

AG NEWS

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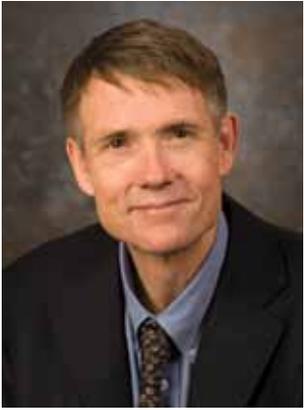
Graduate student Nate Storey tilts traditional greenhouse practices to save space, increase production.

SEE STORY PAGE 10



UNIVERSITY OF WYOMING

COLLEGE OF AGRICULTURE
AND NATURAL RESOURCES



Dean Frank Galey

“ Be an opener
of doors... ”

Ralph Waldo Emerson

Dear Friends and Colleagues,

Although late in arrival, summer is well underway. This time of year is always a fun time in the college. There is a lot of research underway in the field, and we have had opportunities to meet many of you at our field days and other agricultural and natural resource summer events. Excitement is also building as we welcome new faces in our faculty for the start of the new year and prepare to honor our outstanding donors, alums, and research/outreach partners.

Each of our new faculty members will soon be “openers of doors,” and our honorees for Ag Appreciation Weekend are already opening doors for our faculty members, students, and constituents.

We have several new faculty members to welcome. **Dan Levy** will start in August as an assistant professor in the molecular biology department. Dan has received a number of prestigious fellowships for his research about intracellular sensing. His work has been recognized by the American Cancer Society and the Howard Hughes Medical Institute, among others.

Jeff Adamovicz is an immunologist who will be joining our veterinary sciences department. Jeff served as a researcher with the U.S. Army Medical Research unit in infectious diseases. Jeff will be working with others on research about brucellosis in cattle and elk.

Allison Meyer is joining the Department of Animal Science in ruminant nutrition as an assistant professor (see page 5). Allison was raised on a cattle ranch in the Midwest and just completed her Ph.D. at North Dakota State University.

Finally, we were happy to welcome **Doug Zalesky** to direct the newly consolidated Laramie Research and Extension Center. Doug has an extensive background in animal science and comes to us with lots of experience with research and extension from Colorado.

Much of the growth in our excellent programs comes with your help. This year, we are pleased to recognize and thank **Tim Mellon** as this year’s Legacy Award winner. Tim donated the Riverbend Ranch to the College of Agriculture and Natural Resources. This ranch, which is known for outstanding hay production, wildlife habitat, and fishing along the Laramie River, is being marketed and the proceeds will be used to support our programs in wildlife and livestock health.

We are honoring two alumni this year for their outstanding careers and contributions. **Gary Darnall** received two degrees in agricultural and applied economics in the 1960s. Gary operates beef cattle and feedlot operations in Harrisburg, Nebraska. He has received numerous awards for feedlot quality.

Angus McColl, also a 1960s grad in animal science, started a wool fiber testing laboratory in Denver, Colorado. Angus has worked with the University of Wyoming to develop standards for wool fiber testing. His work has helped increase the marketability of U.S. wool over his career.

Our research and outreach partner of the year is **Syngenta Crop Protection**. Its staff members have worked closely with our plant sciences faculty members to develop new treatments for plant diseases. The company has sponsored research, weed extension tours, and graduate students for the University of Wyoming.

Please read the articles in this issue for more details about this year’s honorees. We will be celebrating their service and success at this year’s Ag Appreciation Weekend September 9-10. Please join us for the ag barbecue and the football game (see page 14) featuring the University of Wyoming versus West Texas State.

This issue also contains an article about Assistant Professor **Jay Gatlin’s** research on cell division. We also present **Nate Storey**, a graduate student, who is raising tilapia fish and recycling the water to grow hydroponic vegetables. We also have an article on some of our research about chronic wasting disease in deer and elk.

Thank you for your continued support of your college! Have a great fall! We can be contacted at (307) 766-4133 or by e-mail at agrdean@uwyo.edu. Our website is www.uwyo.edu/UWag/.

Dean Frank Galey

College of Agriculture and Natural Resources

RULE RECEIVES ANIMAL SCIENCE SOCIETY WESTERN REGION'S DISTINGUISHED TEACHER AWARD

Dan Rule, a professor in the Department of Animal Science, received the Distinguished Teaching Award from the American Society of Animal Science, Western Section.

