one of its major projects: beaming tiny subatomic particles called neutrinos underground from Chicago's famous Fermi Lab to a massive detector deep inside the gold mine.

"I will do the theory of neutrinos relevant for that experiment," Babu says.

"The collaboration is active, but it is not ready to take data."

Babu, who was appointed Regents Professor — the highest promotion an OSU

professor can receive — in 2012, came to OSU in 1998 after several postdoctoral fellowships at Princeton and the universities of Maryland and Rochester. When he arrived, he found only one other person in high-energy physics on campus, professor Satya Nandi. Together, they drummed up funding from the Department of Energy and founded the Oklahoma Center for High Energy Physics collaboration among OSU, the University of Oklahoma and Langston University and helped hire three new faculty members at OSU.

"We're very proud of what we have set up here," says Babu, a native of south India's Kerala Province.

CONTINUES

Kaladi Babu is providing the theoretical background for a major project by the **Sanford Underground Research Facility** in South Dakota.

"If protons decay, then that would tell us that ultimately matter is not stable. It will be one of the most profound discoveries in science — implying all matter will eventually decay away. That will be the ultimate fate of the universe if protons are unstable." — *Kaladi Babu*

His involvement in the national lab based in Lead, S.D., (pronounced "lead") is due to his considerable expertise in physics' Grand Unified Theory. The theory, an attempt at merging the fundamental forces behind the universe into one simplified theory, attempts to explain how matter and forces interact to create what we see, hear and feel.

"It's the ultimate beauty of nature that will show up in this, if it's proven," says Babu.

He has been helping with international fundraising for the lab, which has already secured about \$867 million from the U.S. Department of Energy. It will take a bit more to build the detector and acquire the 34,000 tons of ultra-pure liquid argon needed for testing.

The National Science Foundation selected the mine as the site for the underground lab in 2007 but in 2010 stopped funding project

designs. The Department of Energy took it over, funding daily operations along with the state of South Dakota, while also looking at longer-term research through an agreement between the state technology authority and Lawrence Berkeley National Laboratory, the lab's website states.

"It's not completely clear whether it will be successful or not, but this discussion has been going on for seven or eight years, and the process is very slow," Babu says. "After a certain amount of approval, it will have to go through Congress, so we are dependent on the Congress."

If the lab is established, it'll join 18 other national labs, some of which, including New Mexico's Los Alamos National Laboratory and Tennessee's Oak Ridge National Laboratory, have been behind the greatest inventions of the last 100 years. The South Dakota lab and the neutrino project will be worthwhile investments, Babu says, because they will complement work at Europe's Large Hadron Collider (which recently turned the physics world on its head by discovering the elusive Higgs boson particle, explaining why matter has mass) by focusing on projects the super collider isn't addressing, such as whether protons can decay.

"If protons decay, then that would tell us that ultimately matter is not stable. It will be one of the most profound

discoveries in science — implying all matter will eventually decay away. That will be the ultimate fate of the universe if protons are unstable."

Babu, the son of a teacher, came to the United States to work on his doctorate at the University of Hawaii after finishing college in Mumbai. His younger brother is a chemical engineer, and his older brother is an economist.

He enjoys teaching students. He has a lively way of talking about physics and is quick with a laugh, which makes him an entertaining teacher of the introductory physics courses the department offers.

"I love undergraduate teaching," he says. **"There are so many bright and very enthusiastic students.** It's always fun to talk to them. Many of them come by after class to talk about what they find interesting in popular literature. We also get very good graduate students in the physics program, so I can challenge them a bit more in specialized topics, such as advanced quantum mechanics."

Babu's work has appeared in dozens of journals, and he has won numerous awards and honors, including being elected Fellow of the

American Physical Society, the OSU Regents Distinguished Research Award, serving on the "theory panel" of the American Physical Society's Division of Particles and Fields and organizer of the Center for Theoretical Underground Physics summer program in Lead.

Babu says earning the Regents Professorship has been a humbling event, one that is especially meaningful to him because he worked his way up to OSU's highest promotion from assistant professor.

