

Linked to Agriculture

*Serving Montana in agriculture
research, outreach and
teaching since 1893.*

Field Days

Celebrating research conducted
at MSU and across Montana.

- 5 **Student raised meat**
- 10 **Montana bumble bees**
- 16 **\$1.2 million federal grant to improve camelina seed**

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The College of Agriculture and Montana Agricultural Experiment Station

Administration

Vice President Dean and Director, Charles Boyer, Ph.D.
Associate Director of the Montana & Agricultural Experiment Station,
Barry Jacobsen, Ph.D.
Assistant Dean for Academic Programs, Nora Smith, Ph.D.

Departments and Department Heads

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Animal and Range Sciences, Patrick Hatfield, Ph.D.
Division of Agricultural Education, Tracy Dougher, Ph.D.
Land Resources and Environmental Sciences, Tracy Sterling, Ph.D.
Microbiology and Immunology, Mark Jutila, Ph.D.
Plant Sciences and Plant Pathology, John Sherwood, Ph.D.
Department of Research Centers, Barry Jacobsen, Ph.D.

MAES Research Center Superintendents

Central AES, Moccasin, Pat Carr, Ph.D.
Eastern AES, Sidney, Chengci Chen, Ph.D.
Northern AES, Havre, Darrin Boss, Ph.D.
Northwestern AES, Creston, Robert Stougaard, Ph.D.
Southern AES, Huntley, Ken Kephart, Ph.D.
Western AES, Corvallis, Zach Miller, Ph.D.
Western Triangle AES, Barry Jacobsen, Ph.D., interim

We are a proud cornerstone of the land-grant mission, educating the students of tomorrow and meeting the agricultural challenges of Montana today.

By the Numbers

9th year of increasing enrollment, more than 1,253 students in the college (Fall 2016).

11 majors, **13** graduate programs, **22** options and **seven** minors

Student body represents **42** states and **10** countries.

28 different bumblebee species found in Montana.

1 new pure-bred red Angus cattle herd, **ONE** new Pollinator Garden and **NINE** new faculty.

20 student run clubs.

3rd year of College of Agriculture students named MSU Homecoming Royalty.

Statewide infrastructure updates and buildings across **seven** statewide Research Centers.

36 million

in research expenditures benefitting Montana agriculture this year.

\$400,000

in scholarship funds given to MSU College of Agriculture students this year, that went to **200** different students, with an average GPA of 3.6.

10 year anniversary of MSU's Towne's Harvest Garden.

Dear Montana agriculture friends, family and partners:

2017 has arrived. I'm honored to send you winter greetings from Linfield Hall, whose hallways are filled with students from all walks of life, energetic faculty and dedicated staff and researchers. This team is working hard to study, challenge, investigate, grow and support agriculture in Montana and the world.

While your MSU College of Agriculture and Montana Agricultural Experiment Station are anticipating the New Year to be filled with continued accomplishments and excellence from our students and faculty, we have much to be thankful for as we look back at 2016. This issue is full of examples.

We were able to award more than \$400,000 in student scholarships. We are blessed by our generous and kind supporters who understand the value of making a difference in a student's life. This fall, our college cheered loudly for two agriculture students who were crowned MSU Homecoming King and Queen—the third year in a row ag students were homecoming royalty at MSU. We opened our doors in August to the largest class of agriculture students in the history of the institution, making this year our ninth (almost a decade) of continued enrollment growth, with 1,253 students. Our students continue to astonish the university with their dedication to the agriculture sciences both in and outside of the classroom. You'll find an agriculture student in most student leadership positions across campus.

Our faculty invested \$36 million in research expenditures this year and we were pleased to welcome nine new talented faculty members to our college who will enrich our research enterprise in new and creative ways. Included in this class are our college's two endowed chairs, Hikmet Budak, Ph.D., Montana Plant Sciences Chair and Timothy Del Curto, Ph.D., Nancy Cameron Beef Physiology Chair, and Kevin McPhee, Ph.D., as our new Pulse Crop Breeder. Our statewide Department of Research Centers continue their vital role of addressing production challenges and providing the foundation upon which the research and teaching missions of the university stay relevant to the needs of Montana agriculture.

As always, our college and station successes are not realized without our deep and valued partnership with our friends across the state. We thank you for your support. We are committed to greater accomplishments in 2018.

Yours in Agriculture,
Charles Boyer



Charles Boyer
MSU Vice President
of Agriculture



Barry Jacobsen
Associate Director of the Montana
Agricultural Experiment Station



Nora Smith
Assistant Dean,
College of Agriculture

COVER: MSU PHOTO BY ADRIAN SANCHEZ GONZALEZ

MSU College of Agriculture students win more than \$400,000 in scholarships

The Montana State University College of Agriculture distributed more than \$400,000 in scholarships to more than 200 agriculture students at its annual student scholarship banquet held in October.

College of Agriculture faculty and staff acknowledged agriculture students who received scholarships from a variety of donors during the 2016–2017 year, in addition to recognizing the college's 2016 Outstanding Agricultural Leader, Jim Hagenbarth. The banquet dinner featured a Montana-made meal highlighting local and regional foods and their agricultural producers.

With more than 110 distinct, named scholarships housed in the College of Agriculture, Montana businesses, families and individuals contributed scholarship donations in every size and shape, from a "full ride" (tuition and fees) to a silver belt buckle, according to Nora Smith, assistant dean of the College of Agriculture and Montana Agricultural Experiment Station.