The award, presented during its meetings this summer in Miles City, Montana, recognizes distinguished teaching accomplishments in the animal sciences.

"The University of Wyoming is truly fortunate to have Professor Rule on our faculty," says Doug Hixon, professor and head of the Department of Animal Science.

Rule has taught undergraduate courses in domestic animal metabolism and companion animal nutrition.

"Dan does a tremendous job of teaching organic chemistry principles within the context of the animal. In visiting his classroom, one finds the students totally engaged and interacting with Dan," says Hixon. Rule has developed a study guide and a complete PowerPoint presentation to support his lecture materials and to further explain information in the study guide.

Rule also teaches graduate-level courses.

"Students consistently comment about his ability to explain complicated concepts in an easy-to-understand manner," adds Hixon. "Dan relates these items to real-world production issues so they can understand how even the most basic scientific concepts might have industry application at some point in the future. He also directs graduate students and serves on a plethora of graduate committees."

Rule is adviser to the Block & Bridle Club and served as adviser to the Ag Amba-



Professor Dan Rule, left, receives the Distinguished Teaching Award from Denny Crews of Colorado State University, past-president of the American Society of Animal Science, Western Section.

sadors from 1998-2001. He was selected Outstanding Adviser in the College of Agriculture and Natural Resources by Ag Council; Outstanding Teacher as selected by Ag Council; and received Top Prof recognition by the Mortar Board Honor Society in 2007 and 2008.

His research projects involve dietary effects on fatty acid composition of grass-fed beef. In addition, his research involves the study of lipid biochemistry.

Rule has written or co-written more than 90 papers in refereed journals and 10

book chapters and given numerous invited presentations.

"Rule is also a great department, college, and university citizen," notes Hixon.

Rule has served on the UW Institutional Animal Care and Use Committee since 1996 and has chaired it since 2000. He is chair of the College Tenure and Promotion Committee, served on the editorial board of the *Journal of Animal Science* from 1994-2000, and serves as an ad-hoc reviewer for eight different scientific journals.

FIRST CUTTING

MORE THAN 120 ATTEND POWELL RESEARCH AND EXTENSION

Afternoon clouds provided a cooling canopy for the estimated 120 on research tours during the Powell Research and Extension Center (PREC) field day July 14.

Tours this year were in the afternoon followed by an early dinner. The switch from morning tours and a noon lunch was made to better accommodate busy producers, on recommendation of the PREC advisory board.

“I would say 80 percent of those attending the field day were producers,” says Axel Garcia y Garcia, acting director of PREC. “That’s pretty much the opposite of what has happened in past years. I thought we would have less people, and we had more than last year. It was beyond my expectations.”

Research included corn response to water stress, effects of different irrigation practices on sweet corn, sunflower response to different levels of drought stress, a case study for forage alfalfa crop production, effects of phosphorous on established and newly established sainfoin, spring barley and spring wheat variety performance, and dry bean performance, among many others.

The new seed cleaning facility at the center was also toured.

Those attending the field day were provided a bulletin with two-page synopses of research at PREC and at research and extension (R&E) centers in Sheridan, near Lingle, and at Laramie.

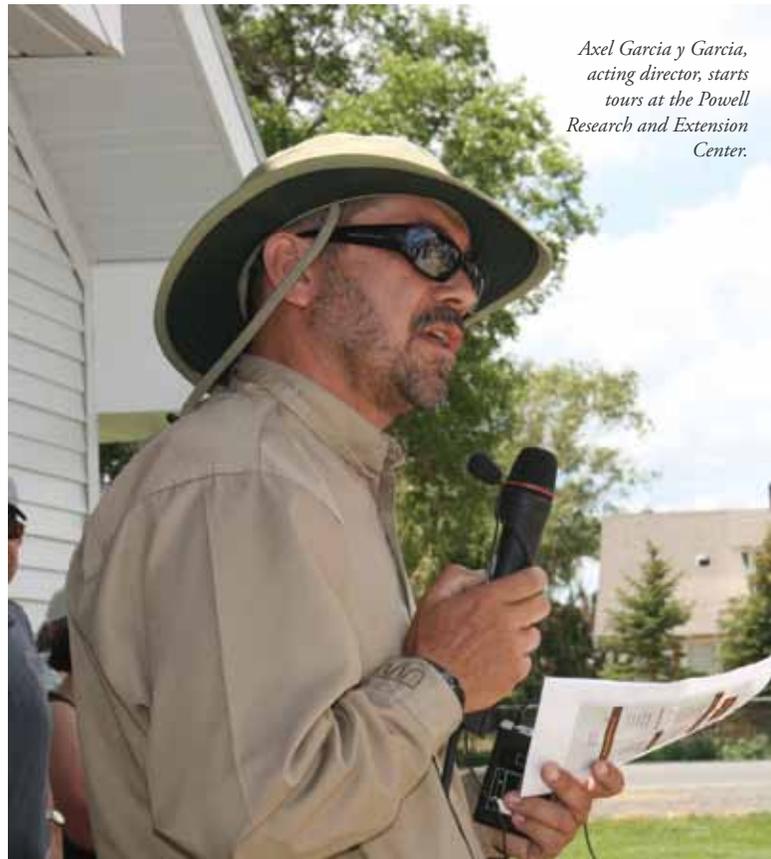
“The main idea for the bulletins is to keep track of what we do at the R&E centers and to have something to provide to farmers to take home for future reference,” says Garcia y Garcia, assistant professor and irrigation specialist. “Contact information is also provided if they want to contact the researchers.”