"I am very grateful for the honor," he says. "There are so many incredible researchers at OSU who could've received it."

He lives in Stillwater with his wife Kime. Their daughter Maya graduated last May from Stillwater High School and is enrolled at Boston University. They enjoy traveling to exotic locales in their spare time, including recent destinations such as Trieste, Italy; Ljubljana, Slovenia; and Split, Croatia. They've also been to Japan, Russia, India, Poland, Mexico, Taiwan, Korea, Sweden and the Netherlands. ☒

THE DOEL
REED
CENTER
FOR THE ARTS

Through the Doel Reed Center for the Arts in Taos, N.M., OSU is offering students and lifelong learners unique academic opportunities.

Next summer's course offerings will be posted soon.

For more information, visit drca.okstate.edu.

If you would like to help us enhance educational experiences through the Doel Reed Center for the Arts, please contact Debra Engle at the OSU Foundation at 405-385-5600 or dengle@OSUgiving.com.

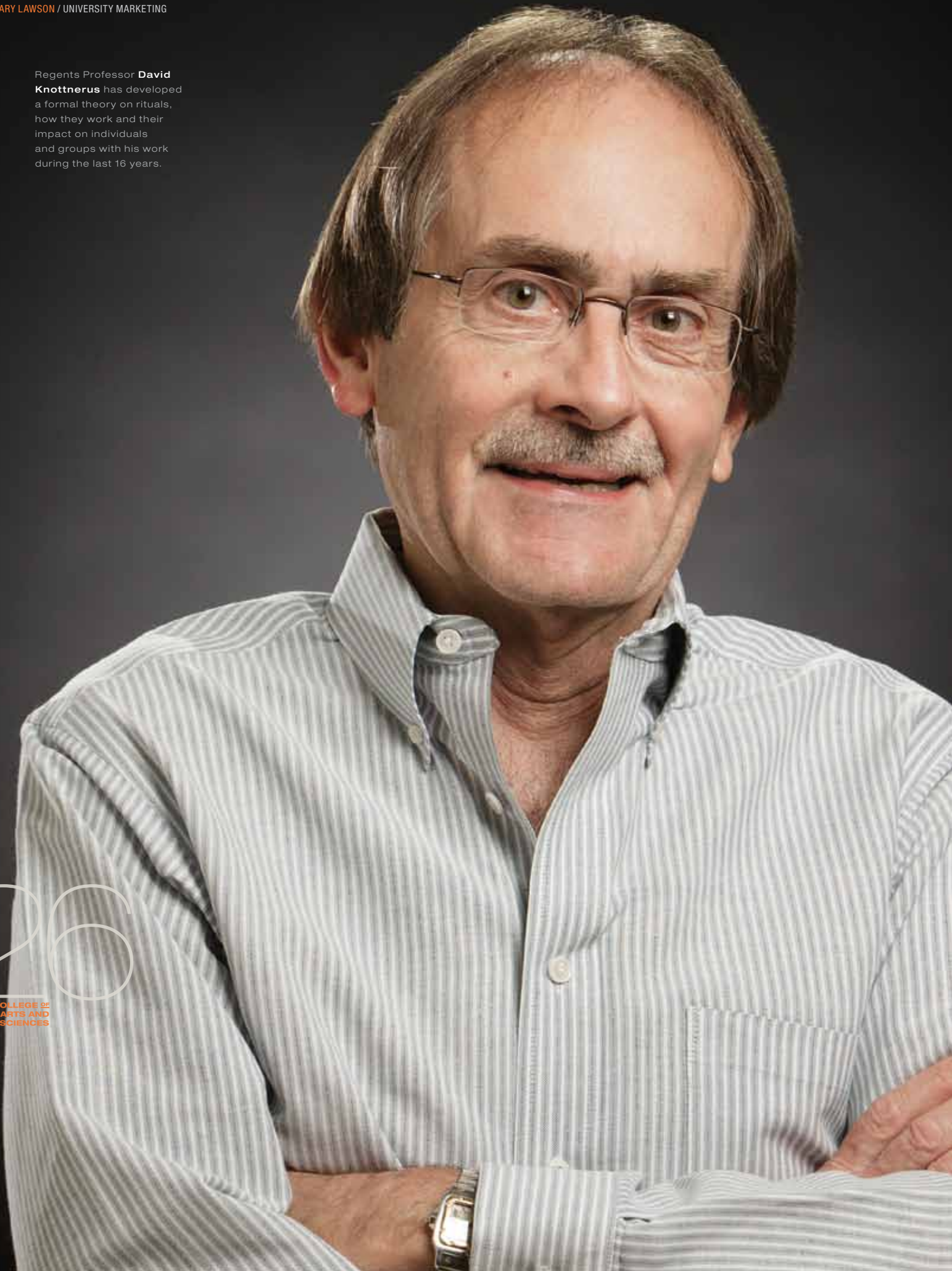


The Doel Reed Center for the Arts is named for the renowned artist who directed OSU's Department of Art from 1924 until retiring to the family estate in northern New Mexico in 1959. Thanks to the generosity of his daughter, Martha, the picturesque property and three historic adobe structures now serve as an inspiring setting for teaching, research and outreach related to the Southwest.

Regents Professor **David Knottnerus** has developed a formal theory on rituals, how they work and their impact on individuals and groups with his work during the last 16 years.

26

COLLEGE OF
ARTS AND
SCIENCES



Working Together

STORY BY Ryan Tomlinson

Knottnerus studies collaborations — and practices what he researches

OSU sociology and Regents Professor David Knottnerus first saw his studies come to life during the Vietnam War.

He was drafted in 1969, just weeks after earning a bachelor's degree in sociology. The Army assigned him to a medical evacuation unit outside of Tokyo, where he saw his fellow soldiers — all from diverse backgrounds — overlook their differences and work together to save the wounded. And he found the living examples of his studies fascinating.

"We worked, ate and lived together 24/7," Knottnerus says. "So obviously, conflicts and tensions arose. But I was struck by how well we worked together as a team."