"We are so fortunate to have such outstanding support for our students and such a commitment from our scholarship donors," Smith said. "Our donors understand the importance of keeping college accessible for Montana students, and they clearly see the value in investing in our intellectual future, which begins with our students."

The more than 200 College of Agriculture students who received scholarships represented every option and curriculum in the college's academic departments, with scholarship recipients averaging a 3.6 (out of 4.0) cumulative GPA, according to Smith. The college's scholarship selection committee considered nearly 400 scholarship applications, Smith added, and noted that the committee consists of faculty from every department in the college.

The college hosts an online platform for scholarship applications for students, which streamlines the application process into a singular submission for the scholarship selection committee. That process gained particular notice in a national poll that ranked the College of Agriculture as the fourth best college of agriculture in the country, according to Campus Explorer.

Many of the scholarships provided to students come from current and historical Montana producers and generations of families who have long and storied connections to the college, according to Kevin Brown, senior development director for the College of Agriculture.

"What's remarkable about scholarship giving, particularly in the College of Agriculture, is the commitment to supporting the next generation of agricultural leaders—from all walks of life and from every industry," Brown said. "The agriculture community in Montana has a healthy and wonderful commitment to supporting current students who want to carry on MSU's agricultural legacy."

Some of the scholarship funds date as far back as the 1950s, and continue today bearing the name of a family member from a farm or ranch, or former MSU Cooperative Extension agents, or Montana Agricultural Experiment Station or college faculty, Brown said. Other scholarships are given from regional and local commercial agribusinesses, the Montana Wheat and Barley Committee, Montana FFA, Montana Cattlewomen's Association, First Security Bank, Alpha Zeta Society, statewide crop and beef producers and a host of College of Agriculture alumni. ■

Student-raised meat now served in MSU dining hall

Thanks to a partnership between the MSU College of Agriculture and the Montana Made Program in University Food Services, meat from steers in the college's Steer-A-Year program will be served in Miller Dining Commons and at other university events, and profits are used to benefit agriculture students.

Through Steer-A-Year, students care daily for steers that Montana ranchers have donated to the university, according to Hannah DelCurto, instructor and program manager. The steers live at MSU's Bozeman Agricultural Research and Teaching Farm, or BART, farm. DelCurto said the students are responsible for everything from feeding the animals to health checks to vaccinations. In addition, the students provide data about the steers—such as average daily weight gain, carcass information when the meat is harvested and even genetic testing—to the ranchers who donated them.

In the past, meat harvested from the donated steers

was simply available for anyone to purchase. With a larger program this year, however – the program grew from eight animals last year to 25 this year—there was more meat to sell.

Steer-A-Year donors suggested selling meat to MSU's University Food Services through the university's Montana Made Program, which seeks to increase access to local food products. With the help of Montana Made, approximately 20 percent of the food purchased for the university last fiscal year—or approximately \$1.5 million worth of products—came from local vendors.

"We're really excited about this opportunity," DelCurto said. "We think it will be a really neat partnership."

Approximately 3,600 pounds of beef from the Steer-A-Year program will be served at MSU, according to Amy Bordeau, coordinator of the Montana Made Program. Pioneer Meats near Big Timber, which is owned by MSU alumnus Brian Engle, processed the meat. ■





A Goji berry grown at WARC. Fruits that are rich in antioxidants and health benefits are one of the fastest-growing food items in the country, according to the USDA. As more consumers are looking to local markets for buying and selling organic small-fruit products, COA/MAES faculty and staff at our Western Agricultural Research Center in Corvallis are researching diverse crops, including berry varieties, which might be well-adapted to Montana soils and climate.

MSU Western Agricultural Research Center launches new initiatives to support Montana horticultural industry

For the last 109 years, the Montana State University Western Agricultural Research Center (WARC) has been nestled on the floor of Montana's Bitterroot Valley in Corvallis, providing meaningful research and education for the region's agriculture producers.

Today WARC has new facilities, as well as new staff and faculty who manage a growing research profile focusing on fruit and vegetable production for local markets and intensively managed small farms in Montana.

Zach Miller, WARC superintendent, was hired in 2014 and is leading the way for the center, according to Barry Jacobsen, associate director of the Montana Agricultural Experiment Station.

"At the same time Zach was hired, the directive from our advisory boards was to focus on horticultural crop research," Jacobsen said. "Since then, the center has been actively involved in establishing plantings and constructing new facilities so that we can answer horticulture research needs expressed by the community."

WARC's new research efforts are aimed at identifying varieties of fruits and the best ways to grow them, as well as working to expand markets for local fruits and vegetables. The center is planting new fruit trees, berries and grape varieties, in addition to research trials on grafted-tomato varieties, organic fertilizer and weed management trials, and annual strawberry production evaluations.

The Bitterroot Valley and much of Montana is seeing an increased interest in local food markets, according to Amy Hutton, local produce-to-market food coordinator at WARC. She added this reflects WARC's growing local food-to-market profile.


"There's certainly a growing market for a deeper connection between local commercial business and local food producers for our restaurants, groceries and schools," said Hutton. "The Bitterroot Valley has the

capacity to be a regional model that connects local producers to local businesses."

