



College of Agriculture • Fall 2014

AgReport

KANSAS STATE
UNIVERSITY

*K-State Launches Global Food
Systems Initiative*

From the Dean and Director



Pat Melgares

John Floros, dean of the College of Agriculture and director of K-State Research and Extension, gives a presentation on the challenges of feeding a growing population.

As I begin my third year at K-State, I'm pleased to report record enrollment for the college in 2013, and our new student projections for fall semester follow that trend. The college has a reputation for excellent advising, with a 25 students per advisor ratio. Hands-on training, flexible curricula, and highly ranked programs also contribute to our enrollment numbers and student retention.

Even with continued growth — more than 50 percent in the last nine years — we still have nearly 100 percent job/graduate school placement rates. We also are making great strides in recruiting and retaining a more diverse student body. Multicultural student enrollment has increased by 180 percent since 2009.

Earlier this year, students who applied to be Ag Ambassadors were asked to describe the college with one word. "Home" was the top choice, which confirms the dedication of our faculty and staff.

In addition to excellence in the classroom, faculty and staff conduct research on topics important to Kansas. Undergraduate and graduate students work side by side with their instructors in laboratories, greenhouses, animal research facilities, and fields to reinforce what they learn in the classroom.

This magazine highlights some of the awards earned by our students, faculty, and staff. Extension, research, and teaching faculty and staff compete

successfully for grants by focusing on our strengths, such as crop breeding, food safety, range management, pest and crop disease management, and postharvest loss reduction.

We qualify for these grants because our faculty submit well-written comprehensive applications. They build upon established collaborations around the world, incorporate education and extension components early in the grant process, and have strong leadership qualities to implement the project.

The college, K-State Research and Extension, and individual departments carefully crafted strategic plans to complement the university's goal to be a top 50 public research institution and the college's goal to be a top five College of Agriculture. The strategic plans drive our efforts to meet the grand challenges facing Kansas.

K-State and the college set new fundraising records — \$211 million for the university and \$14.5 million for the college. Thank you to our alumni, friends, parents, faculty, students, and corporate partners for their support. A significant portion, \$89 million of the total, supports student scholarships and international experiences as well as endowed professorships to attract and retain the best faculty.

John D. Floros

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Dean and Director

AgReport

Fall 2014

College of Agriculture
and
Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

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On the cover

Carly Hoffman, junior in bakery science and management, mills grain in the Principles of Milling laboratory in Shellenberger Hall.

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News Briefs

Livestock Production Grant

K-State is part of an international team awarded a \$250,000 grant with academic institutions in the United Kingdom, China, and India. The grant was created by the Global Innovation Initiative, a new program funded by the U.S. and U.K. governments to foster research collaboration with Brazil, China, India, and Indonesia.

Through this project, K-State will exchange research and training on “Global Farm Platforms for Sustainable Ruminant Livestock Production” along with the University of Wisconsin-Madison, University of Bristol (U.K.), Zhejiang University (China), and Kerala Veterinary and Animal Science University (India).

Chuck Rice, university distinguished professor of agronomy, will serve as the K-State contact to host scientists for collaboration and training.

Defining Gluten-Free

Fadi Aramouni, professor of food science and supervisor of the university’s Kansas Value-Added Foods Laboratory, believes most companies will comply with a new voluntary federal labeling regulation that defines the term “gluten-free.”

The new rule put in place by the U.S. Food and Drug Administration defines gluten-free as a food item that contains less than 20 parts per million of gluten, which is a protein that occurs naturally in wheat, rye, barley, and crossbred hybrids of these grains. According to the FDA, this new regulation provides a uniform standard definition to help the 3 million Americans who have celiac disease, an autoimmune digestive condition that can be effectively managed only by eating gluten-free foods.

Aramouni’s laboratory has been busy helping small businesses in Kansas prepare for the new regulation by testing their products for gluten, writing specifications for food products, creating labels, and even helping companies develop gluten-free products.



Courtesy of K-State Olathe

Major Grant for K-State Olathe

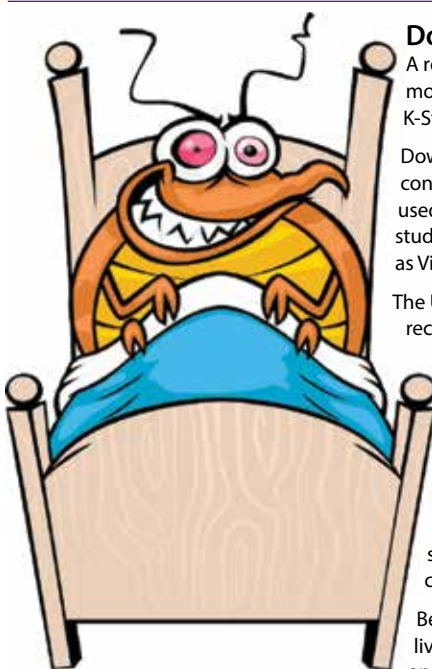
Kansas State University and the University of Florida have teamed up to look for ways to improve the quality and extend the shelf life of fruits and vegetables using tomatoes and spinach as their models.

The four-year project is funded by a \$1 million Agriculture and Food Research Initiative grant from USDA’s National Institute of Food and Agriculture.

“The goal is to increase the availability of locally grown food by reducing the loss of fresh fruits and vegetables after they’ve been harvested,” said Eleni Pliakoni, horticulturist and lead researcher on the project.

The team also plans to develop digital tools, including a phone app that will help growers assess produce losses on their farms, and to disseminate the results of the study.

Pliakoni, who joined K-State Olathe in 2013, and Cary Rivard, assistant professor at the Olathe Horticulture Research Center, are working with the Florida researchers to develop strategies growers can use to reduce crop losses before and after harvest.



Don't let the bedbugs bite ...

A recent change to bedbug fumigation will make it more cost-effective to get rid of the pests, thanks to K-State entomologist Tom Phillips.

Dow AgroSciences asked Phillips to test a gas used to control drywood termites and determine if it could be used at a lower dosage to kill bedbugs. He conducted a study to find the lowest level of sulfuryl fluoride, known as Vikane, needed to kill bedbugs at all life stages.

The U.S. Environmental Protection Agency had recommended using three times the termite rate for bedbugs. Phillips found that Vikane used at 1.9-fold the termite rate eliminated bedbug adults, late-instar nymphs, and eggs. The EPA recently approved the label change, reducing the amount of chemical used to treat bedbugs by one-third.

“This is a good thing because we can be more efficient by using less gas. And from a consumer’s standpoint, it will cost less money because less chemical is being used,” Phillips said.

Bedbugs are most prevalent where groups of people live, especially in transient housing such as hotels, apartment buildings, and nursing homes.

100 Years of Wheat Breeding

Kansas State University released its first wheat variety, Kanred, 100 years ago. Now, a century later, K-State, in conjunction with the Kansas Wheat Alliance, unveiled its latest variety, KanMark.

KanMark

A Century of Wheat Research

The name pays tribute to Kanred and Mark Carleton, the researcher responsible for bringing varieties from Russia to breed Kanred.

K-State wheat breeder Allan Fritz calls KanMark a “workhorse,” producing remarkably consistent yields with less than favorable water inputs. It is targeted primarily toward growers in western Kansas.

Its pedigree includes lines from Parula, Pastor, and Karl 92. KanMark is a very short-statured, upright variety, and the producer may not see much of a canopy, Fritz said, but he warns not to judge it until it comes across the scale.

“I’ve always thought this was an ugly duckling wheat,” said Fritz. “But we’re not here to release bouquet wheat, we’re here to release varieties that will make money for producers, and I think it will do that.”

International Study Opportunities

Each year, about 100 students participate in department-sponsored group study tours to learn about agriculture in countries around the globe. Trips in 2014 included:

- Western Europe, May 15–29, Chad Miller and Cathie Lavis, Horticulture, Forestry and Recreation Resources;
- China, May 20–30, Andrew Barkley, Agricultural Economics;
- United Kingdom, May 20–31, Sean Fox, Agricultural Economics;
- Tuscany region of Italy, March 12–23, Melvin Hunt, Animal Sciences and Industry; and
- Alberta, Canada, May 30–June 5, Scott Schaa, Animal Sciences and Industry.

For more information, go to www.ag.k-state.edu/international-programs.



Back row from left: Mike Smith, Keith Harris, Aleksan Shanoyan, Associate Dean Don Boggs, Assistant Dean for Diversity Zelia Wiley, and Bradford Wiles. Middle row: Kane Barr, Aramis Harris, Sara Menard, Aisha Ellis, Derris Burnett, and John Gonzales. Front row: Rosalynn Morgan, Kiawna Williams, and Crystal Serrano.

The ninth annual K-State Research and Extension Multicultural Summer Research Fellowship brought six students to Manhattan to work with faculty mentors. The students, their university, project title, mentor, and mentor’s department: **Kane Barr**, Florida A&M University, “The Detection of Triticum Mosaic Virus Vector by the Wheat Curl Mite in Wheat Breeding Lines,” Michael Smith, Entomology; **Aramis Harris**, Southern University and A&M College, “Fruit and Vegetable Consumption in Developing and Developed Countries, Multi-Stakeholder Alliances in Food – Agribusiness,” Aleksan Shanoyan and Keith Harris, Agricultural Economics; **Rosalynn Morgan**, South Carolina State University, “The Effect of Radio Frequency Dielectric Heating on Whey Proteins,” Karen Schmidt and Sara Menard, Animal Sciences and Industry; **Aisha Ellis**, Tuskegee University, “Serological Analysis of Orbivirus Exposure in Geographically Diverse Cattle Herds in Nebraska,” Scott McVey and Tom Shanower, USDA Center for Grain and Animal Health Research; **Kiawna Williams**, Fort Valley State University, “Elements of High-Quality Early Childhood Education: Implications for Research and Practice,” Bradford Wiles, School of Family Studies and Human Services; **Crystal Serrano**, Tuskegee University, “The Molecular Mechanisms in a Commercial Plasma Product on Fetal Growth and Postnatal Development,” John Gonzales and Derris Burnett, Animal Sciences and Industry.

MAB Offers Brazil, Argentina Tours



K-State’s Master of Agribusiness (MAB) program is offering travel to Brazil and Argentina to learn about the food and agriculture industry in South America.


The trip includes visits to agricultural and food-related industries and guided sightseeing tours with free time to explore Buenos Aires, the waterfalls at Puerto Iguazu, and Sao Paulo. The tour (February 20–March 7, 2015) is open to anyone with an interest in international agribusiness.

The program previously offered trips to South America, as well as Russia, Southeast Asia, Australia and New Zealand, and Europe.

Travelers get a firsthand perspective of international agriculture, while building relationships with members of the group.

MAB — an award-winning, distance-education degree program — focuses on food, animal health, and agribusiness management.

Visit www.mab.ksu.edu/Alumni/SAmerica15.html or contact Mary Bowen at 785-532-4435, mjbowen@ksu.edu for information.

A photograph of a man with short blonde hair and a beard, wearing a white t-shirt, standing in a field of grain sorghum. He is holding a head of sorghum in his hands and looking at it. The sorghum plants have large green leaves and dark brown seed heads. The background shows a blue sky with some clouds.

Jason Spengel (BS'14 wildlife and outdoor enterprise management) inspects a head of grain sorghum.

Feeding a Need

University Launches Global Food Systems Initiative

When Kansas State University President Kirk Schulz announced to the Kansas Board of Regents in January 2014 that the university was ready to take on the challenge of helping the world's farmers feed 9 billion people in the next 30 years, it wasn't something he decided to do on the spur of the moment.

