Securing our food animal supply
Diagnostic detectives

On the front line of protecting the nation's food animal agriculture industry are the staff in Iowa State's Veterinary Diagnostic Laboratory.

Photo: Paul Gates

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SECURING our food animal supply

Stopping viruses and diseases that threaten the animals we depend on for food requires a highly-coordinated, all-hands-on-deck effort – one that Iowa State is leading.

By Erin Peterson
The Big Picture

Turkey Farms Tend to Be Noisy

places, full of thousands of chattering, social birds. But at hundreds of farms in the spring of 2015, that high-energy vibe changed almost overnight. “People walked into the barns and it was silent,” explains Jim Roth, director of the Center for Food Security and Public Health at Iowa State University. “They knew something was wrong.”

As the numbers of sick birds mounted, government agencies, industry leaders and consumers turned to Iowa State for help. Diagnosticians in Iowa State’s Veterinary Diagnostic Laboratory worked around the clock with researchers in the College of Veterinary Medicine and across the university to diagnose samples from farms nationwide and pinpoint the cause of the illness.

Hongwei Xin, Iowa Egg Council Endowed Professor and director of the Egg Industry Center, and his team fielded the media’s questions about whether eggs and turkey meat were safe to eat (they were), and whether the virus could be transmitted to humans (it couldn’t). Egg Industry Center staff also worked closely with the industry to answer daily challenges of coping with an unprecedented crisis, and fielded research proposals from across the nation to focus on avian influenza studies. Likewise, ISU Extension and Outreach specialists played a vital role in disseminating up-to-date research-based information and resources to producers, veterinarians and consumers.

With the virus contained—from now—Iowa State researchers have been charged with creating a new action plan to use for future disease outbreaks among poultry.

Iowa State’s role in managing the avian influenza crisis made headlines, but it’s just one of the many food-animal challenges the university’s experts are tackling. Its researchers were the first to diagnose the recent outbreak of porcine epidemic diarrhea, a disease that killed 8 million pigs, and they played a critical role in identifying the far less contagious but, still troubling, Seneca Valley Virus in swine.

Thanks to a vast network of experts and research, cutting-edge technology, and powerful partnerships and programs, Iowa State helps the state’s $16 billion-a-year food-animal industry hum along. As significantly, the university is guiding key national strategies and training food-animal experts around the world.

As the university looks ahead, it seeks even more effective ways to prevent outbreaks, diagnose and contain diseases, and train tomorrow’s research and industry pioneers.

“We have a robust and fast-moving research program, we’re educating veterinarians who go on to be leaders all over the world, and we’re devoted to service,” says Lisa Nolan, the Dr. Stephen G. Jaagsiogard Dean of Veterinary Medicine. “We need to continue to invest in all of these things so we can reach our goal of being the best college of veterinary medicine in the world.”

From lab to industry to classroom

Iowa State’s food-animal research spans an array of scientific disciplines—biology, chemistry, engineering and public health—in ways that quickly become head-spinningly complex. But what grounds the work is scientists’ singular focus on turning big ideas and surprising discoveries into practical solutions that

We always have to be thinking about the next big, bad thing. We have to invest in these areas because an outbreak could devastate the economy.”

JIM ROTH
Director, Center for Food Security and Public Health, Iowa State University

(continued on p.6.)

Programs That Matter

How important is Iowa State to Iowa and the nation’s food-animal supply?

(continued on p. 6.)

What’s at Stake

In 2013, PEDv wiped out an estimated 10 percent of the U.S. swine population over two years.

In 2015, avian flu affected more than 200 premises in 15 states, with more than 48 million birds depopulated. Losses are estimated at nearly $1.6 billion, with an economy-wide loss of about $3.3 billion.

Just a 1% decrease in Iowa’s food-animal production due to disease means a $170 million annual loss.

Concentrated, Connected and Collaborative

Ames is home to one of the world’s largest concentrations of animal health professionals—Iowa State University, the USDA’s National Animal Disease Center, the National Veterinary Services Laboratories and the Center for Veterinary Biologics. Together these entities collaborate closely to conduct world-class animal health research, diagnosis and product evaluation.

IOWA STATE’S VETERINARY DIAGNOSTIC LABORATORY: A DIAGNOSTIC POWERHOUSE

78,000+

diagnostic case submissions processed in FY 2015

1,500,000
tests performed in FY 2015

FIRST

to diagnose cases of porcine epidemic diarrhea virus in the U.S. in 2013 and to develop a test to detect PEDV antibodies.