Hutton is managing a produce marketing program on behalf of WARC. The program is managed in collaboration with the Loyal to Local Bitterroot co-op and funded by the Montana Department of Agriculture Specialty Crops Block grant. The new program supports marketing and distribution support for Bitterroot Valley farmers, with an end goal of jumpstarting an independent, farmer-run marketing and distribution program.

Miller is managing a research project that also reflects a growing market in agriculture produce: berries that are rich in antioxidants. Fruits that are rich in antioxidants and health benefits are one of the fastest-growing food items in the country, according to the USDA. Miller is researching several berry varieties, such as the goji, haskap (or honeyberry), aronia and saskatoon berries. He noted the varieties are not widely planted in Montana, but fit this market niche. Miller added that many of these varieties may have the potential to be well-adapted to Montana soils and climate.

"Our goal is to eventually expand small fruit and berry production across Montana," Miller said. "More and more consumers are looking to local markets for buying and selling small fruit products, and the Montana Agricultural Experiment Station has the research capacity to support Montana farmers looking to tap into these growing markets." ■



Netted berry variety trials are grown at WARC this summer, in an effort to keep out birds from foraging on the berries. WARC is located in Corvallis, framed by the Bitterroot Mountains.

College of Agriculture beef and plant endowed chairs take their seats in 2016

Sustained by permanently invested funds, endowed chairs—which are often the highest academic award universities bestow on faculty—provide predictable and stable funding to help the university build upon its existing academic and research programs. The College of Agriculture now boasts two endowed chairs, the most of any college at MSU.

Hikmet Budak, Montana Plant Sciences Chair

The former head of a plant genetics and genomics team at an international university who is considered a world leader in cereal genetics has been chosen as Montana State University's first Montana Plant Sciences Chair. Hikmet Budak is the first endowed chair in the history of the MSU College of Agriculture and Montana Agricultural Experiment Station, or MAES. The idea for the position began more than three years ago from the Montana Grains Foundation as a charge to help Montana's wheat farmers stay sustainable and remain competitive. It has since grown into a vision for expanding statewide support for Montana's grain

growers with the help of MSU faculty and the Montana Grains Foundation.

Budak earned a doctorate in agronomy from the University of Nebraska and has been actively involved in leadership for wheat improvement projects sponsored by the European Union. Budak, a member of the MSU Department of Plant Sciences and Plant Pathology, will work with an advisory council made up of representatives from Montana's cereal grains production industry and will actively collaborate with breeders, entomologists and plant pathologists in integrative research.



MSU PHOTOS BY ADRIAN SANCHEZ GONZALEZ

"I am delighted to be the inaugural Montana Plant Sciences Chair housed at Montana State University," Budak said. "I'm very much looking forward to joining stakeholders and producers so that we can develop a research program that has the capacity to make an instrumental difference in the state's highest-grossing industry."

Timothy DelCurto, Nancy Cameron Endowed Chair in Range Beef Cattle Production

A national leader in beef research, Timothy Del Curto has joined the university's Department of Animal and Range Sciences as the college and university's first endowed chair dedicated to beef research.

The position is the department's first endowed chair, meant to develop a rich research profile and program in range beef cattle nutrition and management that serves Montana and the region's beef industry. DelCurto was selected after a national search by a search advisory committee of MSU faculty and private stakeholders.

"I'm thrilled to join Montana State University, particularly in a research vein so heavily supported by the university, faculty and the state of Montana," DelCurto said. "There is a wealth of opportunity to investigate and develop answers to the largest challenges facing the livestock industry through advanced research, highly qualified faculty and an integrated network of private producers across the state. I'm honored to serve as the department's first beef physiology chair."

DelCurto has a bachelor's degree in general agriculture, a master's degree in animal sciences from Oregon State University and a Ph.D. in animal sciences from Kansas State University. He has authored more than 60 peer-reviewed articles in animal sciences, authored or co-authored five books, holds 24 years of university teaching experience and has generated \$3 million in grant funding. ■

Welcome, new faculty



Thomas Murphy, Assistant Professor of Animal Science/ Sheep Production



Diane Charlton, Assistant Professor of Economics



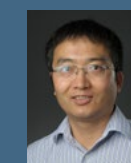
Brock Smith, Assistant Professor Economics



Frankie Crutcher, Assistant Professor of Plant Pathology, Eastern Agricultural Research Center



Agnieszka, Rynda-Apple, Assistant Professor of Microbial Pathogenesis



Hong-Yi Li, Associate Professor of Watershed Analysis



Kevin McPhee, Professor of Plant Sciences, Pulse Crop Genetics and Breeding



Jed Eberly, Assistant Professor of Agronomy and Soil Microbiology, Central Agricultural Research Center



Maryse Bourgault, Assistant Professor of Cropping Systems, Northern Agricultural Research Center

MSU faculty and graduate student document first-ever Montana bumble bee species record

“It’s an exciting time to work in pollinator research, especially in Montana. Many people ask if Montana bees reflect a national bee decline, but we can’t answer that without first knowing what’s already here. This is a first step to understanding and documenting what other bee species might be here, so we can start looking at bigger questions.”

– Casey Delphia, MSU Research Scientist

The first time a bumble bee was recorded in Montana was in the journals of the Lewis and Clark expedition in 1805. More than 200 years later, Montana State University faculty and a former graduate student say they now have compiled the state’s first inventory of bumble bees known to live in Montana, and their research reveals the largest number of bumble bee species known from any state in the nation.