Indeed, the university has been working for more than two years to fortify its position as a leader in the global food system. And most would agree that the university's land-grant heritage — and its passion for safely feeding the world — has strategically positioned K-State for more than 150 years.

"Kansas State University is already a global leader among research universities in addressing the world challenge of feeding a growing

population," Schulz said. "With the imminent construction of the \$1.2 billion National Bio and Agro-Defense Facility (NBAF) on the Manhattan campus, the window is open to claim the leadership position in global food systems."

*... when we address
items for Kansas, the
solution also can be
applied globally ...*

The university's Global Food Systems Initiative is gaining momentum, invigorated by \$5 million from the Kansas Department of Commerce.

Continuing to Serve Kansans

John Floros, dean of the College of Agriculture and director of K-State Research and Extension, says the university has leading programs and research capabilities related to the world's food systems. In that sense, not much changes with Schulz's initiative.

"It is our job to address food system issues for Kansas producers," Floros said. "But when we address items for Kansas, the solution also can be applied globally," such as drought-tolerant wheat varieties and grain sorghum hybrids for western Kansas and other dry areas of the world.

"Ultimately, this will help Kansans today and tomorrow. This is what we have done since we began as a land-grant university, and this is what we will continue to do."

Floros said the new element includes the university's focus on a broad, global food network that must improve if it is to feed an estimated 2 billion more people by 2050.

University faculty and researchers will not only be involved in production agriculture, but also in projects that study how food is transported, stored, consumed, and protected. It will involve every department at the university, including those that study family issues, nutrition, health, business, biology, the environment, and more.

"This effort should lead toward Kansas State University becoming the place you go if you want to improve your food system capabilities, or to learn more about the global food system," Floros said. "We want to improve the expectation of industry and students in this regard."

Research Gets a Boost

University faculty are eligible to apply for grants of up to \$200,000 for research related to the Global Food Systems initiative.

That money — offered through challenge grants — will boost an already successful research program that university officials say will make K-State even more competitive for federal dollars.

"You compete more effectively for those tough dollars when you become one of the only places where a certain type of research can be done," said Ernie Minton, associate director for research and technology transfer with K-State Research and Extension.

The university's research muscle is highlighted by the upcoming construction of NBAF, which — combined with the adjacent Biosecurity Research Institute — gives K-State one of the world's greatest concentrations of facilities for research in animal health, crop protection, and food safety.

Recent multimillion dollar awards to K-State also speak to its leadership in the global food system. Some of those include research on childhood obesity, *E. coli* in beef, sorghum and millet as dryland crops, global food waste, and wheat genetics.

Manhattan also is home to the U.S. Department of Agriculture's Center for Grain and Animal Health Research, AIB International (formerly American Institute of Baking), and the Kansas Department of Agriculture.

The capabilities of numerous campus facilities make Manhattan attractive to food companies. As the north campus research corridor grows, officials say the university will offer laboratory space to attract research that helps companies develop and improve consumer food products.

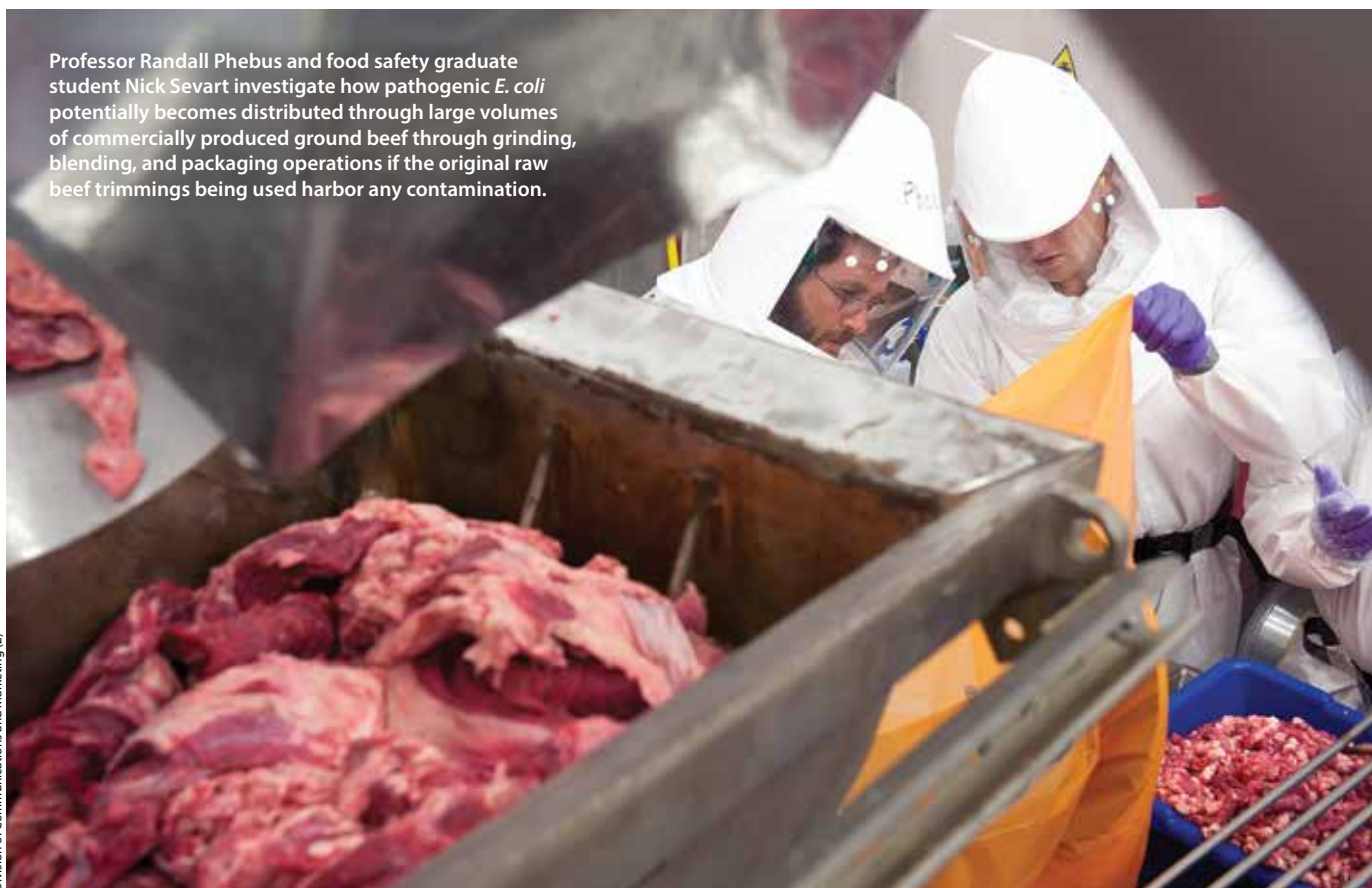
Or, as Floros says: "Together we will innovate the next breakthrough."

"These goals aren't just to benefit the university," he added. "I want people to know that this is to help the public. We want to address industry problems of the global food system and make things better. This will provide an even bigger impact beyond our current goals."

"If we do this successfully, we can use the resources we already have on campus to meet our goals of educating others and helping industries improve their capabilities."

by Pat Melgares and Greg Tammen

Professor Randall Phebus and food safety graduate student Nick Severt investigate how pathogenic *E. coli* potentially becomes distributed through large volumes of commercially produced ground beef through grinding, blending, and packaging operations if the original raw beef trimmings being used harbor any contamination.





The Next 100 Years

After celebrating its centennial,
the Cooperative Extension Service looks to the future.

Changing needs for K-State Research and Extension's traditional clients require an agile, dedicated workforce.

David Key, director for the Meadowlark Extension District that combined resources in Nemaha, Jackson, and Jefferson counties in 2011, said he sees a shift in how help is requested from local extension offices.

"In the past, we were more in a service mode," Key said. "Today, people are attached to their smartphones and need an answer now and don't want to wait for a report."

Key said specialized district staff are more agile in meeting needs.

"We need to be able to provide a high level of engagement in a short period of time, and ramp up our staff on the local level to provide relevant, quality information," he said. "It's all about working with people."

A Look to the Future

Daryl Buchholz, associate director of extension and applied research, said extension continues to provide three dimensions: a trusted source of information; an educational look at issues and solutions; and a convener of engaged, local conversations about big issues.

The main difference for the future will be in how extension provides information and engages in conversations with people, Buchholz said.

"The relevance and value stem from what we provide in keeping people's perspectives out in front.

"Evolving media sources — such as a Web presence, social media, and mobile abilities — will provide avenues for those programs and conversations about science, research, and technology to continue to advance our communities.

Technology will continue to evolve at a rapid pace, creating new and better ways to provide extension education and innovative opportunities for learning.

"Engaging with the public on emerging issues and our five grand challenges through the research and education coming from our land-grant university will help provide economic competitiveness to our state," Buchholz said.

Forming Extension Districts

At the local level, extension's transformation will take place in multicounty districts, with specialization and teamwork delivering university research-based information to Kansans, Buchholz said. As of July 1, 2014, Kansas has 16 districts across 45 counties.

Extension boards across Kansas are looking at ways to develop their workforce to deliver priority programs

Franklin and Osage counties formed the Frontier District in 2011. Gary Thompson, Quenemo, serves on the Frontier District Extension Council and the State Extension Advisory Council. He also helped Anderson County join the district in 2014.

“A district office should be a place that people can call or stop by to visit with someone that either knows the answer to their question or can connect them with someone else quickly that can provide quality information,” Thompson said.

Another benefit for adding Anderson County is financial stability.

Mark Nelson is a member of the
Marais des Cygnes Extension District

“Agents can give attention to the areas they are strong in and hopefully, most interested in,” he said. “This will give the district better opportunities in filling local needs.”

“My vision for extension is to grow in the educational services offered to the people of Kansas,”

"People need a source and they can trust. Its research-based and provided without selling a product, should be needed in the future."

Cheyenne	Rawlins	Deatur	Norton	Phillips	Smith	Jewell	Republic	Washington	Marshall	Nemaha	Brown	Duniphan
Sherman	Thomas	Sheridan	Graham	Rooks	Osborne	Mitchell	Cloud	Clay	Pottawatomie	Jackson	Atchison	
Sunflower	Logan	Gove	Trego	Ellis	Russell	Lincoln	Ottawa	Central Kansas	Riley	Meadowlark	Leavenworth	Wyandott
Wallace	Golden Prairie				Midway		Sabine	Dickinson	Geary	Wabaunsee	Shawnee	Johnson
									Morris		Oage	
Greeley	Wichita	Scott	Lane	Ness	Rush	Barton	Ellsworth	McPherson	Marion	Flint Hills	Frontier	Miami
											Franklin	Marais des Cygnes
Hamilton	Kearny	Finney		Hodgeman	Pawnee	Stafford	Rice			Chase	Coffey	Anderson
Stanton	Grant	Haskell			Edwards		Reno	Harvey			Woodson	Albee
			Gray	Ford	Knows	Pratt	Kingman	Sedgwick	Butler	Greenwood	Wilson	Neosho
Morton	Stevens	Seward	Meade	Clark	Comanche	Barber	Harper	Sumner	Cowley	Rolling Prairie	Montgomery	Labette
										Chautauque	Wildcat	Cherokee

“We are excited for the district to get going,” Nelson said. “It’s been quite a long process for both counties. We had countless information meetings with a lot of different people.”