More than 40 years later, Knottnerus continues to be part of a team, motivated by his work with others. Today, he gives his college students a lot of credit for his success.

"I make a big point of trying to pull students in and to work with and collaborate with them on research," Knottnerus says.

A former student, Jason Ulsperger, now an associate professor of sociology at Arkansas Tech, has known Knottnerus for more than 15 years. Together they have published one book, co-authored nine articles and book chapters and teamed to present papers at regional, national and international conferences.

"Dr. Knottnerus was the first person to help me realize how important scholarly activity is if I want to be a successful educator," Ulsperger says. "He also taught me the value of encouragement and mentorship."

Knottnerus mentored Ulsperger on several papers, including one based on his dissertation, *The Social Dynamics of Elder Care*. The paper won the Mid-South Sociological Association's Research Article of the Year in 2008.

"He mentored me on how to structure the paper, express my ideas and in general enhance the quality of my writing," Ulsperger says. "I couldn't have done this without Dr. Knottnerus."

Jennifer Edwards, now an associate professor in sociology at Northeastern State University in Tahlequah, Okla., also sings Knottnerus' praises.

"If he's mentoring you, he's putting in 100 percent," she says. "He mentored me for six years, and he was a fantastic teacher. He was very instrumental in building my career. We still work, publish and present together. I was very fortunate to have the opportunity to have Dr. Knottnerus as a professor and mentor."

Basudhara Sen, another graduate student of Knottnerus' who recently received her doctorate, chimes in: "Dr. Knottnerus has proven himself exceptional in both his graduate student advising and his scholarly work. He has been a friend, a guide, a colleague and a mentor. ... His inspiring comments and positive attitude helped me to grow as a scholar. He instilled confidence in me to carry on with my professional goals as a future sociologist and an academician. He maintains his friendly, caring ways and scholarly knowledge within the classroom as well. He is

27

“Dr. Knottnerus was the first person to help me realize how important scholarly activity is if I want to be a successful educator.”