The group’s research is detailed in a paper, “Bumble Bees of Montana,” which was published this week in the *Annals of the Entomological Society of America* (AESA), the country’s flagship entomology journal. The paper’s co-authors were Michael Ivie, associate professor of entomology in the MSU Department of Plant Sciences and Plant Pathology, Kevin O’Neill, professor of entomology in the MSU Department of Land Resources and Environmental Sciences, Casey Delphia, MSU research scientist, and Amelia Dolan, former MSU entomology graduate student, all within the MSU College of Agriculture.



“Because of Montana’s size, landscape diversity and regional junction of eastern and western geographies, when it comes to bumble bees, Montana hosts a diverse, large and globally relevant community of species,” Ivie said. “Our research shows 28 different species of *Bombus*, with four more expected to make the list. That’s the largest number of bumble bee species recorded for a state in the entire country.”

To get to that number, a research group that included Dolan, Delphia, Ivie and O’Neill used existing specimens in the Montana Agricultural Experiment Station’s Montana Entomology Collection, those from a variety of existing MSU faculty projects and material in other museums. Then, they enlisted a host of MSU faculty, staff, students and alumni from across the campus and around the state to collect and contribute specimens from under-sampled areas. Collaborators from the Montana Agricultural Experiment Stations (located at seven different research centers across the state), statewide MSU Extension agents and specialists, Montana Master Gardeners, hobby entomologists, hikers, and U.S. Geological Survey researchers all pitched in, greatly expanding the areas represented in the database.

“The specimen gathering was a large effort,” Dolan said. “We reached out to a wide group of people who have an interest in entomology (and gave them directions for catching specimens), who would be out

and about in Montana for the summer for potential specimen collection. The turnout of people willing to collect specimens and send them in was exciting.

“It was amazing because we had people collecting specimens across the state, in varying elevations and diverse ecosystems—areas we alone wouldn’t have had access to in the time that we had to complete the project,” Dolan said. “The number of species is representative of Montana’s wild spaces and diverse landscapes that host these bees.”

Once the MSU researchers cleaned, examined and identified the specimens, Dolan and Delphia pored over bumble bee research records spanning 125 years and 25 natural history collections. They consulted with national bee labs and compared data sets so they could accurately identify and document specimens.

That Montana has the largest number of bumble bee species of any state in the country is of scientific importance, Ivie said.

“Having a baseline record of bumble bee populations in a state that reflects both western and eastern geographies has major global impacts when it comes to pollinator research,” Ivie said. “Nationally, bees in general, and bumble bees specifically, are in decline, and they serve as critical pollinators for the world’s food supply. The first step towards understanding measures to protect them is to understand what their species numbers look like so that we can build on monitoring efforts.” ■



MSU PHOTOS BY ADRIAN SANCHEZ GONZALEZ

MSU agricultural economics faculty launch new informational website for regional producers

A group of faculty and Extension specialists in MSU's Department of Agricultural Economics and Economics in the College of Agriculture and College of Letters and Science have launched an informational agricultural economics website for producers in the northern Great Plains agricultural industry. The website includes information on economics and policy, market news, trade and industry content.

The website, <http://ageconmt.com>, is applicable for anyone involved in agriculture and features blogs, podcasts, presentation events and industry information on a variety of subjects spanning crops, livestock, policy and business and finance, according to Anton Bekkerman, MSU associate professor of agricultural economics.

"A primary goal of the website is to offer trending content that's specifically tailored for agricultural communities and producers in the western U.S.," Bekkerman said. "We want to share our research and things we're excited about with people whom it directly affects. There wasn't a source site like this out there before that includes both news content and research analysis that relates to the northern Great Plains."

The site features weekly blogs written by faculty that provide short, in-depth analyses on a wide array of

topics that influence the country's agricultural economy. The blogs explore news and policy with trending data, infographics and the potential associated effects for Montana's agricultural community. The website also features short interviews with faculty on their particular research or their thoughts on markets and industry news. Commentary in a web-based open forum is encouraged, as is feedback from producers on what they would like to see covered.

"Our goal was to streamline our research into 300–400 word blogs and five minute podcasts, so that people who are literally in the field could read or listen on their phone," he said. "The agricultural community is a highly technologically advanced audience, and we need to be meeting this audience on those platforms with focused content. ■



MSU agricultural education students receive national scholarships

Joshua Toft, a sophomore from Somonauk, Illinois, and an agricultural education major, was recently designated as one of 12 national scholarship representatives who will serve as a Teach Ag Ambassador on behalf of the National Teach Ag Campaign. The campaign is an initiative of the National Council for Agricultural Education led by the National Association of Agricultural Educators (NAAE) to raise awareness of agricultural careers in education and to celebrate the positive contributions that agriculture teachers make in their schools and communities, according to the NAAE.

Gwynn Simeniuk, a senior in agricultural education from Glasgow, was selected as one of 23 national participants in the Future Agriscience Teacher (FAST) Symposium, held in Sioux Falls, South Dakota, in September. Simeniuk also won a separate \$1,500 national Upper-Division Scholarship from the NAAE, the professional organization in the United States for agricultural educators. The scholarship was awarded to 25 national upper-level agricultural education majors to help offset expenses during their student teaching experience. The scholarship was based on academic performance and leadership and service activity, according to the NAAE. Simeniuk is planning to student teach in the spring. ■



Partnerships between MSU and federal agencies provide job opportunities for graduate students

Years before earning their Ph.D.s, two Montana State University graduate students already have jobs lined up because of new partnerships between MSU and two federal agencies.