Thompson said. “People need a source that is reliable and they can trust. Extension, with its research-based information and provided without the intent of selling a product, should become more needed in the future.”

In 1914, U.S. Senator Hoke Smith of Georgia and U.S. Representative A.F. Lever of South Carolina authored the Smith-Lever Act to expand the “vocational, agricultural, and home demonstration programs in rural America.” The act assured delivery of research-based knowledge of the land-grant universities to people where they live and work.



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Collaborating to Master Agricultural Communication

By Jennifer Ray and Katie Rohling

Graduates of the Kansas State University agricultural education and communication master's degree program are prepared to jump in and help others. For some, that means obtaining a career in the agricultural industry as a teacher or communicator; for others, it means going on to get a doctorate. Agricultural communication is a growing academic field.

"Agricultural communications is a good field to study because it can help people communicate both to, and on behalf of, agriculture," said Jason Ellis, associate professor and graduate

program coordinator in the Department of Communications and Agricultural Education. "Farmers and ranchers are making high-stakes decisions for their operations, and consumers are making important decisions at the restaurant and grocery store. Agricultural communicators provide the information needed for informed decision making."

Program Approval

K-State's agricultural education and communication master's degree program was first approved in spring 2012. Seven on-campus students and

14 distance students are enrolled in the program. Graduate students with assistantships help teach undergraduate classes or collaborate on research projects with faculty in the College of Agriculture and throughout the university.

The first on-campus graduate of the program, Lana (Swendson) Barkman said, "The courses elicit deeper thinking, assisting with undergraduate classes encourages creative learning, and conducting research develops analytical skills." Barkman works as an event coordinator for No-till on the Plains,



Graduate students (L-R) Jennifer Ray, Jessie Topp, and Audrey Holderness practice a presentation "Pinned Perfect: An Exploratory Study on How Pinterest Is Utilized by Agriculture."

Students presented the research at the Association for Communication Excellence national meeting in Portland, Oregon.



Lauri Baker, assistant professor of agricultural communications and journalism (standing), discusses a project with graduate student Jennifer Ray.

a nonprofit organization that provides information to encourage farmers to adopt the most beneficial agronomic practices.

Sharing Resources

To ensure students receive all the opportunities available, the department participates in Great Plains IDEA (Interactive Distance Education Alliance), a consortium of universities that share teaching resources. The consortium has two disciplinary areas: human sciences and agriculture (AG*IDEA). K-State played a role in the founding of Great Plains IDEA.

“AG*IDEA offered its first class around 2007–2008,” according to Amanda Gnadt, Great Plains IDEA lead campus coordinator and AG*IDEA program coordinator.

Classes through AG*IDEA are offered online through universities across the United States. Nine universities, including K-State, teach online classes for the agricultural education and communication master’s

degree. AG*IDEA is a particularly helpful resource for faculty in this developing field.

AG*IDEA allows universities to “rotate and divide up the course teaching responsibilities,” said Gnadt. “Each university enrolls students in those classes, and it streamlines the process for students. It is more efficient for the universities because they can capitalize on the resources of their partners.”

Gnadt clarified that Great Plains IDEA does not award degrees; the participating universities do.

K-State’s Role

K-State offers a master’s degree, additional courses, and four graduate certificates in various areas with the help of AG*IDEA: agricultural education (master’s); agricultural systems, management and technology (course share); bioenergy and sustainable technology (certificate); food safety and defense (certificate); grassland management (certificate); and horticulture (certificate).

“What Great Plains IDEA offers to students is the opportunity to complete an online degree program, while often working full- or part-time,” Gnadt said. “Students can also complete a program that an institution may not have access to without AG*IDEA. The benefit to the institution becomes the benefit to the student.”

Through the help of Great Plains IDEA staff and collaboration with universities, including Oklahoma State and Texas Tech, K-State faculty members are helping students earn master’s degrees in agricultural communication. Graduates of this program know how to strategically address communication issues facing the agriculture industry today. The agricultural education and communication master’s degree is just one example of how K-State works with others to address common needs.

For more information on AG*IDEA, go to www.agidea.org.

Educating Youth on Career Opportunities Related to Agriculture

From State-of-the-Art Feed Mill to Chuck Wagons

With the global population projected to exceed nine billion by 2050, it is vitally important to prepare today's youth with the skills needed to promote and advance agriculture.

The College of Agriculture and K-State Research and Extension host numerous programs to introduce students to opportunities in agriculture.



Youth tour the O.H. Kruse Feed Technology Innovation Center as part of the Veryl Switzer/KSU Agriculture Camp. They spent two days at K-State learning about agriculture and campus life and the remainder of the week in historic Nicodemus, Kansas. The College of Agriculture Diversity Programs Office helps coordinate the camp.

Elementary students use butterfly nets to sweep plants for insects during a Soybean Science Institute field day at K-State. They learned about how the crops are used and the difference between harmful and beneficial insects.



College of Agriculture students coordinate Ag Fest to provide an awareness of agriculture. During Ag Adventures, a program designed for kindergarten through third grade, students planted seeds, learned about animal byproducts and grain milling, and wrote thank you notes to wheat farmers.

At left, students are tested on Beef Trivia. At right, students learn how wheat is used.



More than 65,000 youth were involved in Kansas 4-H Youth Development programs in 2013, with 62 percent of local clubs increasing membership during the past year.

"We get youth involved in experiences that are of interest to them," said Barbara Stone, assistant director of 4-H Youth Development programs. "We have everything from photography to shooting sports to geology."

Various youth livestock programs promote different species, allow Kansas youth to become more interested in the livestock industry, and develop leadership skills, said Hilary Hawkins, K-State youth livestock coordinator.

Kansas 4-H Livestock Sweepstakes includes judging contests, a "skillathon," and quiz bowl. Students tour local agriculture industry companies and prepare a presentation as part of the annual Leadership Academy.

Since its inception in 2009, 256 youth ages 10–16 have received scholarships to attend the Veryl Switzer/KSU

Agriculture Camp. At K-State, students tour agronomy, dairy research, grain milling, and bakery science facilities. They live in the residence halls, eat at the dining center, and meet Coach Bill Snyder.

At Nicodemus, they tour working farms, learn the history of ethnic minority farmers and cowboys, enjoy a campfire cookout, ride horses, hike, fish, and complete a conservation curriculum unit approved by the USDA/National Resources Conservation Service.

The Soybean Science Institute recruits second- through sixth-grade teachers to use the soybean as a model system for teaching science in the classroom. The program encourages students to ask questions about the world around them.

"It gives teachers the opportunities to get their hands dirty and put their scientist hats on, then come back to the classroom and think about how to incorporate that into a lesson plan," said entomologist Brian McCornack.

by Shelby Mettlen



Above: Elementary students learn what agricultural products are in the food they eat every day. For nearly 20 years, the Department of Agronomy has invited fourth-grade students from area schools to K-State for a day to explore agriculture. Nearly 600 students attend each year.



Courtesy of Kansas 4-H

At 4-H Discovery Days more than 630 teens and adult volunteers from 86 Kansas counties stayed in dorms and chose from 75 different classes, such as the rug-making class.



Courtesy of Kansas 4-H

A 4-H member gathers rocks for his geology project.



Discovery Days participants experience cooking chuck-wagon style.

Student Highlights

Division of Communications and Marketing



This photo of Nathan Spriggs adorned the plaque he received as one of 18 Dean of Student Life Outstanding Graduating Seniors. Each student received a plaque with his or her picture at a favorite place on campus. Spriggs, an agricultural economics and food science and industry graduate from Riverton, compiled a long list of campus service activities including student body president for two consecutive terms, Union Governing Board president, and vice president of the Union Program Council. He also received the Anderson Award for Outstanding Leadership from the K-State Alumni Association.

Courtesy of Sandy Klein



Left to right: Esther McCabe, Kurt Lockwood, Lexi Wingerson, and Matthew McKernan.

Students of the month

September — **Matthew McKernan**, horticulture junior;
 October — **Elizabeth Forsyth**, animal sciences and industry senior;
 November — **Kurt Lockwood**, agricultural economics junior;
 December — **Esther McCabe**, animal sciences and industry junior;
 January — **Lacie Jacobs**, agricultural education senior;
 February — **Brady Rundel**, agricultural economics senior;
 March — **Alexis Wingerson**, horticulture senior;
 April — **Jordan Pieschl**, agricultural communications and journalism junior.
 Student of the Year — **Alexis "Lexi" Wingerson** gave the student address at the May 19 commencement ceremonies and served as activities director for Ag Student Council.



Courtesy of Kai Yuan

Kai Yuan, doctoral candidate in animal science, earned the \$17,000 Alvin and RosaLee Sarachek Predoctoral Honors Fellowship in Molecular Biology. He researched the interactions between inflammation and metabolism and developing strategies to improve immune function, metabolism, and health of dairy cows. His major professor is Barry Bradford.



Alpha Zeta Honors

Alpha Zeta, the nation's oldest fraternal society in agriculture, recognized these K-Staters at the 2014 National Agricultural Leadership Conference: **Brock Burnick**, senior in agricultural economics and pre-law and chapter chancellor, Girard — McClure Outstanding Chancellor of the Year; **Laurel Pierson**, senior in animal sciences and industry and chapter scribe, Watertown, Minnesota — McClure Outstanding Scribe of the Year. **Bobbi Ann Shanks**, immediate past president, Columbus — Steve Drake Outstanding Alumni of the Year.

The K-State chapter serves the college and the university through various activities, including the College of Agriculture Watermelon Feed, Ag Fest, George Stephens Distinguished fall speakers, and SWIPE Out Hunger and Hunger AID food-packaging events. In the past three years, they have raised more than \$40,000, recruited more than 600 volunteers, and packed more than 185,000 meals to address global hunger issues and extend community awareness of service and agriculture.

Graduate Student Awards

Kyle Probst, doctoral candidate in grain science, received the Graduate Award for Outstanding Leadership and Service from the KSU Alumni Association.

Master's students Joshua Craver, horticulture, and Kim Kerschen, agronomy, and doctoral students Jessica Winkler, animal science, and Brady Brewer (MS '12 agricultural economics), economics, received Richard Elmore Brown Outstanding Graduate Student Teaching awards.

Agronomy graduate teaching assistants Bryson Haverkamp (BS '12) and Kim Kerschen (BS '12) earned North American Colleges and Teachers of Agriculture Graduate Student Teaching awards.

Chad Paulk, doctoral student, received \$2,500 from Feed Energy as part of its "Excellence in Ag" Scholarship Program. Mike Tokach, university distinguished professor of animal science, and Jim Nelssen, professor and extension specialist, are his advisors.

Entomology master's student Jessica Kivett was selected nationally to be a 2014 HortScholar by AmericanHort, which is a consolidation of the former American Nursery and Landscape Association and the OFA, the Association of Horticultural Professionals. Professor Raymond Cloyd is her advisor.

Nick Severt, food science master's student, received the 2014 Colvin Scholarship, administered by the Certified Angus Beef Program. Randy Phebus is his major professor.

Larry Corah Outstanding Graduate Student awards were presented to animal science students Ethan Schlegel, master's, and Bryce Gerlach, doctoral.

Kyle Coble and Marcio Goncalves, animal science graduate students, earned the International Ingredients Corporation Pinnacle Award.

Ag Awards Assembly

The college hosted its 50th Ag Awards Assembly to recognize student leaders and 20 college competition teams.