FIRST

to diagnose highly pathogenic avian influenza in Iowa in 2015, and conducted HPAI testing to allow re-population of poultry sites.

FIRST

in number of cases and revenue among Association of American Veterinary Medical Colleges member veterinary diagnostic laboratories.

Sources: USDA Economic Research Service, National Pork Producers Council, Center for Food Security and Public Health, ISU Veterinary Diagnostic Laboratory.
benefit the industry and students.

For example, Kyoung-Jin Yoon, a diagnostic virologist and professor of veterinary diagnostic and production animal medicine, is developing diagnostic tools that allow for broader virus detection. “Many tests are only used when you know exactly what targets you’re looking for, but my work looks at ways to identify ‘families’ of viruses,” Yoon says.

Such work can have an impact in an area where Iowa State is already an undisputed leader: its Veterinary Diagnostic Laboratory. The VDL’s 135 faculty and professional staff members currently process more than 75,000 cases from the industry each year – the largest caseload in the country. Among other things, diagnosticians help farmers and practicing veterinarians unravel the mystery behind an animal’s unidentifiable illness, or assure the health of an animal or herd.

That vast caseload also serves as a rich source of applied research questions and case studies for the next generation of veterinarians, diagnosticians and microbiologists, says Patrick Halbur, professor and chair of the department of veterinary diagnostic and production animal medicine, and VDL executive director. In fact, the caseload’s abundance may partly be why nearly two-thirds of Iowa State veterinary students choose a food-animal specialty – a rate about five times higher than that of peer schools.

The caseload may also help attract and retain some of the world’s best researchers. With interesting and complex cases arriving at Iowa State’s doorstep daily, researchers may see unexpected conditions that fascinate them or intuit patterns that they can pursue more rigorously in their research or intuit patterns that they can pursue more rigorously in their research.

We have a robust and fast-moving research program, we’re educating veterinarians who go on to be leaders all over the world, and we’re devoted to service. We need to continue to invest in all of these … [to be] the best college of veterinary medicine in the world.

Lisa Nolan
Dean of Veterinary Medicine, Iowa State University

“These cases can lead to the development of new diagnostic tools and vaccines, or they can help us discover emerging pathogens,” says Rodger Main, professor and VDL director of operations.

The diagnostic lab is even helping researchers find ways to sidestep disease entirely. Main says, “Diagnostics for preventive medicine is the fastest-growing area of the lab.”

Thinking bigger
Each of these components – the research, the diagnostic lab and its work with industry, teaching and outreach – work together in ways that elevate the other elements, providing new opportunities for Iowa State’s researchers to hone their expertise, for students to build their knowledge and confidence, and for Iowa State to continue to serve the state and the world with the best information and service on food-producing animals.

The federal government, for example, has relied on the university to develop national plans for food security. In 2008, the USDA’s Animal and Plant Health Inspection Service charged Iowa State with developing a Secure Egg Supply Plan for the nation. The plan, designed for use during a disease outbreak, provides critical guidance on monitoring flocks for diseased birds, tracking birds during transit, and using methodical cleaning and disinfection processes to prevent disease from spreading.

This plan was the blueprint for action when avian influenza hit farms last spring. The industry’s close adherence to its guidelines prevented the disease from spreading more widely, while ensuring that eggs and meat from chickens and turkeys sold to consumers was safe to eat. Updates (continued on p.8.)

SCIENCE THAT MATTERS

Boots on the ground
An unexpected discovery leads to powerful student learning.

Last year, Swine Medicine Education Center Director Locke Karriker’s students were on a client’s farm when they noticed something troubling. Some of the pigs had lesions, and they were lame. Karriker, the Dr. Dougies and Ann Gustafson Chair for Teaching Excellence, knew that symptoms might be nothing serious, but they were also consistent with foot-and-mouth disease, a condition so contagious that its discovery could put the world on alert.

Karriker’s students carefully collected samples to learn more, and documented the symptoms with video and photos. They ultimately learned, to their relief, that the symptoms were related to the less contagious Seneca Valley Virus.

For Karriker’s students, it was a profound learning experience that could never be duplicated by a textbook. “Students learn that the picture is never complete when they’re first exposed to a situation,” he says. “You get bits and pieces of information over time, and from there you have to figure out the big picture. That investigative process of considering many answers, assimilating data and re-evaluating their assumptions has enormous value.”