David Wood will become a U.S. Geological Survey ecologist advising the Bureau of Land Management after earning his Ph.D. in approximately four more years. He calls it a fantastic opportunity.

Meryl Storb has the opportunity to become a hydrologist with the USGS' Wyoming-Montana Water Science Center in Helena after earning her doctorate in approximately 2½ years. She says it's a huge relief. Now she doesn't have to worry about finding a postdoctoral position or moving out of state after graduation and she has her dream job.

Storb and Wood are both earning their Ph.D.s in ecology and environmental science in MSU's Department of Land Resources and Environmental Sciences in the College of Agriculture.

Tracy Sterling, head of the department, said USGS and BLM officials approached MSU about a year ago, saying they were looking for Ph.D. students to help fulfill their scientific missions. The resulting partnerships led to new opportunities for MSU graduate students. Rigorous competitions resulted in Storb's and Wood's selections.

"The agencies reviewed Meryl and David as top candidates because of their excellent academic backgrounds and valuable work experience in the private and public sector," Sterling said. "Growing our partnerships with these agencies is an exciting and innovative approach to funding and training graduate students for career science positions."

"This is a fantastic opportunity to strengthen my scientific background and further my landscape ecology interests," Wood wrote in an article for the BLM. "I can't ask for a better opportunity to focus on my research interests while also continuing to support the BLM and the complicated decisions faced here every day." ■



Agriculture students enjoy Harvest Breakfast on November 12th.



The MSU College of Agriculture Student Ambassador class of 2016-2017

Top Row: Christian Guenther, Cody Shick, Brady Richardson, Gordon Holt, Todd Lackman, Randy Taylor, Joseph Jensen
 Second Row: Taylor Broyles, Allie Nelson, Meghan Brence, Katie Harris, Kendall Franks, John Walker, Neela Andres, Amber Roberts, Trestin Benson, Madi Bautista
 Bottom Row (left to right): Cara Still, Kaitlyn Goroski, Austin Grazier, Hannah Allen, Emily Halverson, Chris Hereim



Newly engaged Kim Suta (Agricultural Education, '16) and James Woodring (Animal Science '14), both MSU College of Agriculture alumni at the College's scholarship banquet. Suta graduated from the College of Agriculture and is now the Toole County Agriculture Extension Agent. She spoke at the scholarship banquet to fellow students about the value of her agriculture degree from MSU.

MSU College of Agriculture celebrates agriculture and annual award winners

Montana agriculture and Montana State University have been working together, side by side, for the last 123 years. Each year, the College of Agriculture honors agriculture faculty, staff, friends, students, parents and families and shareholders and industry at the annual Celebrate Agriculture event. This year, the event was held Nov. 10-12 on campus. The 17th annual event included a scholarship dinner for students and donors, an agricultural outlook conference hosted by the MSU Department of Agricultural Economics and Economics and MSU Extension titled, "Agricultural Production Trends and Changing Food Systems" and a Harvest Breakfast with a Montana-made buffet. The event was hosted by the College of Agriculture alongside volunteers from the college's student leadership group, the Agricultural Ambassadors.

Jim Hagenbarth of Hagenbarth Livestock in Dillon has been named the 2016 Outstanding Agricultural Leader on behalf of the College of Agriculture and Montana Agricultural Experiment Station. Hagenbarth was presented with this award during the Celebrate Agriculture weekend event.

Homecoming Awardees

Don Mathre, Ph.D., Honorary Alumni
 Bill Perry, Alumni Achievement
 Jovanka Voyich, Ph.D., Distinguished Faculty
 Bill Bennett, Distinguished Staff

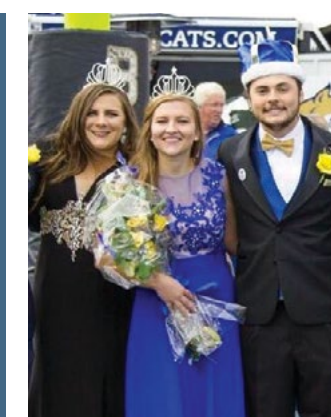
Agriculture on the podium at MSU Homecoming

College of Ag students look good with crowns. For the past three years, MSU agriculture students have been elected MSU Homecoming Royalty—and this year—two of our Ag Business seniors were named homecoming king and queen; John Walker and Charsi Workman. John is from Paradise Valley and is a member of the Alpha Gamma Rho Fraternity. He's active in the College of Ag student council and the college's student ambassador leadership group. Charsi is from Grass Range and is active in a number of clubs including; AdvoCats, Collegiate Young Farmers & Ranchers, the Alpha Zeta Honor Society, College of Agriculture Student Council, Collegiate Stockgrowers, and Collegiate CattleWomen. Previous College of Ag homecoming winners were: Lane Nordland (king) in 2014 and Cali Christensen (queen) in 2015. John, Charsi and Cali pictured below (photo by Zen Wohlers). ■



Harvest Breakfast table decorations included a variety of pea grown in our Plant Growth Center as a nod to 2016 as the "International Year of the Pulse Crop." Montana grows the most pulse crops of any state in the nation.

2016 Homecoming Royalty



Bill Perry presents President Waded Cruzado and Vice President Charles Boyer with funds from Northwest Farm Credit Services that will support the college's Endowed Chair in Beef Physiology.