Ag Economics Quiz Bowl

Animal Science Quadrathlon

Crops Teams

Dairy Cattle Judging

Dairy Products Evaluation

Food Science Quiz Bowl

Horse Judging

KSU PLANET Landscape Contracting Team

Livestock Judging

Linnaean Team

Marketing Team

Meats Science Quiz Bowl

Meats Team

Poultry Team

Food Product Development Team

Quarter-Scale Tractor Team

Rodeo Team

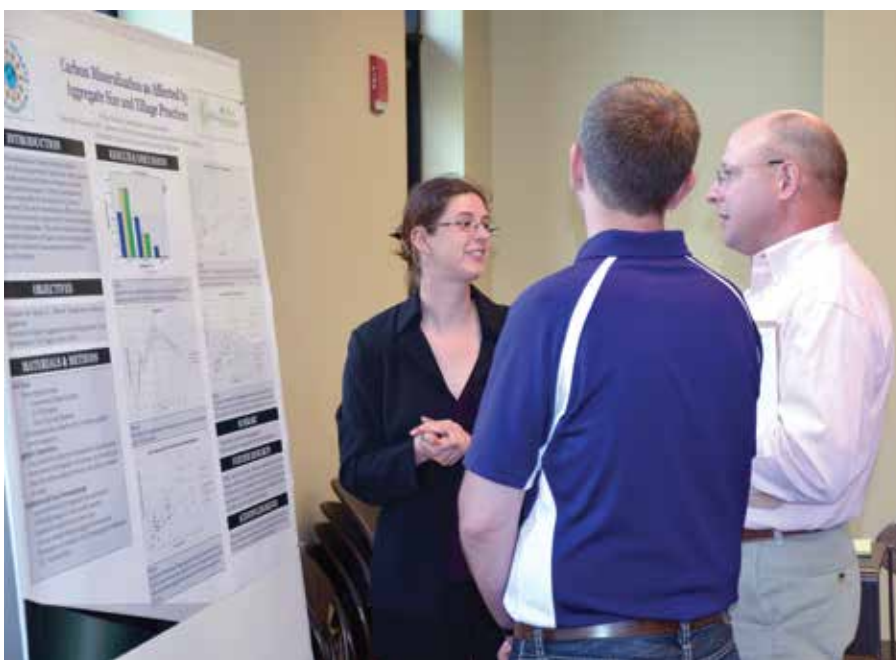
Soils Team

Weeds Team

Wool Team



Joshua Craver, center, examines bedding plants with his mentors Chad Miller, assistant professor of ornamental horticulture, and Kimberly Williams, professor of greenhouse management. Craver completed his master's degree in horticulture in May 2014. He was awarded the \$10,000 Paul Ecke, Jr. Scholarship through the American Floral Endowment to pursue a doctorate at Purdue University.

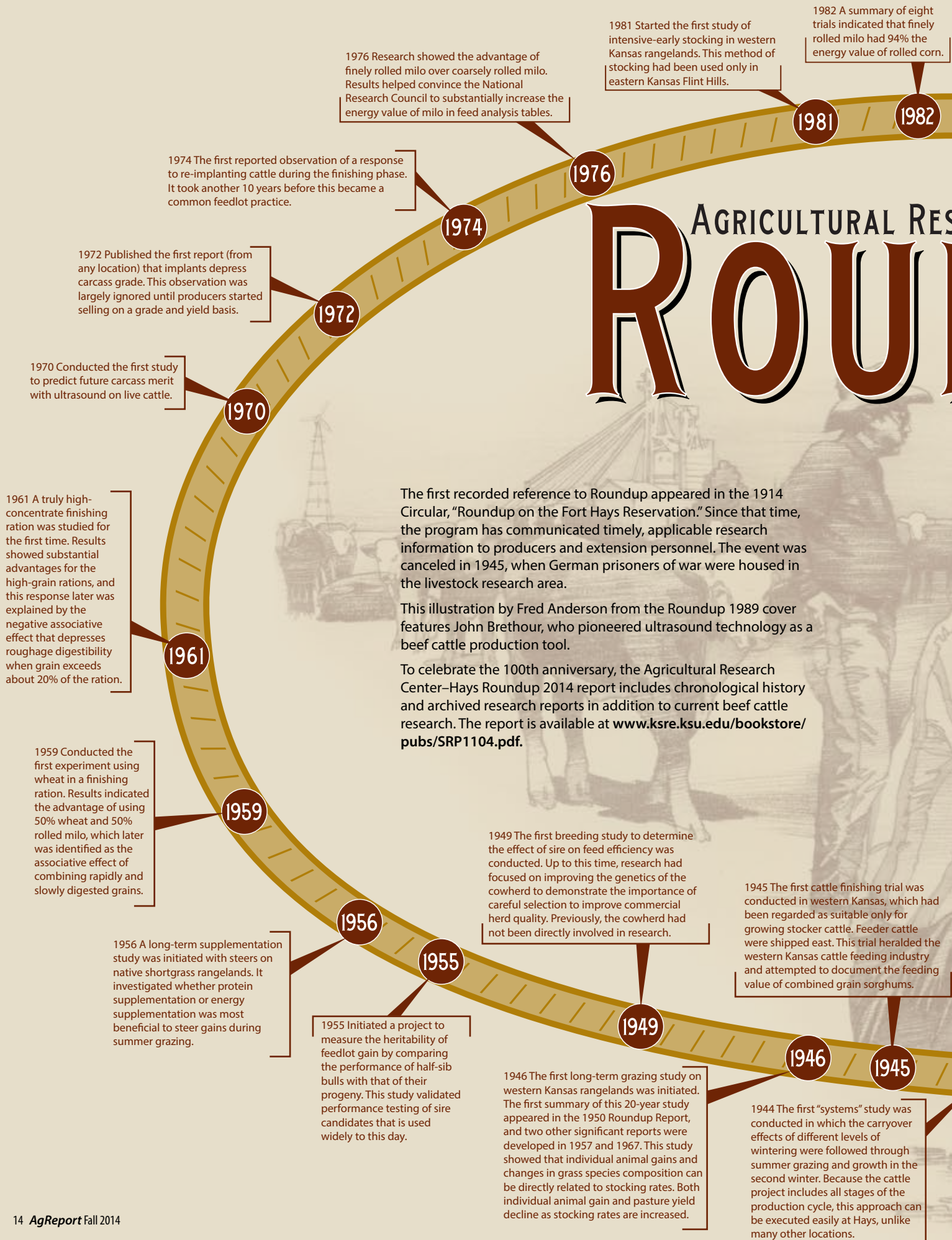


Gamma Sigma Delta Recognizes Research, Teaching

Gamma Sigma Delta honor society sponsored the College of Agriculture Undergraduate Research Showcase on April 25. Nineteen students presented research posters, with top honors going to **Paige Druffel**, *Agriculturists and Consumers' Perceptions of Sustainability*, Jason Ellis and Jessie Topp, advisors; **Evelyn Nordberg** (shown above answering questions about her research at the showcase), *Carbon Mineralization as Affected by Aggregate Size and Tillage Practices*, Charles Rice, advisor; **Ira Parsons**, *Effects of Specialty Soybean Product Inclusion on Pelletability and Pellet Quality in Early Swine Diets*, Cassie Jones, advisor.

Other awards included: Outstanding Undergraduate Student Research — **Andrew Scherrer**, agronomy; Outstanding Graduate Student Teaching, MS — **Kim Kerschen**, agronomy; Outstanding Graduate Student Teaching, PhD — **Matthew Wilson**, horticulture; Outstanding Graduate Student Research, MS — **Heather Bradford**, animal science; and Outstanding Graduate Student Research, PhD — **Sruthi Narayanan**, agronomy. The chapter also presented 100 Junior Honor awards.

AGRICULTURAL RESEARCH ROUNDUP



1985 Developed the one-calf heifer system, in which a female is bred and allowed to have one calf that is weaned early, while the 2-year-old cow is fed for harvest. Conducted during one of the "farm crises," this program was promoted to enable maximum profitability for operations with limited resources.

1987 Research began on applying ultrasound technology to beef cattle production. The first effort was to exploit serial insonation and develop a model for the increase in backfat thickness during the finishing phase.

1988 Discovered that an artifact called ultrasonic speckle is an indicator of marbling (intramuscular fat).

1989 The first studies that indicated improved feedlot profit from sorting cattle into outcome groups appropriate to the carcass and performance potential of each animal.

2002 Implemented another seven-year study of intensive-early stocking. Intensively stocking pastures early in the season at 1.6 times the normal stocking density, removing the heaviest animals at midseason, and keeping the lightest animals on pasture produced a 26% increase in beef production on a per-acre basis compared with continuous stocking at the normal rate.

2006-present A series of experiments evaluated the effect of preconditioning management techniques and length of the ranch-of-origin preconditioning period on the health and performance of spring-born beef calves.

2011 First report (from any location) of successful long-term storage (200 days), without significant spoilage, shrink, or change in nutrient content of wet distillers grain without the addition of low-quality roughages to increase dry matter content to enable packing. This increased the economic potential of small Kansas livestock operations to use wet distillers grains.

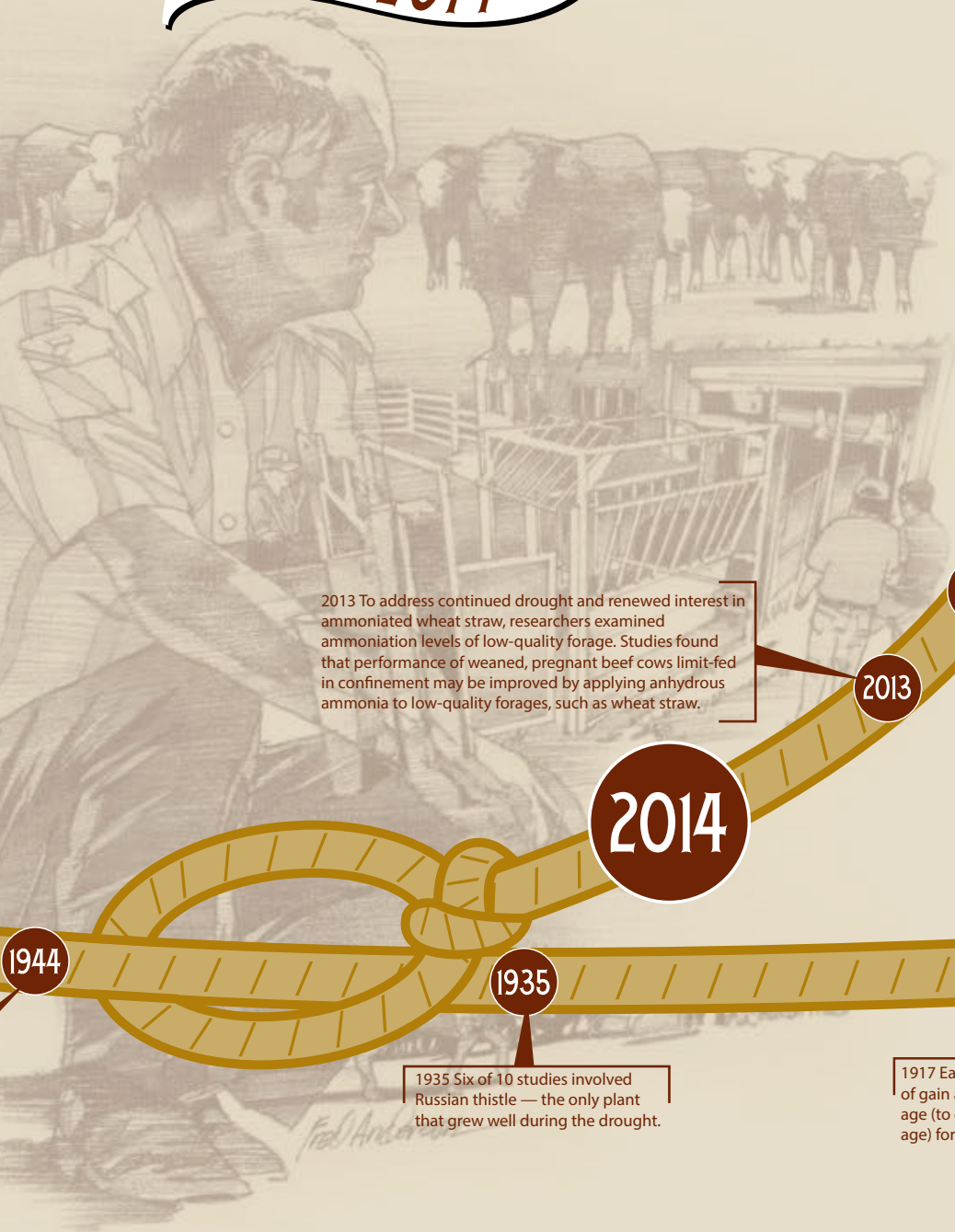
2012 Found that third-trimester cows grazing dormant native range and provided dried distillers grain as a protein supplement once every 6 days performed as well as those receiving the supplement every 3 days or daily.