Swine education excellence
Veterinary medicine students from other institutions, such as Marissa Gary, left, and Anna Forsith, come to Iowa State’s Swine Medicine Education Center to avail themselves of the faculty expertise in swine production medicine.

Photo: Contributed
to the plan since last spring’s outbreak are designed to contain the spread of future variations of the disease – which typically arrive in the spring and fall – even more tightly. Iowa State also has been charged with developing the secure supply plans for turkey, beef, milk and pork.

In addition to rolling out national food security plans, Iowa State is developing programs for improving international veterinary education for the World Organization for Animal Health, an organization with 180 member countries around the world. “We always have to be thinking about the next big, bad thing,” Roth says. “We have to invest in these areas because an outbreak could devastate the economy.”

Iowa State’s global reach is not the only way that the university’s researchers are thinking bigger. Some of the college’s most important food-animal research has implications for human health as well.

For example, researchers, including Yoon, are doing work to understand the vexing mechanism by which viruses subtly alter themselves in ways that allow them to attack their animal hosts in new ways, year after year. While these viruses are frustrating for those working to keep food animals healthy, they’re also a huge problem in human medicine.

Other researchers within veterinary medicine are studying animal models for variations of human diseases and conditions, including stroke, Alzheimer’s and Parkinson’s. This work often serves as a springboard into solutions for human health.

The road ahead
There is no question that Iowa State’s leadership in food-animal research, teaching and outreach is growing. But as the world’s population rises and as globalization brings the potential of transporting new animal diseases from one location to another in a single airplane flight, the challenges are growing just as fast.

And while the university has stepped up to make sure the state, the country and the world are ready to face these issues, resources are admittedly stretched thin. Since the Veterinary Diagnostic Lab was built in the 1970s, the number of staff members in animal agriculture has quintupled. The buildings now used for animal agriculture work, including renovated barns from the 1920s and a 40-year-old building ill-designed for today’s biosecurity challenges, are bursting at the seams.

That’s why more spacious and technologically-sophisticated facilities are at the top of the university’s list as it plans for the future. Scholarships that can lighten tuition costs and attract top veterinary students are vitally important, such as the Iowa Pork Producers Association Fellowships in Veterinary Diagnostic and Production Animal Medicine, established to recruit individuals to Iowa State to pursue graduate studies and work on research problems of importance to the swine industry.

Also essential are endowed professorships that lure exceptional faculty – the very people who will keep us safe by fighting diseases in both humans and animals, with immense implications globally.

Together, such investments at Iowa State will provide the university the ability not only to meet the emerging disease challenges in animal agriculture, but to defeat them.

What you can do
Philanthropy can be part of the line of defense helping Iowa State serve the food-animal industry and protect the health of humans and animals alike through:

-Scholarships and fellowships to train tomorrow’s food-animal veterinarians, diagnosticians and microbiologists.

- Support for faculty and researchers to develop new diagnostic tools and vaccines, and discover emerging pathogens.

- Funding programs to enable Iowa State to provide the best information and service on food-producing animals to those in the field and in industry.

- Strengthening physical infrastructure and access to cutting-edge technology, so Iowa State continues leading the world in animal health.

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PHOTOGRAPHY: Christopher Gannon

**GIFTS at WORK**
EXTENDING IOWA STATE’S IMPACT THROUGH PHILANTHROPISTIC GIVING

**The arc of ‘TwoXTwo’**
Using 2x2 lumber and deck screws, 77 second-year architecture students redefined the Lyle E. Lightfoot Forum in the College of Design as a public space, with support from the Stan G. Thurston Professorship in Design Build.
Building Bridges through Language

A new professorship is contributing to the growing impact of Iowa State’s Applied Linguistics and Technology Program on campus and beyond.

By Steve Sullivan | Photo: Paul Gates

When Amal Hazura came from Malaysia to study at Iowa State University, she was tested to assess her English skills.

Although the geology major had studied for years to develop her English, Hazura’s test results showed her skills needed more work. Fortunately, she could gain the proficiencies she needed in the English as a second language courses offered through Iowa State’s applied linguistics and technology program.

“Becoming truly proficient in another language is hard,” says Carol Chapelle, Distinguished Professor of English and the program’s coordinator. “We help international students like Amal succeed in school by studying the language they need to learn, and developing effective tests to assess their progress.”