Jim Hagenbarth accepts the college's "Outstanding Agricultural Leader Award" on November 10th.



A photograph of a scientist, Chaofu Lu, wearing a white lab coat and glasses, looking down at a plant in a greenhouse. The background shows other plants and a hanging light fixture.

MSU scientist wins \$1.2 million federal grant to improve camelina seed qualities

A Montana State University scientist has received a \$1.2 million grant from the U.S. Department of Energy's Office of Science to research ways to improve the usefulness of camelina, an ancient crop that the modern world has come to value as a potential source of alternative fuel.

By Michael Becker for the MSU News Service

The project was one of seven totaling \$7.8 million that were jointly selected by the DOE and the U.S. Department of Agriculture to fund bio-based fuel research.

The grant will allow Chaofu Lu, associate professor in MSU's Department of Plant Sciences and Plant Pathology in the College of Agriculture, to study ways to improve the crop's seed and oil quality.

Lu, working alongside John Browse, professor at the Institute of Biological Chemistry at Washington State University, seeks to answer two questions with the federal grant.

"We're going to try to understand the genetic mechanisms and find factors we could use for the breeding," Lu said.

First, the idea is to selectively breed for larger camelina seeds. Typically, they are about the size of sesame seeds, but smaller seeds are less efficient for processing — there's not enough oil relative to the husk and rest of the seed.

Second, Lu wants to improve the quality of the oil coming from the seeds. Right now, camelina oil is too high in unsaturated fat and could render oil that is prone to oxidation and spoilage. The goal of the grant work is to make the oil more like olive oil — to increase its proportion of oleic acid — from about 15 percent naturally to some 80 percent.

Lu, an oilseed molecular geneticist who began researching camelina in 2005, said that even during the decade he has been working on it, the crop has gone from a relative unknown to an almost ubiquitous research topic.

"It's an emerging crop," he said. "The Romans grew it, but somehow it became minor, almost gone by World War II. It emerged again in the '70s because of the oil crisis." ■



Field Days 2016

Seven research stations across the state and two local Bozeman campus farms hosted field days in the summer of 2016. The annual field days across Montana are slated for the public to tour and learn about the people, places and projects involved with agricultural research at Montana State University's College of Agriculture and Montana Agricultural Experiment Station (MAES). Field days included facility tours, explanations of research projects and results and a chance for the public to speak with MSU scientists and Extension agents. MSU's on-farm research work has a statewide and regional impact spanning beef genetics, water, cropping systems and plant breeding to beekeeping and small-acre vegetable farming.



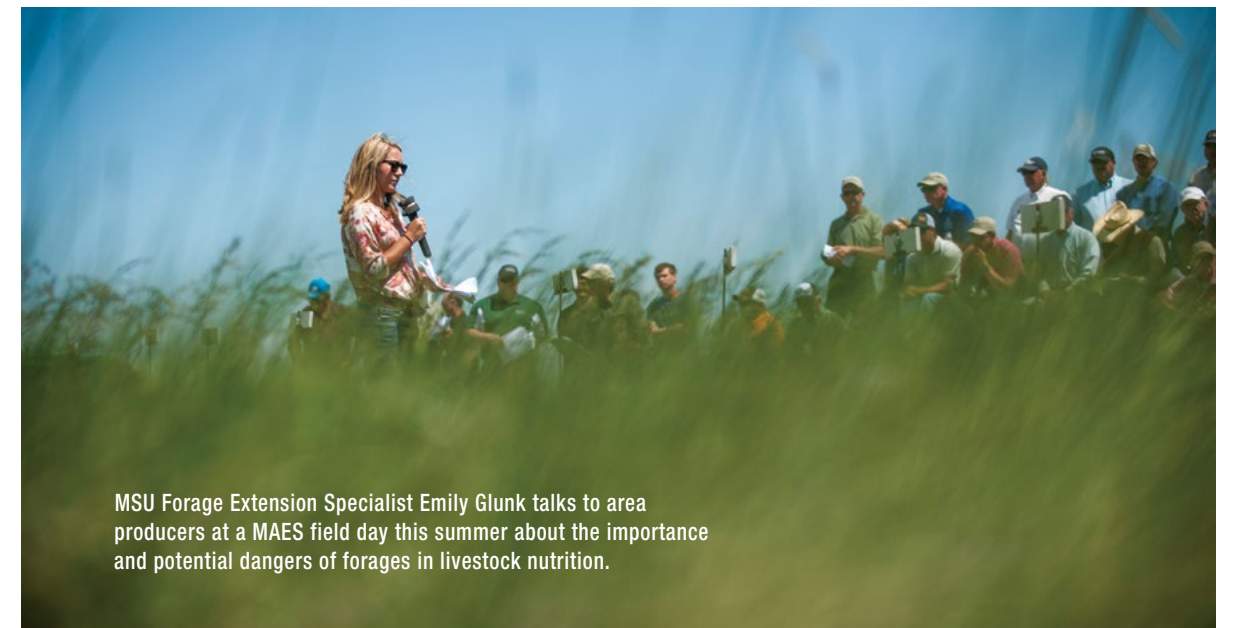
Producers from central Montana attending the Central Agricultural Research Station field day in June.



Kale and Swiss Chard grown at the college's Horticulture Farm.