2013 To address continued drought and renewed interest in ammoniated wheat straw, researchers examined ammoniation levels of low-quality forage. Studies found that performance of weaned, pregnant beef cows limit-fed in confinement may be improved by applying anhydrous ammonia to low-quality forages, such as wheat straw.

1917 Early work examined rate of gain and optimum breeding age (to calve at 2 or 3 years of age) for replacement heifers.

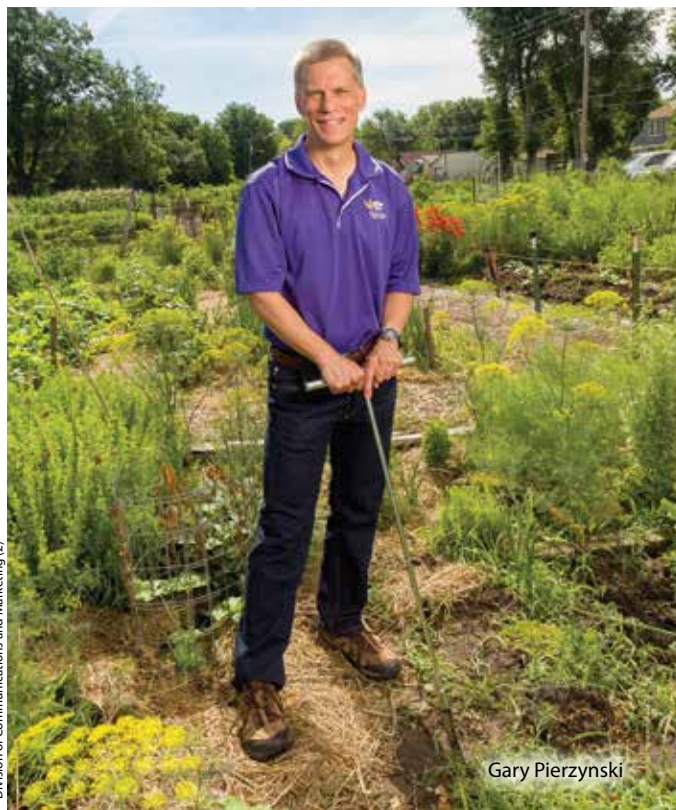
1935 Six of 10 studies involved Russian thistle — the only plant that grew well during the drought.

RESEARCH CENTER~HAYS INDUSTRY 1914~2014



Top University Honor to Agronomist, Entomologist

Division of Communications and Marketing (2)



Gary Pierzynski



Bhadriraju Subramanyam

Two of the three 2014 Kansas State University Distinguished Professors are from the College of Agriculture.

Gary Pierzynski, professor and head of the agronomy department, and Bhadriraju Subramanyam, the Don Wilbur Sr. professor of postharvest protection in the grain science and industry department, were recently awarded the highest honor the university bestows on its faculty members.

“Our newest university distinguished professors represent the very best scholars in their fields,” said April Mason, university provost and senior vice president. “Through their outstanding teaching, research, and creative work, they demonstrate dedication to education and scholarship.”

Soil Scientist, Administrator

Pierzynski joined the agronomy faculty in 1989, was appointed department head in 2006, and served as interim dean of the College of Agriculture and interim director of

K-State Research and Extension (2010–2012).

He has earned an international reputation for his knowledge of soil chemistry and work on remediation of contaminated sites and soils. He patented a method to immobilize metals, which provides a way to stabilize lead in soil and to minimize negative environmental effects. This work has been extended to the study of potential contaminants in urban gardens.

By collaborating with various entities — including the U.S. Environmental Protection Agency, the U.S. Department of Agriculture, and the Kansas Department of Health and Environment — he has brought more than \$5 million in research funding to the university.

He is a fellow of the American Society of Agronomy and the Soil Science Society of America. He served as president of the SSSA, and was on the board of directors for the Alliance of Crop, Soil and Environmental Science Societies. Pierzynski has received national awards for both teaching and research.

Stored Product Insect Expert

Subramanyam is recognized internationally for his expertise in developing integrated pest management programs to protect dry, durable commodities and their products from the farm to the fork.

He mentors students and conducts research and educational programs on pesticide alternatives for managing insect pests in stored raw grains, food/feed processing facilities, warehouses, and retail environments.

Since joining the grain science and industry department in 1999, his research has garnered more than \$19 million in grants.

He received the 2004 EPA Stratospheric Ozone Protection Award, the 2012 Award of Excellence in Integrated Pest Management Research from the Entomological Society of America Foundation, the 2012 Andersons Cereals and Oilseeds Award of Excellence, and the 2013 Commerce Bank Distinguished Graduate Faculty Award.

RECOGNIZED FOR EXCELLENCE



Associate Professor Barry Bradford, left, examines feed rations with students Stephanie Vasquez, Fabian Vargas, and Caroline Ylioja at K-State's Dairy Research Center.

Kansas State University annually recognizes outstanding faculty during the All-University Awards Ceremony in May. This year Barry Bradford, associate professor of dairy nutrition, and Jason Bergtold, associate professor of agricultural economics, earned Presidential Awards for Excellence in Undergraduate Teaching. Cathie Lavis, associate professor of landscape management, received the Presidential Award for Excellence in Undergraduate Advising.

Importance of Dairy Nutrition

More than 170 undergraduate students each year take Barry Bradford's

animal nutrition classes. Dairy products account for 17 percent of the protein in the typical American consumer's diet, and dairy cattle management and feeding have a big impact on the sustainability of dairy production.

Bradford's research focuses on the metabolic physiology of dairy cattle and has been featured in *National Geographic* and *Hoard's Dairyman*.

He recently received a Fulbright Senior Scholar

Award for a six-month sabbatical to collaborate with scientists in southern Australia.

Analyzing and Applying

Jason Bergtold helps students develop tools to critically analyze problems and apply those tools to situations they may encounter in agriculture and business.

Bergtold has published in the *American Journal of Agricultural Economics*, *Journal of Agricultural and Applied Economics*, *Bioenergy Research*, and the *Journal of Choice Modeling*.

He teaches optimization techniques and methods at the graduate level and an introductory agricultural economics course.

His research examines the impact and policy implications of conservation, bioenergy feedstock production, and climate change on agricultural crop production and land use.

In 2013, he earned the Gamma Sigma Delta Outstanding Teaching Award.

Dedicated Advisor

Cathie Lavis teaches a range of landscape management classes, and she may be the only K-State faculty member whose students don hard hats and harnesses to learn how to safely climb trees for proper pruning.

She works closely with horticulture students as they prepare for the national Professional Landcare Network Student (PLANET) Career Days. She also helped students meet the criteria to



The students in Cathie Lavis' Arboriculture class prepared posters about campus trees for Arbor Day. From left: Lavis with students Alexis Wingerson and Olivia Meyer.

have K-State designated as a Tree Campus USA.

As an advisor, Lavis (MS '93 horticulture, PhD '05 agronomy) has influenced students' academic and professional lives by listening, being honest, and speaking from the heart.

Lavis recently earned the Alex Shigo Excellence in Arboriculture Education Award from the International Society of Arboriculture. In 2013, she received the American Horticultural Society Great American Gardener Teaching Award, the Irrigation Foundation Outstanding Educator Award, and the Gamma Sigma Delta Outstanding Advisor Award.



From left: Agricultural economist Jason Bergtold reviews class materials with students Steven Ramsey and Pedro Masi.

Grain Science Department Honors Alumni, Service



Alumni (L-R) Charles Fahrenholz, Palamreddy V. "Venkat" Reddy, and Bill Barr were among those honored by the Department of Grain Science and Industry.

The Department of Grain Science and Industry recognized seven individuals for their contributions to the department at an April 23 luncheon at the International Grains Program Conference Center.

Outstanding alumni awards were presented to Bill Barr, president of Bill Barr & Company; Charles Fahrenholz, director of Global Formulation Development for the Phibro Animal Health Corporation; Dave Pfefer, general manager of Advanced Food Services; and Palamreddy V. "Venkat" Reddy, managing technical director of the U.S. Agency for International Development Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss.

Barr (BS '67 feed technology) became president of the family feed ingredient business in 1972. He serves on the department's advisory council, provides student internship opportunities, promotes the pet food curriculum, and serves as co-chair of the College of Agriculture Vision 2025 fundraising initiative. He was recently honored as the College of Agriculture

Distinguished Alumnus.

Pfefer's extensive work experience at Roman Meal Milling Co., Watson Foods, Archer Daniels Midland, Caravan Ingredients (now Corbion), and his current position at Advanced Food Services makes him an excellent resource on market trends and industry product development. Pfefer (BS '70 bakery science and management) has been the treasurer for the K-State Bakery Science Alumni organization for more than 25 years.

Fahrenholz (MS '83, PhD '89 grain science) worked at the USDA/ Agricultural Research Service Grain Marketing Research Center before attending K-State. In 1992, he became senior investigator with Smithkline Beecham Animal Health (now Pfizer). In 2002, he joined Phibro, which conducts research and development in the department's Bioprocessing and Industrial Value-Added Program building. He also created a scholarship in the feed science and management program.

Reddy (MS '82, PhD '96, grain science) worked in the department

(1989–1997) before joining Pillsbury, where he created specialty flours for dry mixes for General Mills India and high-quality flour for Pizza Hut India. He earned the 2001 Pillsbury International Division Innovation of the Year, the 2003 General Mills Technical Innovation Award, several Trade Secret awards, and the 2012 Gold Medal Award from the International Association of Operative Millers. He returned to K-State in 2013.

Service awards were presented to William Nelson, vice president for corporate citizenship for CHS Inc. and president of the CHS Foundation; Rene Steiner, president of Buhler North America; and Ron Stevenson, former K-State mill technician.