— Jason Ulsperger, about his mentor



COURTESY JASON ULSPERGER

an inspiring teacher and ... I know he always is there as my friend and a guide.”

EARLY DAYS

Knottnerus was born and raised in Alton, Ill., a small town on the Mississippi River. At age 18, he enrolled at Beloit College in Wisconsin to study chemistry. Once he realized that chemistry wasn't his passion in life, he took some time to determine what that actually was. An introductory course in sociology later, Knottnerus fell in love with the subject.

After earning his master's and doctorate from Southern Illinois University in Carbondale, Knottnerus taught at Florida's University of Tampa. In 1989, he brought his talents to Oklahoma State, where he could focus on research and other scholarly work in addition to teaching.

At OSU, he met another new professor, Frederique Van de Poel, who would become his wife. She is a professor of French and has collaborated with Knottnerus on several articles and two books, *The Social Worlds of Male and Female Children in the 19th-Century French Educational System: Youth, Rituals and Elites* and *Literary Narratives on the*

19th- and Early 20th-Century French Elite Educational System: Rituals and Total Institutions.

STUDY OF RITUALS

Why do people do what they do? That's exactly what Knottnerus' research seeks to answer.

Within the field of sociology, Knottnerus has several interests, including social theory, social psychology and social inequality. However, his main interest is the study of rituals.

Over the past 16 years, Knottnerus has developed a formal theory on rituals, how they work and their impact on individuals and groups. He defines a ritual as a routine or a patterned behavior that has a higher meaning and that aids people in coping with their situations. His theory is defined in his book *Ritual as a Missing Link: Sociology, Structural Ritualization Theory and Research.*

“The concept of rituals is underutilized and often ignored,” Knottnerus says. “It is essential to use this knowledge to alleviate and reduce social problems and

inequalities. The main goal in all of this research is to apply it to everyday life.”

His studies, done with collaborators, have encompassed all sorts of groups and many different situations, ranging from the social dynamics in ancient Sparta (“That paper is getting a global response,” he says) to Ireland's Orange Order to the Notting Hill Carnival in London, from the development of golf in America to coping with life in concentration camps including Russian labor camps, Nazi camps, POW camps and Japanese internment camps in the U.S. during World War II, as well as an intense look at the culture inside Enron and the various practices there that led to its meltdown.

A current example of Knottnerus' research involves analyzing social interactions among members of an Antarctic crew working under extreme conditions. He and his collaborators, graduate student Kevin Johnson and James Mason, a lecturer in the Department of Marketing in the Spears School of Business, are reviewing and analyzing the diaries and memoirs of crew members from several

COURTESY BASUDHARA SEN



Basudhara Sen celebrates graduation with her mentor, David Knottnerus.

expeditions to the Arctic and Antarctic. A book on the results is under contract.

So far, their research has turned up items brought to Antarctica that could be considered luxuries: musical instruments, wine, liquor and chocolate.

“The Antarctic is the harshest climate on earth,” Knottnerus says. “Why did explorers bring such trivial items when they could have

increased their margin of safety and brought more food or fuel?”

The short answer could be: With music, chocolate and alcohol, life in such harsh conditions becomes more bearable. And that’s what Knottnerus found: “In this book, I argue that the rituals associated with these and other items increased people’s ability to cope with the

extreme conditions they experienced during these Arctic/Antarctic expeditions.”

As Knottnerus and his collaborators examined the various crews, he found he could classify each expedition as a failure, a success or a super-success. But those weren’t based on what the expedition itself brought back; it was based on team morale.

“Super successful leaders were the ones who brought those items (music, chocolate, etc.) and who had much tighter crews,” he notes.

Another research interest that Knottnerus is passionate about is nursing home conditions. He and Ulsperger wrote *Elder Care Catastrophe: Rituals of Abuse in Nursing Homes & What You Can Do About It*. In it, the two discuss how bureaucracy can lead to the objectification and neglect of nursing home residents.