Chapelle is a leading authority in second language acquisition and assessment, and in computer-assisted language learning and testing research. This technology emphasis sets Iowa State’s program apart, both in serving ESL learners on campus and in educating students who wish to teach or do research in applied linguistics.

“Connectivity brings a huge range of cultural and linguistic resources to the classroom,” she says. “It’s monumental. What do teachers and researchers do with these resources? How can students interact with them? How do we build online courses for language learning? We’re doing work both in theory and research to answer these questions.”

Chapelle’s work was recognized last year when she was named the inaugural Angela B. Pavitt Professor in English, established through a bequest by the late Dale Grosvenor to honor a faculty member who focuses on ESL. The professorship supports Chapelle’s research and writing, including an upcoming book that analyzes how culture is expressed in language and images in foreign language textbooks.

Indeed, in an increasingly global society, research in applied linguistics is becoming more important than ever, here at Iowa State and beyond. As the number of international students has risen at the university, so has ESL enrollment, doubling over the past decade. And with English becoming the common language globally of a growing number of professions and in academia, developing effective tools for English language learners and training English language teachers will be central to our shared future.

For example, air traffic controllers for whom English is not their first language are expected to have English proficiency in the context of aviation. “One of our doctoral students used the online virtual world Second Life to create a prototype English test for Korean air traffic controllers. It was designed to help assess if they could use the type of English they needed to successfully do their jobs,” Chapelle says.

As for Hazura, now a junior, she relishes the opportunity to give her English a good workout beyond her classes, such as when she interacted with national park personnel and others during a recent adventure to the western United States.

“At Iowa State, I know students from all over the world and I am able to speak English with them,” she says. “The same thing happened during this trip. I’m not only communicating with Americans, but with people from other countries.”

Language for Life

Angela B. Pavitt Professor in English Carol Chapelle is passionate about connecting people to language – and to each other.

Devoted Iowa Stater, a mysterious inspiration

As an Iowa State faculty member in statistics and computer science, the late Dale Grosvenor traveled the globe, which may have contributed to an appreciation for the English language. Grosvenor, who earned several degrees from Iowa State, established the Angela B. Pavitt Professorship in English through his estate to support English as a second language research and teaching. But who was Angela B. Pavitt? Grosvenor’s friends and family haven’t a clue. An exhaustive search through Grosvenor’s background in his native Nebraska and beyond failed to shed any light on her identity.

By Steve Sullivan | Photo: Paul Gates
FROM THE SOLES OF YOUR SHOES to the sticky notes on your refrigerator, petroleum-based polymers are nearly everywhere. “And their use is growing,” says Chris Williams, the Gerald and Audrey Olson Professor in Civil Engineering at Iowa State University, and manager of the Institute for Transportation’s Asphalt Materials and Pavements Program at the ISU Research Park.

Yet if Williams and his colleague Eric Cochran succeed, plant-based polymers could be just as ubiquitous. They lead a $5.3 million Bio-Polymer Processing Facility at Iowa State. A joint project with Argo Genesis Chemical LLC, a sister company to Seneca Petroleum Co., Inc. of Illinois, the pilot plant’s first product, expected this spring, will be a soybean oil-based asphalt additive. It could replace petroleum-based products manufacturers use to make asphalt surfaces tougher and resistant to thermal expansion and shrinkage, Williams says.

The Iowa State-produced biopolymer should be a practical alternative, says Cochran, an associate professor of chemical and biological engineering. “Data shows you can get your asphalt up to the specifications the Department of Transportation requires while using a half to two thirds of the biopolymer, compared to what would be needed with comparable petroleum-based polymers.”

That saves money for manufacturers—and for transportation departments. Moreover, the Iowa State process could lead to environmentally friendly biopolymers for uses far beyond asphalt, from packaging to coatings to adhesives—including those used for sticky notes. “We want to build some test pavements to demonstrate the biopolymer’s viability, but we also want to test these other markets,” Williams says. The plant will help them study their biopolymers’ viability. “The goal is to produce sufficient quantities of these different kinds of polymers, depending on what market you want to look at, and evaluate them on a larger scale than what we can in a lab.”

The Iowa State-Argo Genesis venture is the largest biopolymer pilot plant at a university based on radical polymerization, the process the Iowa State researchers use, and is working toward commercialization, Williams says. The public-private partnership has helped accelerate that move by providing business expertise the researchers lack.