Under Nelson's leadership, CHS Inc. and the CHS Foundation have supported the O.H. Kruse Feed Technology Innovation Center project; multiple study abroad trips; and distance learning, credentialing, and other safe-handling educational efforts. The foundation also sponsors the annual College of Agriculture scholarship breakfast. Nelson speaks at the breakfast each year and accepted his award at the May 3 event.

Steiner and Buhler provided equipment and served as the general contractor for the Hal Ross Flour Mill, which was completed in 2006. The company established the Buhler Instructor of Milling faculty position in the department and continuing education of industry professionals through the International Grains Program. For the last six years, Buhler has sponsored a student for a semester at the Swiss Milling School.

Stevenson was honored posthumously for nearly 35 years of service to the department. He maintained lab equipment and assisted undergraduate and graduate students. Terri Mangiaracino nominated her former co-worker for his strong work ethic, devotion to students, and cheerful demeanor. Members of Stevenson's family accepted his award.

Two Faculty Promoted to Department Head Status



Allen Featherstone is the new head of the Department of Agricultural Economics, and Candice Shoemaker has been chosen to lead the Department of Horticulture, Forestry and Recreation Resources.

In addition to being K-State faculty members, both have received teaching awards from the Association of Public and Land-grant Universities (APLU), have earned national awards for developing innovative distance education graduate programs, and garnered \$1.5 million each in research funding.

"Drs. Featherstone and Shoemaker bring a wealth of ideas, energy, and experience to their respective departments," said John Floros, dean of K-State's College of Agriculture. "I welcome them to our college's leadership team."

Featherstone became a K-State faculty member in 1986. He was serving as interim department head and transitioned to department head June 30, 2014.



for Continuing Higher Education Distinguished Credit Program Award, the College of Agriculture Excellence in Graduate Teaching Award, and the Commerce Bank Distinguished Graduate Faculty Award.

Candice Shoemaker (MS '82 horticultural therapy) joined the K-State faculty in 2001. As a professor of horticulture and human health, she helped create and direct a graduate certificate program and an urban food systems specialization within the horticulture master's program. Her term as department

head began September 1, 2014.

"I look forward to working with the department's excellent faculty and staff as we build on our strengths, embrace opportunities, and continue to deliver programs of excellence that enhance K-State's reputation nationally and internationally," Shoemaker said.

Her honors include the K-State Office of Assessment Award, a national APLU teaching award, and the University Professional and Continuing Education Association Innovative Program Award for the horticulture therapy graduate certificate program.

Shoemaker's research investigates the physical and psychological health benefits of gardening, with a focus on children and older adults.

Featherstone and Shoemaker actively serve on various K-State, regional, and national committees. As leaders in their respective fields, they have been invited to speak at international conferences, bringing a wealth of contacts and resources to their departments.

As a professor of agricultural economics, he guided the development of K-State's award-winning online master of agribusiness (MAB) program. Featherstone also directed the department's graduate program. He has advised more than 60 graduate students and taught a variety of undergraduate and graduate courses.

"The department has experienced 40 percent growth in its undergraduate programs in the last two years," Featherstone said. "Certainly meeting student needs will be an important aspect to work on. In addition, the department is having several faculty with many years of service retiring, and hiring individuals to continue their legacy will also be very important."

Featherstone, a renowned expert in land values and agricultural lending, serves on the research team for the biannual Ag Lender's Survey, a nationwide survey of agricultural lending institutions.

His accolades include a regional APLU teaching award, Association

Faculty Notes

Agricultural Economics

Barry Flinchbaugh, professor emeritus, received the 2014 Jay B. Dillingham Award for Agricultural Leadership and Excellence from the Agricultural Business Council of Kansas City at a June 2 banquet.

Keith Harris, assistant professor of agribusiness management, received a K-State Mentoring Fellowship.

Hikaru Hanawa Peterson, professor and director of undergraduate programs, was chosen Faculty of the Spring Semester.

Agricultural Research Center–Hays

Weed scientist **Phil Stahlman** served on a panel to review the Australia Grains Research & Development Corporation's investment in weed management research.

Agronomy

Dorivar Ruiz Diaz, associate professor of soil fertility and nutrient management, earned the Soil Science Society of America Early Career Award.

Gary Pierzynski, department head, was named a university distinguished professor (see page 16).

Vara Prasad, professor of crop ecophysiology, and **Curtis Thompson**, professor of weed management, have been named Fellows of the American Society of Agronomy.

Animal Sciences and Industry

Teresa (Slough) Douthit (BS '99, MS '01 animal science), associate professor of equine nutrition, was named Faculty of the Spring Semester, and **Terry Houser**, associate professor of meat science, was recognized as Advisor of the Year.

Professor Emeritus **Michael Dikeman** (BS '66 animal science, PhD '70 food science) received the 2014 American Meat Science Association Intercollegiate Meat Judging Meritorious Service Award.

Awards presented at the American Dairy Science Association/American Society of Animal Science (ASAS)/Canadian Society of Animal Science joint annual meeting: **Ken Odde**, department head, 2014 ASAS Fellow – Administration Award; **Bob Goodband**, professor/extension specialist, 2014 ASAS Animal Management Award; **Melvin Hunt**, professor emeritus, 2014 ASAS Fellow – Research Award.

Communications and Agricultural Education

Lauri Baker, associate professor of agricultural communications and journalism, and **Shannon Washburn** (BS '95 agricultural education, MS '99 secondary education), professor of agricultural education, received 2014 College of Agriculture Scholarship of Teaching and Learning awards.

Entomology

Raymond Cloyd, professor of pest management, received four Awards of Merit from the American Rose Society for articles published in 2013.

Kun Yan Zhu, professor of insect toxicology and molecular biology, was elected a Fellow of the Entomological Society of America.

Grain Science and Industry

Josephine Boac, postdoctoral research associate, was named the American Society of Agricultural and Biological Engineers Young Member of the Year.

The American Feed Industry Association named **Cassandra Jones**, assistant professor of feed technology, as one of its 2014 Members of the Year.

Bhadriraju Subramanyam was named a university distinguished professor (see page 16).

Horticulture, Forestry and Recreation Resources

Ted Cable, professor of recreation resources, helped design the nature trails and write sign text for the grounds around the new American Museum of Natural History at Prairiefire in Overland Park, which opened May 12.

Steve Keeley, professor of turfgrass science, received a 2014 Crop Science Teaching Award from the Crop Science Society of America.

Northwest Research-Extension Center

Freddie Lamm, professor and research irrigation engineer, received the Award for Advancements in Microirrigation from Netafim USA, an irrigation company. At the American Society of Agricultural and Biological Engineers, he was named Outstanding Reviewer in the Soil and Water Division and received a Blue Ribbon Award for Outstanding Website Development in collaboration with faculty from Texas A&M University and University of California-Davis on "Maintenance of Microirrigation Systems."

Plant Pathology

Anna Whitfield, associate professor of virology, earned the College of Agriculture Excellence in Graduate Teaching Award.

Academic Programs

Associate Dean **Don Boggs** received the Outstanding Support and Lasting Contribution to Teaching Excellence Award from the K-State Teaching and Learning Center.

NACTA Awards

K-State earned four of 21 Teacher Fellow awards from the North American Colleges and Teachers of Agriculture. Recipients are **Nathan Nelson** (BS '98 agronomy), associate professor of soil

fertility and nutrient management; **David Grieger**, associate professor of beef cattle reproduction; **Joann Kouba**, associate professor of equine physiology, and **John Unruh** (PhD '84 animal science), professor of meat science and animal production.

All-University Campaign

College of Agriculture/K-State Research and Extension employees who contributed to the All-University campaign were entered into a drawing. Here are the prize winners:

Call Hall Dairy Bar coupons

Larry Biles, Kansas Forest Service
Lisa Martin, Shawnee County
Beverly McGee, Grain Science and Industry
Nancy Nelson, Meadowlark Extension District
Gina Nixon, Communications and Agricultural Education
Doug Shoup, Southeast Area Office
John Unruh, Animal Sciences and Industry
Shannon Washburn, Communications and Agricultural Education

Meal at Bluemont Room, K-State Student Union

Vicki Brown, Northwest Research-Extension Center
Gregg Eyestone, Riley County
Sharolyn Jackson, Northwest Area Office
LuAnn Ward, K-State Research and Extension Business Office

Dean's reserved parking spot for a day

Jan Taggart, Grain Science and Industry

Promotional items from the K-State Research and Extension Bookstore

Sandra Chandler, Kansas Forest Service
Jinching Gao, Agronomy
Linda Gilmore, Communications and Agricultural Education
Scott Gordon, Montgomery County
Cheri Hodgson, Agricultural Economics
Susan Horton, Food and Nutrition Program
Fran Richmond, Osage County
Karlene Varnadore, Agronomy

Visit skybox at Bill Snyder Family Stadium during nonconference home football game

Mary Beth Kirkham, Agronomy
Dennis Patton, Johnson County

In Memoriam

William "Bill" H. Johnson, 91, Manhattan, died March 20, 2014. He served as head of K-State's Department of Agricultural Engineering (1970–1981) and director of the Engineering Experiment Station (1981–1987). He previously worked at Ohio State University (1941–1969). He received many awards from engineering associations and consulted in India, the Philippines, Nigeria, Tunisia, and Korea.

Anita Leitz Kesler, 58, Manhattan, died May 14, 2014. She was the business manager for the Department of Plant Pathology for 15 years. The KSU Foundation has established a memorial fund in her honor for the K-State Gardens.

New Tools for Wheat Breeding

K-State plant pathologists were essential in helping assemble a draft of a genetic blueprint of bread wheat, which grows on more than 531 million acres around the world and produces nearly 700 million tons of food each year.

The International Wheat Genome Sequencing Consortium recently published a chromosome-based draft sequence of wheat's genetic code, which is called a genome.

Four papers about the wheat genome will appear in the journal *Science*.

For the first time, plant science researchers and breeders have at their disposal a set of tools to rapidly locate specific genes on individual wheat chromosomes throughout the genome, said Eduard Akhunov, associate professor of plant pathology.

"This resource is invaluable for identifying those genes that control complex traits, such as yield, grain quality, disease, pest resistance, and abiotic stress tolerance," Akhunov said. "They will be able to produce a new generation of wheat varieties with higher yields and improved sustainability to meet the demands of a growing world population in a changing environment."

Akhunov, Shichen Wang, a programmer and bioinformatics scientist, and Jesse Poland, assistant professor, collaborated with the International Wheat Genome Sequencing Consortium to order genes along the wheat chromosomes.

The Wheat Genetics Resource Center provided all the genetic material for the project. Bikram Gill, university distinguished professor and director of the Wheat Genetics Resource Center; Bernd Friebe, research professor; Duane Wilson, associate scientist, and Sunish Sehgal, senior scientist, assisted with the project.

The research is funded by the U.S. Department of Agriculture's National Institute of Food and Agriculture.

Gamma Sigma Delta Presents Annual Awards

Gamma Sigma Delta presented awards to (L-R) Outstanding Research

— **Joe Hancock**, professor of animal nutrition; Distinguished Alumnus — **Jean L.**

Steiner (MS '79, PhD '82 agronomy), supervisory soil scientist, USDA/ARS Grazinglands Research Lab; Outstanding Advising — **Kevin Donnelly** (BS '72, MS '74 agronomy), professor of agronomy and crops judging team coach; and

Outstanding Teacher — **Hulya Dogan**, G.M. Ross Endowed Associate Professor of Milling Science and Management. The Early Career Award went to **Andrea Sexten**, assistant professor of animal science (not pictured). The K-State chapter of the international honorary society of agriculture was founded 100 years ago on June 25, 1914.