Nursing home residents are under the supervision of strangers, who often have little to no emotional connection with their patients, Knottnerus says. The lack of such a connection can lead to insufficient care.

Knottnerus also says that government regulations that require caretakers to spend excessive amounts of

time filling out paperwork can impede creating those emotional connections.

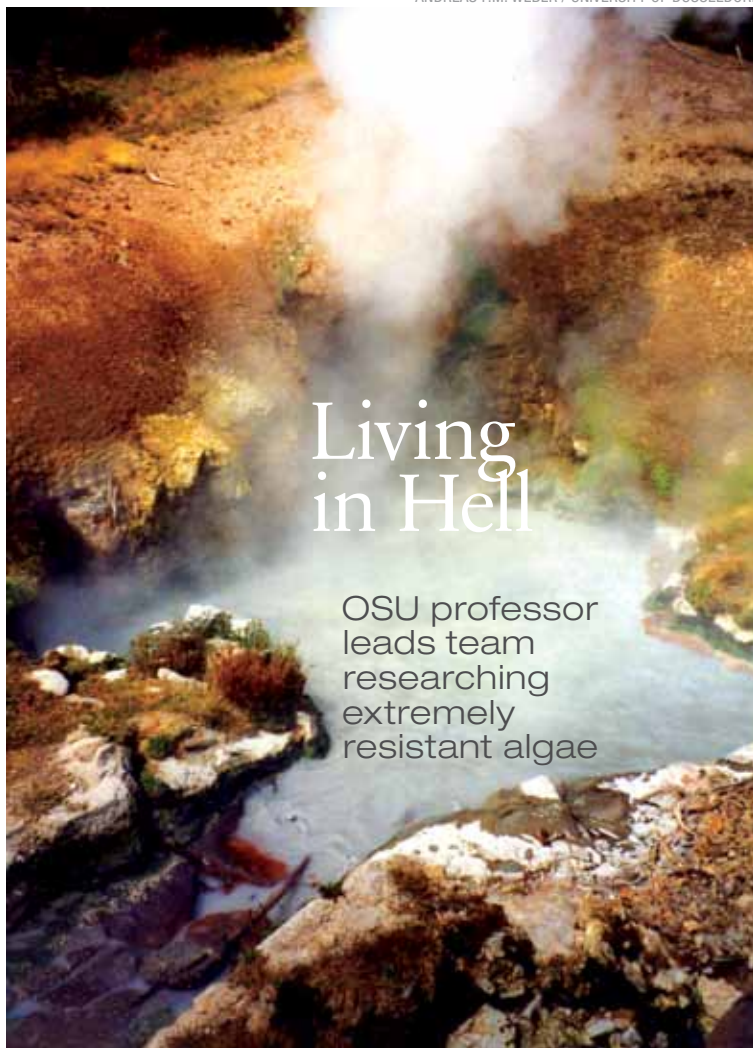
“I have a great deal of respect for [Knottnerus’] work on the book,” Ulsperger says.

In his latest project, Knottnerus and his collaborators, professor and department head Duane Gill and graduate student Kevin Johnson, are studying the social response to the tornadoes that swept through Moore and El Reno and how daily life in the Oklahoma cities was disrupted. The analysis will be used to develop more sophisticated disaster response policies.

Simple steps can help victims cope. Knottnerus suggests these steps can involve rituals such as talking with victims, hosting social events or celebrations to highlight accomplishments or holding memorials for the lives lost in a disaster.

Outside of teaching, Knottnerus has held positions with the American Sociological Association, Mid-South Sociological Society and other professional associations.

Knottnerus and his wife live in Stillwater. During his free time, he enjoys exercising, reading and traveling. ☒



Living in Hell

OSU professor
leads team
researching
extremely
resistant algae

In the movie *Alien*, the title character is an extraterrestrial creature that can survive brutal heat and fend off toxins.

In real life, organisms with similar traits exist, such as the “extremophile” red alga *Galdieria sulphuraria*.