While the biopolymer grew from an idea developed by Nacú Hernández-Cantu, one of Cochran’s graduate students who has stayed with the project since graduation to help operate the pilot plant, he credits Cochran and Williams for helping take his idea from concept to pilot project. “Eric has been an excellent mentor and an example of hard work and perseverance,” Hernandez-Cantu says. “Chris is people savvy, with a very good understanding of what industry needs, traits that I have tried to incorporate into my work.”

Meanwhile, Williams says his endowed professorship has given him the flexibility to pursue his research. “That means being able to use some of these resources to study something a bit more in depth,” he says. “That’s where the professorship funds have been really helpful,” and are putting the next biopolymer breakthrough that much closer in reach.
A legacy of her own
One of the first Legacy of Heroines Scholarship recipients turned to Iowa State to establish her own tradition of giving. Sharon Haselhoff, a 1998 alumna, sought to honor her family, encourage students and pay tribute to the Iowa State people and programs that gave her career its start by establishing two new Legacy of Heroines Scholarships – the Haselhoff Family Scholarship and the Meylor Family Scholarship.

How did being among the first Legacy of Heroines scholarship recipients impact your experience at Iowa State?
I immensely enjoyed the program. Working with Diane Bystrom, director of the Carrie Chapman Catt Center for Women and Politics, and the other students in the program was a significant experience for me. I was working my way through college and paying tuition on my own, so receiving the scholarship was a life-changing event.

What inspired you to establish both of these scholarships?
Family is a big part of my life, so I wanted to name the scholarships for both my father’s and mother’s sides of my family. I didn’t want to pick one grandparent or one influential woman – both men and women have been impactful in my life, including my parents. They were surprised!

What advice or encouragement would you give to others who want to get involved with philanthropy?
Just do it! I don’t think you’ll ever regret making a donation that will impact somebody’s life or future. Students at Iowa State who are recipients of scholarships, including myself, are fortunate. But hopefully we take the opportunities these scholarships provide and accomplish the most that we can with them. It’s important to continue to pay it forward.

Teaching the future
With about 8,200 graduates working as educators throughout the state, Iowa State University is a leader in preparing thousands of teachers, principals, superintendents, professors and other educators working in all 99 Iowa counties.
CIRCLING BACK TO QUALITY CARE
Corner-less patient rooms and a soothing curved building circulation were the innovative features of a winning hospital design project by a team of five Iowa State design students.

The team won the student category of the 2015 Healthcare Environment Awards with their design for an oval-shaped tower for patients at the University of Iowa Hospitals and Clinics.

NOTABLE QUOTES

“Had I not been selected as an Emerging Leader for the Global Food Challenge, I may not have discovered my passion for feeding the world. To this day, I am thankful to donors who help students like me find their purpose while in college.”
— Olivia Reicks, senior in supply chain management and multiple scholarship recipient, including the CRST International Scholarship in Transportation and Logistics, Thompson Transportation and Logistics Scholarship, and Ric and Carol Jurgens Business Scholarship.

“It all comes back to people. We will make our mark and make our difference by supporting people through the Greenwood Department Chair who do the great things that universities do.”
— Terry Wipf, the inaugural Greenwood Department Chair in Civil, Construction and Environmental Engineering.

“I’ve been familiar with William Frankenberger’s academic work since I was a student. His work transcends disciplines and impacts scientists far beyond soil science. It’s my goal that the Frankenberger Professorship impacts Iowa State faculty, students and citizens far beyond my program.”
— Michael Castellano, the inaugural William T. Frankenberger Professor in Soil Science.

“I’m proud to work for an institution that firmly believes in and upholds its land-grant ideals. I’m fortunate to find myself in a tremendous department, where we’re focused on making life better for people, regardless of things like race, class, ethnicity or borders.”
— Tom Bumm, the inaugural Mary and Charles Sukup Global Professor in Food Security.

ACCOLADES

On Friday, April 15, Iowa State University bestows its highest awards on the university’s most dedicated alumni and friends:

Order of the Knoll Corporation and Foundation Award
Union Pacific Corporation

Order of the Knoll Faculty and Staff Award
David G. Topel and Jay-Lin Jane-Topel

Order of the Knoll Cardinal and Gold Award
Craig K. Denny and the late Terry M. Denny

Order of the Knoll Campanile Award
Donald E. and Sharon A. Greenwood

Honorary Alumni Award
Ruth M. Harpole and Janice Marie Harpole Jessen

Distinguished Alumni Award
Delbert L. Harris, Charles Lettow and Dr. Long Nguyen

Find more at www.isualum.org/dac.