Division of Communications and Marketing

Retirees Acknowledged for Years of Service

In April, the university recognized retirees from the College of Agriculture and K-State Research and Extension. They are listed with their most recent position and years of service. They compiled an impressive 612 years of service, with an average of 29 years.

From left: **Margaret Phillips**, assistant program leader, 38; **Norman Klocke**, Southwest Research-Extension Center, 11; **Orlen Grunewald**, agricultural economics, 35; **Colleen Hill**, animal sciences and industry, 34; **James Adams**, 4-H Youth Development, 43; **Bob Burton**, agricultural economics, 30; **Deanna Sweat**, Post Rock District, 29; **James Shroyer**, agronomy, 34; and **Stephen Thien**, agronomy, 44. *Not pictured:* **Peggy Berrier Boyd**, Wyandotte County, 15; **Scott Chapman**, Post Rock District, 13; **Mike Deewall**, Comanche County, 8; **Cynthia Dixon**, Rawlins County, 18; **Beverly Dunning**, Sedgwick County, 50; **Wayne Geyer**, horticulture, forestry and recreation resources, 47; **Jack Lindquist**, Kansas Agriculture and Rural Leadership program, 32; **Ann Ludlum**, Southwind District, 18; **Richard Mattson**, horticulture, forestry and recreation resources, 44; **Belinda Oldham**, Wichita County, 26; **Jim Strine**, Kansas Forest Service, 36; and **Stuart Warren**, horticulture, forestry and recreation resources, 7.

Different Majors, Diverse Careers

Three College of Agriculture alumni were recognized as 2014 K-State Alumni Fellows, a K-State first.



Division of Communications and Marketing (3)

College of Agriculture alumni (L-R) Ed Kaleikau, Cristina Mansfield, and Tom Carr were all honored as 2014 Alumni Fellows.

Tom Carr (BS '69, MS '70 animal science) represented the College of Agriculture, Ed Kaleikau (PhD '88 plant genetics) was chosen by the Graduate School, and Cristina Mansfield (Master of Agribusiness '04) was selected by the Division of Continuing Education as Alumni Fellows.

Fellows spend two days meeting with colleagues and students in their respective colleges. As Carr, Kaleikau, and Mansfield talked with students, they shared a common theme — the importance of a good work ethic and integrity, the ability to work as a team, and the value of their K-State education.

Teacher and 4-H Promoter

"I learned about K-State in 4-H, and never considered going anywhere else," Tom Carr said.

After graduating from K-State and completing a doctorate at Oklahoma State University, he served 36 years in a teaching/extension position at the University of Illinois, Urbana-Champaign. During his tenure, he taught a number of meat science courses and worked with hundreds of students, including 36 intercollegiate meat judging and meat animal evaluation teams.

In 1976, Carr initiated a statewide 4-H meat evaluation program and

worked with livestock and meat industries to improve the quality and composition of beef, pork, and lamb. In 2010, he retired to his hometown of Medicine Lodge.

He returns to Manhattan frequently, especially during football season, and continues to promote 4-H programs.

Carr addressed a variety of animal science classes about how the industry and communication channels have changed since he was a student.

He also shared his wealth of experience with competition team coaches. Carr encouraged students

to apply for internships and join clubs and competition teams that can lead to industry contracts and job opportunities.

"Never stop learning," he stressed. "We're all teachers; have the right information and share it."

USDA Plant Science Advisor

Ed Kaleikau is the national program leader for plant genomics and breeding research, education, and extension in the U.S. Department of Agriculture's National Institute of Food and Agriculture in Washington, D.C. He previously served as senior advisor for plant science in the USDA Office of



Associate Dean Don Boggs (L-R), Alumni Fellow Tom Carr, and Dean and Director John Floros, stand in front of the banner honoring Carr outside Waters Hall. Carr taught Boggs at the University of Illinois.

the Chief Scientist. He also served as the USDA liaison to the White House National Science and Technology Council's federal partnership that sequenced the first model plant genome, as well as in the international collaboration that sequenced the rice genome.

"As a graduate student, I never imagined an opportunity to work for a great organization like USDA," said Kaleikau. "K-State opened many doors for me."

He commended K-State for its innovative work in genomics and genetic resources that takes place in classrooms, laboratories, fields, and greenhouses at scales ranging from individual gene function to entire agricultural systems.

He sees recruitment and education of young plant breeders and a robust germplasm system as essential resources to produce future varieties with higher yields and improved sustainability to meet the demands of a growing world population in a changing environment.

In his current position, Kaleikau enables grant funding. He said that one of the most fulfilling parts of his job involves awarding grants to promising young faculty, such as K-State's Eduard Akhunov, associate professor of plant pathology and collaborator

on the International Wheat Genome Sequencing Consortium.

Kaleikau said, "K-State competes well for grants because it's a top class university built on strong collaborations and innovative research.

"Having international collaborators, incorporating education and extension, and having strong leaders that deliver results to growers and producers are important factors that strengthen grant proposals," he added.

Multilingual Law School Candidate

Cristina Mansfield completed a Master of Agribusiness degree online while working in Cambodia on democracy and governance issues. She currently is a Juris Doctor candidate at Vermont Law School. Mansfield has taught advocacy to nongovernmental organizations and activists in several countries including Kyrgyzstan, Uganda, and Guatemala and worked as a consultant in Afghanistan and Libya.

Mansfield also earned a bachelor's degree in politics from New York University and a master's degree in public administration from Harvard's John F. Kennedy School of Government. She speaks English, Italian, Arabic, Cambodian, and has taught Spanish and French.

She spoke to students in the Food and Agribusiness Management class about her varied career, saying she often "trusted her gut" about career changes.

"Always show the best of yourself," she said. "Be dependable, do quality work, have integrity — and people will call you."

When a student asked Mansfield about her education choices, she said the agribusiness skills she learned transfer into any business. The law degree helps understand contracts and teaches discipline for legal arguments.



Alumni Fellow Cristina Mansfield, left, and Mary Bowen, Master of Agribusiness assistant program coordinator.



College Honors Its Own

A feed ingredient company owner, the current Kansas Secretary of Agriculture, and an innovative instructor were honored May 3 by the K-State College of Agriculture Alumni Association during Wild for Ag weekend events.

Bill Barr (BS '67 feed technology) was honored as Distinguished Alumnus; Jackie McClaskey (BS '93 agricultural economics, PhD '14 animal science) received the Outstanding Young Alumnus Award; and Dave Krishock, baking instructor, earned the David J. Mugler Outstanding Teaching Award.

Distinguished Alumnus

William “Bill” Barr is president and CEO of Bill Barr & Company of Overland Park, a family business founded in 1956. Under his leadership, the company has grown to a multimillion dollar business.

He actively supports the Department of Grain Science and Industry by serving on its advisory council, providing internship opportunities for students, helping to raise funds for the O.H. Kruse Feed Technology Innovation Center, and serving as co-chair of the College of Agriculture Vision 2025 fundraising initiative.

He was recently honored by the department as an outstanding alumnus. Barr has served in leadership roles in various state and national feed industry associations and strongly supports the K-State pet food curriculum. In 2013, he was chosen “Man of the Year” for more than 25 years of service to the Big Brothers Big Sisters of Greater Kansas City.

Outstanding Young Alumnus

Jackie McClaskey has compiled an impressive résumé of leadership and service to K-State, agriculture, and Kansas. She has applied her strong organizational and communication skills to various campus, community, and FFA programs.

She served as K-State student body president from 1991 to 1993 and from 1996 to 2009 as assistant dean for the College of Agriculture, where she developed a student recruitment strategy that helped increase new student enrollment by 20 percent and diversity by nearly 70 percent. She also co-founded Roots and Legacies, an agricultural development consulting firm, in 2000.

McClaskey was appointed deputy secretary for the Kansas Department of Agriculture in 2011 and became secretary in December 2013. In that capacity, she serves as a member of Gov. Sam Brownback’s cabinet, co-leads the 50-year water vision for Kansas team, and managed the transition of moving the state agency from Topeka to Manhattan. She was the main speaker at the spring college commencement ceremonies.



Family, friends, and former students of Jackie McClaskey attended the reception. From left, Glendolyn Neely, agricultural communications and journalism student; Mary (Geiger) Soukup (BS '07 agricultural communications and journalism); Lindsey (George) Huseman (BS '06 agricultural education, MS '10 secondary education), current ag alumni board president; Sarah (Geiger) Goss (BS '02 agricultural economics), former board member; Jackie McClaskey; Sandy (Dillon) Klein (BS '06 agricultural education, MS '11 curriculum and instruction); Sharon (Combes) Thielen (BS '02 agribusiness, MS '05, PhD '12 curriculum and instruction). Klein serves as College of Agriculture event coordinator, and Thielen replaced McClaskey as assistant dean.

David J. Mugler Outstanding Teaching Award

Dave Krishock joined the K-State Department of Grain Science and Industry faculty in 2005 as the Baker’s National Education Foundation instructor in baking science. He incorporates his previous experiences — director of the largest Boy Scouts of America camp, owner of Sunnyday Bakery, director of technical services at King Arthur Flour Company, and production manager for Zingerman’s Bakehouse — into the classroom.

In addition to teaching and advising, he serves as the department recruitment coordinator and advisor for the Bakery Science Club that produces baked goods for weekly bake sales and various college and university functions. He also coordinates department events that raise funds for student trips and speakers, which greatly enhance the classroom experience.

Krishock was nominated by three of his students, which shows that he follows Dave Mugler’s motto, “They don’t care what you know until they know you care.”

Alumni Awards Nomination. Nominate someone or several for:

- Distinguished Alumnus Award • Outstanding Young Alumnus Award
- David J. Mugler Teaching Award

To nominate someone for the Distinguished Alumnus Award or the Outstanding Young Alumnus Award:

- Submit a one-page nomination letter that describes how the nominee meets the award criteria.
- Include a résumé, vita, or short biography.

To nominate someone for the David J. Mugler Teaching Award:

- Submit a one-page nomination letter describing how the nominee demonstrates Mugler’s philosophy of dedication and caring for students in his or her teaching and advising roles.
- Two additional one-page letters of support also may be submitted.

Please include your contact information, in case additional information is needed.

Submit all nominations by Dec. 5, 2014, to:

Don Boggs, Agriculture Academic Programs,
117 Waters Hall, Manhattan, KS 66506-4015 or dboggs@ksu.edu

Previous winners are listed on the College of Agriculture website.

Go to www.ag.k-state.edu, click on Alumni & Friends, then Ag Alumni Awards.

Class Notes

'30s

A scholarship was established to help Kansas students study agriculture at K-State in honor of **Charles W. Pence** (BS '38 animal science) by his son Charles D. Pence (BS '64 physical sciences). The elder Pence was a 4-H agent in Labette, Wyandotte, Saline, and Dickinson counties and an agricultural agent in Saline County.

'70s

Lee Borck (BS '70 agricultural economics) spoke on challenges facing young people and how agriculture played a role in his success as an entrepreneur during the April 28 Upson Lecture sponsored by the Food for Thought student organization.

Kendal Frazier (BS '73 agricultural economics), Centennial, Colorado, chief operating officer of the National Cattlemen's Beef Association, was elected to a four-year term on the K-State Alumni Association board of directors.

Curt Frasier (BS '73 animal science), Beloit, serves as treasurer for the K-State Alumni Association board of directors.