In hot springs in Yellowstone National Park, *Galdieria* uses energy from the sun to produce sugars through photosynthesis.

In the darkness of old mine shafts, in drainage as caustic as battery acid, it feeds on bacteria and survives high concentrations of arsenic and heavy metals.

How has a one-celled alga acquired such flexibility and resilience?

To answer this question, an international research team led by Gerald Schönknecht of Oklahoma State University and Andreas Weber and Martin Lercher of Heinrich-Heine Universität (Heinrich-Heine University) in Dusseldorf, Germany, decoded genetic information in *Galdieria*.

They are three of 18 co-authors of a paper published in *Science*.

The scientists found that the *Galdieria* genome shows clear signs of borrowing genes from

its neighbors. Many genes that contribute to *Galdieria*'s adaptations were not inherited from its ancestor red algae but were acquired from bacteria or archaeobacteria.

This “horizontal gene transfer” is typical for the evolution of bacteria, researchers say.

However, *Galdieria* is the first known organism with a nucleus (called a eukaryote) that has adapted to extreme environments based on horizontal gene transfer.

“The age of comparative genome sequencing began only slightly more than a decade ago and revealed a new mechanism of evolution — horizontal gene transfer — that would not have been discovered any other way,” says Matt Kane, program director in the National Science Foundation’s Division of Environmental Biology, which funded the research. “This finding extends our understanding of the role that this mechanism plays in evolution to eukaryotic microorganisms.”

Galdieria heat tolerance seems to come from genes that exist in hundreds of copies in its genome, all descending from a single gene copied millions of years ago from an archaeobacterium.

“The results give us new insights into evolution,” Schönknecht says. “Before this, there was not much indication that eukaryotes acquire genes from bacteria.”

The alga owes its ability to survive the toxic effects of such elements as mercury and arsenic to transport proteins

and enzymes that originated in genes it swiped from bacteria.

It also copied genes offering tolerance to high salt concentrations and ones with an ability to make use of a wide variety of food sources. The genes were copied from bacteria that live in the same extreme environment as *Galdieria*.

“Why reinvent the wheel if you can copy it from your neighbor?” asks Lercher. “It is usually assumed that organisms with a nucleus cannot copy genes from different species — that’s why eukaryotes depend on sex to recombine their genomes. How has *Galdieria* managed to overcome this limitation? It is an exciting question.”

What *Galdieria* did is “a dream come true for biotechnology,” says Weber.

“*Galdieria* has acquired genes with interesting properties from different organisms, integrated them into a functional network and developed unique properties and adaptations.”

Future genetic engineering may allow other algae to make use of the proteins that offer stress tolerance to *Galdieria*.

Such a development would be relevant to biofuel production, says Schönknecht, as oil-producing algae don’t yet have the ability to withstand the same extreme conditions that *Galdieria* does.

Matt Elliott &

Gerald Schönknecht says the results of his team's studies into *Galdieria sulphuraria* have offered new insights into evolution.

PHIL SHOCKLEY / UNIVERSITY MARKETING



Homecoming Receptions

Hundreds of alumni, students and friends attend the A&S homecoming reception. In 2012, A&S divided its 24 departments to host four different receptions. Alumni from 1962 and 1986 received 50- and 25-year pins respectively at each reception.

Professors and alumni from the zoology, geology, microbiology and botany reception include (from left) **Dr. Gamal Aal Abdel, Brittany Ford, Pride Abongwa and Mercy Achang.**



Among the faculty, staff and alumni at the political science reception were (from left) **Ed Noltensmeyer, Jeanette Mendez, Eve Ringsmuth, Dana Glenncross, Vincent Burke, Jim Davis, Teresa Tackett, Cindy Hutchinson, Pam Amos, Steven Webster, Nik Emmanuel and Ben Pryor.**

Physics alumni gathering with faculty members are (from left) **John Mintmire, Doyle Fouquet, Bill Steckelberg and Jim Wicksted.**