Speaking to the body politic
Syndicated Washington Post columnist E.J. Dionne, Jr. will cover the timely topic of “Our Divided Political Heart: Campaign 2016” as the spring 2016 Manatt-Phelps Lecture series speaker on April 13 in the Memorial Union’s Durham Great Hall. The lecture series, established in 2002 by Kathleen and the late Ambassador Charles T. Manatt with Thomas and Elizabeth Phelps, brings to campus a prominent practitioner or thought leader to address the community on issues of major significance to the United States and Iowa.

O, WE WILL FUND, FUND, FUND FOR IOWA STATE!
FundISU, created by the Iowa State University Foundation, brings together the gifts of many to help crowdfund student, faculty and staff ventures. The first campaign raised $9,480 for College of Design students in Studio Andino to conduct design-build projects in marginal neighborhoods in Lima, Peru. Fueled by a two-for-one match by other donors, the next campaign, to build a training center in the Kamuli District of Uganda for College of Agriculture and Life Sciences students, staff and faculty to better serve the rural families of Kamuli, raised $52,275. Such success is due in large part to the students involved sharing their passion with friends, neighbors and relatives, who in turn passed it on. Check out the current FundISU venture at fundisu.com.
‘CAROL’S CHAIR’ FILLS AN EMPTY PLACE
Carol Vohs Johnson’s life and legacy endures in the endowed chair that bears her name.

By Veronica Lorson Fowler | Photo: Faye Dykema

WHEN CAROL VOHS JOHNSON ENTERED HOSPICE AT JUST AGE 56, finding the philanthropic gift that would best commemorate her life and career took on a new urgency.

Carol left the specifics to her husband, Jack R. Johnson, but there was no doubt in either of their minds that the gift would benefit Iowa State, a place that held special meaning for the Johnsons. After all, they had met in an undergraduate mathematics class at Iowa State, from which Carol graduated with a chemical engineering degree in 1980, and Jack a year later in computer engineering.

The couple began giving to the university shortly after graduation and eventually endowed an assistant professorship, supported a faculty fellowship, and funded spaces in Howe and Coover halls. More significantly, they stayed active in the College of Engineering, considering many faculty and staff their extended family.

That’s why, after Carol’s death in 2014, Jack chose to honor his late wife’s life and professional achievements as a chemical engineer through endowing the Carol Vohs Johnson Chair in Chemical and Biological Engineering.

“We feel it’s the people who are the connection to the department’s people that the chair is informally referred to as ‘Carol’s Chair.’

“She was very warm and friendly, and immediately put you at ease,” says Surya Mallapragada, a professor of chemical and biological engineering who knew Carol and talked with her over the years, including when Mallapragada was department chair and Carol served on the department’s advisory council.

In fact, in October Mallapragada became the inaugural holder of the Carol Vohs Johnson Chair, which will help advance her research to develop new cancer and infectious disease immunotherapies.

The honor is made all the more meaningful because “Carol was in chemical engineering when there were very few women in the field,” Mallapragada says, noting that 40 to 45 percent of chemical engineering students today are women. “That’s a huge change that would not have been possible without pioneers like her.”

WAYS TO GIVE
The Iowa State University Foundation can help you give a gift that moves lives forward.

The Hansens

We truly believe that the education we received and the experiences we had at Iowa State have been critical to our success, both professionally and personally. We want to help the next generation of students have the same opportunity we had by reducing the financial burden of a college education. Providing students with support so they’re able to engage in social and leadership experiences outside of the classroom is the best investment that we can make with our philanthropic giving.

— CRAIG AND JUDY (RALSTON) HANSEN, who graduated in 1980 in industrial administration and accounting and in sociology, respectively, support students in the College of Business and the College of Liberal Arts and Sciences through current and deferred giving.

The Iowa State University Foundation does not discriminate on the basis of race, color, age, religion, national origin, actual or perceived sexual orientation, gender identity, sex, marital status, disability, or status as a U.S. veteran. Any persons having inquiries concerning this may contact human resources, Iowa State Foundation, 515.294.4607.
What you make possible

**Fighting fire with fiber**

**Guowen Song** leads a team of Iowa State researchers in apparel, merchandising and design who are emerging on the national scene with their work of integrating science and technology with design, such as new textiles for clothing worn by firefighters that result in better protection, less heat stress and reduced burn injuries – work made possible in part by support from the Noma Scott Lloyd Chair in Textiles and Clothing.