Ted Bilderback (PhD '76 horticulture), professor and director of the J.C. Raulston Arboretum at North Carolina State University, was honored as the Department of Horticulture, Forestry and Recreation Resources 2014 Distinguished Alumnus.

'80s

Bob Godfrey (BS '80 animal sciences), director and professor at the University of the Virgin Islands, presented his work on the physiology of livestock adapted to a tropical environment as part of the K-State Office for the Advancement of Women in Science and Engineering ADVANCE Distinguished Lecture series.

Angela (Scanlan) Cummins (BS '82 agricultural journalism, MS '83 journalism and mass communications) is the marketing and communications specialist for K-State Olathe.

Kelli Cox (BS '86, MS '88 agricultural economics, PhD '08 education), K-State director for planning and analysis, was recognized as Volunteer of the Year at the 4-H Emerald Circle awards banquet.

'90s

Steve Klecan (BS '94 park resources management) is head of the Plant Health Care Department at Ryan Lawn and Tree in Overland Park.

'00s

Ross Mosteller (BS '01 animal science) and wife Tonya announced the birth of Lindy Louise on May 14, 2014. Ross is the Meadowlark District 4-H Youth Development agent. Lindy has twin siblings, Lane and Maddy.

Mark Seyfert (BS '01 animal science, MS '03 food science) and **Teresa (Finley) Seyfert** (BS '03 animal science, DVM '05) announced the

birth of Lila Evelyn Seyfert March 1, 2014. He is a senior food scientist for Cargill Beef, and she is a small animal veterinary internist at Wichita Veterinary Emergency and Specialty Hospital.

Brandie (Rice) Disberger (BS '01 agricultural education), instructor in the Department of Communications and Agricultural Education, and **William Disberger** (BS '00 animal science/agricultural education), assistant director for admissions, announced the birth of Brock James on March 27, 2014. He has a brother Brigham.

Chris Long (BS '03 agricultural education), agricultural and natural resources agent for the Walnut Creek Extension District, and his wife, Kayla, welcomed their first child, Austin Dale, July 7, 2014.

Brandi (Kaufman) Miller (BS '05 bakery science and management) was promoted to assistant director of the International Grains Program Institute.

'10s

Jenae Skelton (BS '10 agronomy) is the horticulture agent in the Post Rock Extension District, which has offices in Beloit, Lincoln, Mankato, Osborne, and Smith Center. She recently completed a master's degree at Purdue University.

Two animal sciences and industry alumni enrolled in the veterinary medicine program — **Kotie Wootten** (BS '12), Ottawa, and **Ellen "Elli" Ouellette Unruh** (BS '13), Rantoul — earned R.E. Roseberry and Eileen E. Roseberry scholarships established through the Franklin County Community Foundation. The renewable scholarships provide \$10,000 per school year.

Bobbi Ann Shanks (BS '13 animal science), current veterinary medicine student and past president of Alpha Zeta, earned the 2014 Steve Drake Outstanding Alumni of the Year Award.

Jeri Sigle (BS '14, agricultural education) joined the Wildcat Extension District as a crop production and natural resources agent. She previously worked for Kansas Farm Bureau as a safety and agriculture education intern.

In Memoriam

Max Deets (BS '51 agricultural education), 87, Beloit, died May 17, 2014. He used experience on the family farm and ranches in Buffalo, Fredonia, and Arkansas City to found the Solomon Valley Feedlot near Beloit in 1970. He was highly respected in the industry, serving as president of the Kansas Livestock Association and the National Cattlemen's Beef Association. In 2007, the Department of Animal Sciences and Industry recognized his service to the department, industry, and K-State.

Donald Dubois (BS '42 milling science and management), 93, Lenexa, died March 30, 2014. He spent 50 years in the milling and baking industry, including 21 years at the American Institute of Baking, traveling to 21 countries.

James Hundley (BS '57 agricultural education, MS '67 adult and occupational education), 79, Horton, died May 19, 2014. He taught vocational agriculture for 33 years at six Kansas high schools. Survivors include Sandra Wick (BS '81 ag ed), agricultural and natural resources agent in Post Rock District; Brenda Wolters (BS '82 ag ed); Melanie Musselman (BS '93 agricultural journalism); and Cheryl Soderland (BS '81 ag ed).

Robert J. Newman, Sr. (BS '48 milling science and management), 89, Omaha, Nebraska, died May 14, 2014. He worked for International Milling Company then ConAgra Foods in the United States, Philippines, and Mexico before returning to Omaha as vice president of operations at ConAgra.

Steve Posler (BS '90 agronomy), 47, St. Charles, Missouri, died July 7, 2014. He worked for Landscape Unlimited for more than 20 years. He was the construction superintendent developing a golf course in Washington at the time of his death and was a member of the Patriot Guard Riders. He was the son of emeritus professor Gerry Posler.

Danny Trayer (BS '51, MS '67 agricultural economics), 87, Manhattan, died May 26, 2014. He worked as an agricultural extension agent in Hodgeman County, the Kansas Farm Management Association in Garden City, and Trayer Farm Business Consulting.

Ag Alumni Class Notes

Email your updates or address changes to: gloria@ksu.edu

Or mail this form to:

Gloria Holcombe, Department of Communications and Agricultural Education
309 Umberger Hall, Manhattan, KS 66506-3402

Name _____

Spouse's Name _____

City _____ State _____ ZIP _____

Home Phone _____ Email _____

Graduation Date(s) _____ Degree(s) _____

Employer _____ Title _____

Feel free to attach more information.



A Labor of Love

Follow a narrow path into Dale Shirley's cornfield, and you find blooming gladiolus. Just one example of how Shirley (BS '83 agronomy) combines his love for crops and flowers.

"The tall corn stalks shield the flowers from the wind," explained Shirley.

Dale Shirley checks on the gladiolus planted in a corn field.



In addition to gladiolus, he grows dahlias, snapdragons, and sunflowers that he sells individually or as arrangements for weddings, funerals, and other events.

Shirley plants thousands of bulbs starting in the early spring, planting over several weeks to extend the growing season. Many of the bulbs must be dug in the fall and stored in a cave with a constant temperature to ensure beautiful blooms the following year. The beauty and size of the dahlias also can be attributed to manure from the Shirley cattle herd.

In addition to the flowers for sale, the property around the house overflows with annuals and perennials, a gazebo, statuary, fruit trees, seating areas, birdhouses, and archways. Dale and his wife, Carissa, also incorporated play areas and a playhouse for their five children. Traditional farm equipment

and miniature tractors complete the setting.

The Friends of the Kansas State University Gardens sponsored a July 31 tour of the Shirley family farm near Vermillion, which was established by Dale's parents Loyal and Mary Ann in 1964. About 40 garden enthusiasts and local nursery growers attended the event.

The tour also included a brunch, and three attendees won table arrangements created by Dale.

Friends of the KSU Gardens host a garden gala, poinsettia sale, and a luncheon series throughout the year to support the gardens and student scholarships. For more information, go to <http://www.ksre.ksu.edu/ksugardens>.



Tables decorated for Friends of the KSU Garden brunch.

Gloria Holcombe (4)

Friends of the KSU Garden look at dahlias and sunflowers growing near Dale Shirley's corn and soybean fields.



New Center Teaches Students to Turn Risk into Opportunities



Courtesy of KSU Foundation (2)

Providing opportunities for K-State students and helping them develop into tomorrow's leaders are goals of Greg and Mamie Case, Winnetka, Illinois. They've donated more than \$1 million to K-State's Center for Risk Management Education and Research to create the Greg and Mamie Case Integrated Risk Management Endowment.

The center is a joint effort of faculty and students from K-State's colleges of Agriculture, Business Administration, Engineering, and Arts and Sciences. Additional partners from across campus also participate.

Funds from this endowed gift will be used for student fellowships, student educational experiences, program development, faculty support, and other needs determined by Ted Schroeder, professor of agricultural economics and center director.

"By supporting the center, we can create opportunities for interested students to learn that risk is opportunity, that businesses can achieve their desire for predictability by understanding risk, and how it will impact their organizations," said Greg Case, alumnus and president/CEO of Aon, a global risk management and HR solutions firm.

"In my role at Aon, I talk to hundreds of clients around the world, and the common theme I hear is that the magnitude, complexity, and speed of risk is increasing. Companies know that it is important for them to understand risk, measure its impact on their ability to grow, and find ways to mitigate it.

"With the growing presence of nontraditional risks such as cyber risk, pandemic risk, and social media risk, it is important that we have a strong national dialogue, not only in board rooms but on college campuses, on what we need to do to address these challenges because of the impact they and other such risks can have on our global economy."

Honoring a Lifelong Love of K-State

Wendell Brubaker grew up in Manhattan and was an avid K-State fan his entire life. He met his wife, Ina, on a blind date — and they were married for 45 years. After serving in the U.S. Army during World War II, he transitioned his career into milling science, working as a cereal chemist in flour mills and grain elevators until his retirement.

Although he didn't graduate from K-State, the university was always in his heart. He and Ina rarely missed a basketball game, and he always talked about his days in Manhattan.

When Wendall died in 1996, Ina began to think about how she could honor her husband and help the university he loved so much. She established the Wendell Brubaker Memorial Scholarship in the Department of Grain Science and Industry.

"Wendell loved K-State, and I think he would have appreciated this," Ina said. "I hope that this scholarship helps provide an education to those who need it most and, that I can do more in the future."

Before Ina died in late 2013, she established a sizable endowment to perpetuate the scholarship and help more students.



Having Fun, Supporting Students

The College of Agriculture Alumni Board sponsored two golf tournaments in 2014 — one on May 2 as part of the Wild for Ag Weekend and a second tournament on July 18 at the Golf Club at Southwind in Garden City.

The May event at the Manhattan Country Club had 21 four-person teams and 18 sponsors. The July tournament brought together 10 teams and 21 sponsors. Proceeds from the two tournaments will fund 12 \$750 scholarships.



Lindy Bilberry, sophomore in agribusiness, helped with the southwest Kansas tournament.

"It was neat to see so many alumni who are involved and active with the college," Bilberry said. "Several asked if I had taken classes from their favorite teachers."

"The golf tournament is a great opportunity to raise scholarship funds for students while catching up with old friends!" said alumni Keith and Nicole Bryant.

"Hosting the tournament in their backyard has K-State supporters in southwest Kansas excited. An added bonus is knowing 100 percent of the proceeds benefit College of Ag students."

"With the rising cost of education, every dollar we raise counts, and the students really appreciate it. Plus, it allows individuals and companies to be recognized locally. As southwest Kansas residents and College of Ag graduates, this event is one we are very passionate about! These students will one day join our communities, and the opportunity to support them as they earn their education is a great way to pay it forward."

Ag Alumni Scholarship Tournament Sponsors



Nova Technologies • Palen Club Lambs / Fur-fection Boarding and Grooming Pet Center • Finney County Feedyard • Patrick and Barbara Ryan • Suzanne Ryan • Barnhardt Construction

54,000+
Annual job openings
in food,
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and the environment

25:1
Student to faculty
advisor ratio

15
Teaching units
and farms within
a mile of campus

100+
Students travel
internationally each year

>70
Undergraduate
research labs

**Student success is our
#1
priority**

KANSAS STATE
UNIVERSITY

College of Agriculture

Tailgate Party in Cat Town



Saturday, November 1

Starts two hours before kickoff

Football with free food, fun, and fellowship.