Joseph Jensen, a sophomore from Lewistown majoring in Biotechnology in the College of Agriculture's Department of Microbiology and Immunology, speaks to a crowd at the Central Agricultural Research Center Field day last June. Jensen interned with CARC over the summer and learned about the center's cropping systems research profile, which he said was an invaluable experience the college and station provided him.



MSU Forage Extension Specialist Emily Glunk talks to area producers at a MAES field day this summer about the importance and potential dangers of forages in livestock nutrition.

MAES

MAES comprises agricultural research of on and off-campus MSU faculty. Seven centers are strategically located across Montana to allow research with different soil types, elevations, climate zones and landscapes, and a local advisory council guides the research at each station. The federal Hatch Act of 1887 authorized every national land-grant university to establish an agricultural experiment station, with research reflecting the university's curriculum. The Smith-Lever Act authorized the Extension Service in 1914. MSU College of Agriculture, Montana Agricultural Experiment Station and MSU Extension have been cooperatively serving the land-grant mission and the Montana public for the past 100 years. For more information about the Montana Agricultural Experiment Station, visit <http://agresearch.montana.edu/maes.html>. For more information about the station's research centers, visit <http://agresearch.montana.edu/researchcenters.html>

MSU PHOTOS BY ADRIAN SANCHEZ GONZALEZ

MSU purchases red Angus cattle herd, first in university's history

Thanks to a serendipitous conversation on the Hi-Line, cattle research at Montana State University has received a large boost with the purchase of a red Angus purebred cattle herd.

MSU is the new owner of 51 head of cattle, which the university bought from MSU alumni Bob and Rita Dige of Double Tree Red Angus out of Sand Coulee. The herd includes 32 cows, nine bred heifers and 10 replacement heifers. It is the first red Angus purebred cattle herd the university has ever owned, according to Darrin Boss, superintendent of MSU's Northern Agricultural Research Center (NARC) in Havre.

"Owning the herd is a tremendous opportunity for MSU and Montana," Boss said. "The purchase will enable MSU to conduct research on various issues such as heifer development, lifetime productivity, reproduction and profitability, among other economically relevant traits. This type of research will have an impact for Montana cattle ranchers for years to come."

After raising red Angus cattle for the better part of 25 years with their now-grown three daughters, the

Diges were making plans to retire from their red Angus operation last summer. They said they were unsure what they would do with the herd upon retirement.

"We knew we wanted to keep the herd together so that we wouldn't have to piecemeal them out as individual sales," Bob said. "We also wanted to sell to someone who would appreciate their genetic lineage over the years."



The Diges visited MSU's NARC facility at Fort Assiniboine near Havre in September 2015 for a red Angus field day tour sponsored by the Montana Red Angus Association. Boss mentioned to the Diges that several MSU faculty were actively searching for and hoping to purchase purebred red Angus cattle for a variety of livestock research projects.

"It was one of those moments where this fell into our lap, and we knew it would be a perfect match," Rita said. "Our cows would be going someplace where they would be taken care of, and MSU could use them for the benefits of students and research." ■



MSU PHOTOS BY ADRIAN SANCHEZ GONZALEZ

MSU professor wins prestigious presidential award

A Montana State University professor of microbiology and immunology has won the highest honor the United States government bestows to science and engineering professionals in the early stages of their independent research careers.

The White House announced in January that Blake Wiedenheft, assistant professor in MSU's Department of Microbiology and Immunology in the College of Agriculture and the College of Letters and Science, has won a Presidential Early Career Award for Scientists and Engineers, or PECASE. He is one of 102 scientists and researchers honored for their pursuit of innovative research at the frontiers of science and technology and their commitment to community service as demonstrated through scientific leadership, public education or community outreach.

"To have my science recognized by President Obama is truly one of the greatest honors I could ever imagine," Wiedenheft said.

Wiedenheft, who earned his Ph.D. from MSU in

2006, has established himself as a leading researcher in the study of CRISPRs, the defense mechanism that microbes use to

protect against viral infection. This pioneering work in CRISPRs, an acronym for "clustered regularly interspaced short palindromic repeats," has major implications in environmental microbiology, and has transformed biomedical sciences by providing new tools for programmable manipulation of DNA.

Since joining MSU in 2012, Wiedenheft has filed three CRISPR-related patent applications with funding from private partnerships. This applied aspect of his work aims to create new tools for the surgical repair of defective genes that cause genetic diseases, such as muscular dystrophy and cystic fibrosis. ■



MSU hires new pulse crop breeder

Montana State University has hired professor Kevin McPhee to develop a pulse crop research program at the university that will reflect Montana's growing pulse industry in dryland agriculture.

McPhee, a professor of plant sciences and pulse crop genetics and breeding, said he's excited about joining MSU and the university's existing network of statewide research stations with the Montana Agricultural Experiment Station and a host of private and public Montana agricultural producers.

"I'm really looking forward to joining the MSU and larger Montana community," he said. "In this first year I'm particularly interested in making a deeper connection with producers, industry and grower-representation groups, so that I can understand what the desires and challenges are."