Some of those at the botany homecoming reception included (from left) **Gerald Schönknecht, Mark Fishbein, Nicole Bryant, Lupita Borja, Linda Watson, Zoe Austin and Chris Wood.**

Top Ten Seniors

More than 175 scholarships and awards were presented at the OSU College of Arts and Sciences honors and awards banquet. Among those recognized were the **Top Ten Seniors**, who were honored for their academic excellence and campus and community involvement. They are (from left): **Anna Geary, Mackenzie McDaniel, Rosalina Yorks, Caleb Ketcham, Erin Nally, Sara Fevurly, Bridget Harkin, Dawson Metcalf, Andrea Cerar, Sara Roberts** with A&S Dean **Bret Danilowicz**.



33

Commencement

OSU senior **John Leos** led the processional alongside the dean at the 2013 A&S commencement ceremony on May 4. Leos, a theater major, was named a **Senior of Significance** by the OSU Alumni Association and an **Outstanding Senior** by the OSU Department of Theatre. He is also the recipient of the **Honors College Degree**, the highest academic distinction awarded to undergraduates at OSU.



Advisory Board for the Boone Pickens School of Geology

The annual advisory board meeting for the **Boone Pickens School of Geology** was held at the **Boone Pickens Ranch**. During the meeting, board members discussed the goals and directions for the **School of Geology**. Board members include (from left) **Kristie Luchtel Ferguson, John Brett, Jason Hamilton, Lanny Holman, Boone Pickens, Rick Fritz, Jim Puckett, Rick Ely, Bart Gaskill and Gary Ford.**



Rising Star: Adley Stump

Singer and songwriter **Adley Stump** is the **2013 Rising Star** for the College of Arts and Sciences.



Stump, who graduated in 2011 with a bachelor's degree in journalism and broadcasting, kicked off her singing career in front of a global television audience as a contestant on NBC's *The Voice*. She recently finished an album and is on tour.

Stump is also working with fellow Oklahomans and Nashville songwriters to bring more attention and support for the victims of the recent tornado. She has recorded a song, "Weather the Storm," with all the proceeds going to the Red Cross to be used for Oklahoma tornado victims.

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In Memoriam



Raymond Paul

Boosahda, (physics, '56), died Sept. 24, 2012.

Mr. Boosahda, a longtime physics, science and math teacher in the Dallas Independent School District, was 84.

He was born in Worcester, Mass., and graduated from Commerce High School in Worcester. He served in the U.S. Army during the occupation of Japan following World War II and later in the U.S. Air Force during the Korean War. He earned a bachelor's degree in physics from Oklahoma State University and a master's degree from East Texas State University.

Mr. Boosahda taught physics, science and math in Dallas junior high and high schools. He also taught in the Dallas County Community College District.

The Carrollton, Texas, resident volunteered at an animal shelter and shared his home for 17 years with his favorite cat, Snicks. He closely followed politics.

He was preceded in death by his wife, Billie Jean Blackburn. He is survived by a son, Bishop Paul Wayne Boosahda; three daughters, Patricia Miller, Dr. Rachel Griffin and Linda Rahm; four grandchildren; three great-grandchildren; two brothers; and many family members, nieces and nephews.

L. Herbert Bruneau,

zoology professor emeritus, died April 12, 2013.

Dr. Bruneau, a longtime zoology professor at Oklahoma State University, was 84.

He arrived in 1955 at then-Oklahoma A&M College. For the next 40 years, he advised zoology undergraduates and taught genetics and evolution, appreciating the wide range of the field of zoology.

"The continuing theme in zoology is diversity," Dr. Bruneau said.

The Stillwater, Okla., resident retired in 1995 and established the Herbert and Betty Bruneau Endowed Zoology Seminar Fund in 2013, which covers speakers' seminar expenses to address the diverse program.

Dr. Bruneau taught biological sciences, genetics and cytology, as well as the first departmental courses in evolution and human heredity. He received the Amoco and Regents Teaching Awards and was involved with the National Science Foundation Academic Year and Summer Institute Programs for High School Science Teachers. He was a member of the Council of Teacher Education, the Allied Arts Committee and the Pre-Medical Advisory Committee, to name a few.