Pulse crops, also known as dry pea, chickpea (also called garbanzo bean) and lentils, are known for their agronomic and economic benefits because of their ability to add nitrogen to the soil, store water and break

up the disease and pest cycles often found in wheat systems. According to the United States Department of Agriculture (USDA), Montana is America's top producer of pulse crops, with more than 1.1 million acres currently in production. That's compared to Montana's 5 million acres in annual wheat production, according to the USDA, and Montanans have planted about 500,000 acres each of pea and lentil this year. ■





MSU's equestrian club teams ride into winning season

By Jessianne Wright for MSU News Service

MSU's Intercollegiate Horse Show Association English equestrian team is ranked first in the region. The team is currently leading the region with 45 points, competing against riders from Utah State University, Rocky Mountain College, University of Montana Western and the University of Montana. IHSA is a national association that promotes competition horseback riding in both the English and western riding disciplines, where students compete individually and as teams at regional, zone and national levels.

MSU's IHSA western team is also competing well, winning reserve high-point team by scoring the second-most number of points at a show four times this season.

With 40 spots combined, MSU's IHSA teams started the season at full capacity.

Each IHSA equestrian can compete in a variety of disciplines, or classes, based on riding ability, ranging from walk-trot to three-foot jumping for English riders and walk-trot to reining for western riders.

To end the regular season, the western team will compete Feb. 18–19 at Rocky Mountain College in Billings. The English team will host a show at Tri-H Stables, 400 Vandyke Road in Bozeman, on March 4–5. Regionals will follow directly after each show. ■



MSU PHOTOS BY ADRIAN SANCHEZ GONZALEZ



From the Archives

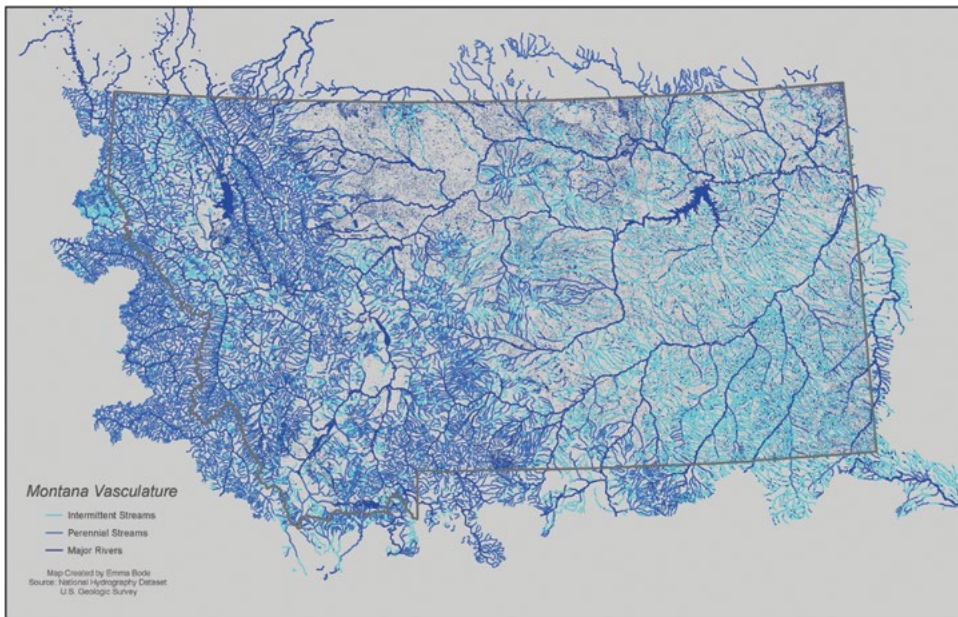
An MSU agriculture student posing with a Rambouillet Ram circa 1920 from the MSU Library Photo Archives. Today, the MSU Wool Lab is one of two in the nation housed in land-grant universities. The MSU Sheep Extension program is dedicated to enhancing Montana's sheep industry through research and education.

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"Water is Life"

Artist Statement Water is life. Just as we depend on our veins and arteries to transport sustenance to our bodies, Montanans depend on streams and rivers to support our crops, cities, and ecosystems. This piece was created in ArcGIS with the National Hydrography Dataset. The NHD represents the national drainage network with features such as rivers, streams, canals, lakes, ponds, coastline, dams, and streamgages. This dataset is typically used in general reference maps and for scientific analyses exploring cause and effect relationships in discharge rates, water quality, and fish populations. Through careful selection and symbology of the feature attributes, I generated an aesthetic interpretation of Montana's hydrology. I chose to depict the streams and rivers extending beyond Montana's border because water is subject to topography, not political delineation.



Emma Bode, Environmental Sciences major, won the College of Agriculture annual "Science as Art" competition this year with "Montana Vasculature" – an aesthetic interpretation of Montana's hydrology, using national drainage data from the National Hydrography Dataset.

Summer 2017 MAES Field Days

Northern AES Havre

June 29

Bozeman Farms Day

July 7

Central AES Moccasin

July 12

Northwestern AES Creston

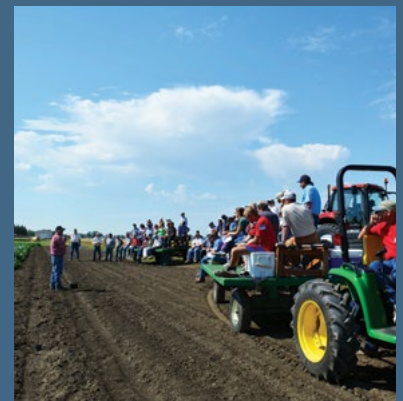
July 13

Eastern AES Sidney

July 19

Western AES Corvallis

July 27



Keep up with the College of Agriculture on Facebook and Twitter: @MSUCollegeofAg, @MSUagVP and @MSUCOA