The Cornwall, Ontario, Canada, native was educated in New Brunswick. He majored in general science at Montreal's McGill University before earning a master's degree and a doctorate from the University of Texas at Austin, where he studied cytology and genetics.

He is survived by his wife Betty Leifheit (they married in 1953); a daughter, Carol Bruneau; and a son, David Bruneau.

Henry J. Dishburger

(chemistry, '53) died Sept. 26, 2012.

Mr. Dishburger, an employee of Dow Chemical Co. for 35 years, was 85.

The longtime resident of Midland, Texas, earned a bachelor's degree from Stephen F. Austin State College in 1950 and was named its 1993 Distinguished Alumnus. He earned a master's degree in chemistry from Oklahoma State University in 1953. Mr. Dishburger served in the U.S. Navy aboard ships in the Pacific theater during World War II.

He worked in research and development for agrochemicals for Dow. At retirement, he was global quality assurance manager for the agricultural products department. His work at Dow resulted in several patents and numerous professional research papers in agricultural products

and pesticide residues. He organized the Dow Residue Laboratory in Lake Jackson, Texas. Prior to Dow, he worked for General Electric Co. at the Hanford Atomic Products Operation in Richland, Wash.

Mr. Dishburger was a 60-year member of the American Chemical Society, where he was a Fellow, chairman, vice chairman and treasurer of the agrochemical division. He is survived by his wife, E. Merle Cox (they married in 1951); two daughters, DeAnn Lee and Denise Clark; a son, Paul T. Dishburger; and other family members.



Rita Kathryn Copeland Matthews

(humanities, '55) died Dec. 26, 2012.

Mrs. Matthews, a wife, mother, grandmother and friend, was 78. She was born in Idabel, Okla., and graduated from high school in Aberdeen, Wash. While attending Oklahoma A&M College in 1953, she met Paul W. Matthews on a blind date. They married in 1955.

Mrs. Matthews was a past president of Oklahoma City Kappa Delta Alumnae and received its highest national honor, the Emerald Award for outstanding service. She led the Bear Pal program, which provided teddy bears to children affected by the Oklahoma City bombing and later benefited victims of abuse.

Mrs. Matthews was active at Fifth Church of Christ, Scientist in Oklahoma City for 37 years, serving as a reader, lecture chairwoman, Sunday school teacher and superintendent. For more than 30 years, she was a full-time practitioner who was listed in the worldwide directory published in *The Christian Science Journal*.

She is survived by her husband, Paul W. Matthews; two sons, Douglas Matthews and David Matthews; and nine grandchildren; and many family members.

Karen Lynne Smith

(physiology '87/psychology '90) died Nov. 2, 2012.

Ms. Smith, a senior academic counselor at Oklahoma State University, was 50.

As a child, Ms. Smith traveled throughout the world because of her father's military service. Some of the places she lived included Oklahoma, North Carolina, Kansas and Germany. In 1980, she graduated from high school in Junction City, Kan. She earned a bachelor's degree in physiology in 1987 and a master's degree in psychology in 1990, both from OSU.

After graduation, Ms. Smith worked as a sales manager and purchasing agent at Nomadics Inc. in Stillwater for 10 years. She joined OSU in 2010 as an academic counselor in the College of Arts and Sciences. She later was named senior academic counselor and advised students majoring in botany and zoology.

Ms. Smith was involved with the OSU Student Council, OSU Office of Institutional Diversity Selection Committee and United Way. In 2007, she was awarded the College of Arts and Sciences Outstanding Adviser Award. In 2012, to honor Ms. Smith's advising efforts, the OSU Department of Zoology created the Karen L. Smith Undergraduate Research Symposium.

Ms. Smith is survived by her mother, Esther Smith; seven siblings, Janice Newsom, Patricia Smith, Cynthia Farrell, Lisa Smith, Robert Martin-Smith, James Smith and Walter Smith; and many other family members. ❧

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