Mike Schwope has been a PREC advisory board member for more than 20 years. He also thought attendance had increased.

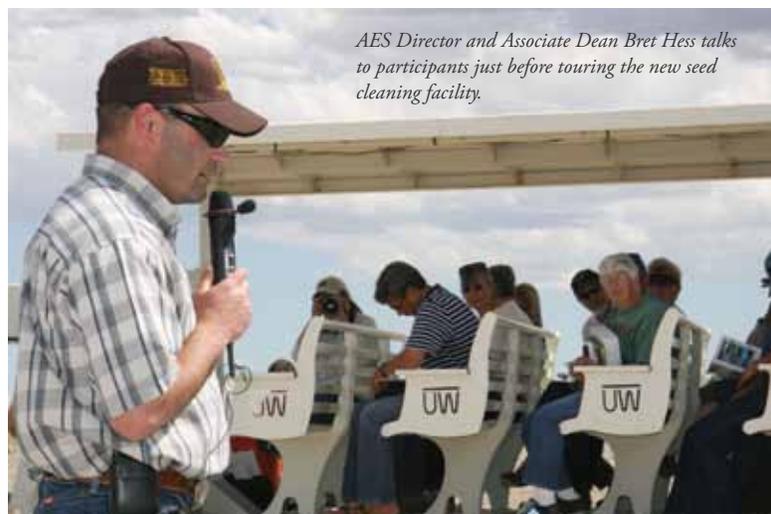
“In fact, I had six or seven of my neighbors here that you never see,” he notes. He wasn’t sure if their attendance was attributable to the schedule change.

PREC farm manager Mike Killen says he believed more growers attended this year.

“I think it had to do with the afternoon schedule fitting them better,” Killen says. “The social time after the tour was a positive thing, too. People stayed afterward visiting. The early dinner was a good, relaxed time.”

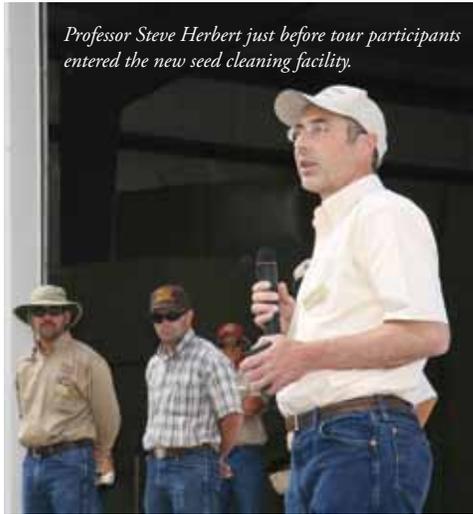


Axel Garcia y Garcia, acting director, starts tours at the Powell Research and Extension Center.



AES Director and Associate Dean Bret Hess talks to participants just before touring the new seed cleaning facility.

CENTER FIELD DAY



Professor Steve Herbert just before tour participants entered the new seed cleaning facility.



Mike Moore explains seed cleaning equipment moved from Sheridan to the Powell Research and Extension Center.



Assistant Professor Anowar Islam presents legume forage research information.

MEYER FILLS ANIMAL SCIENCE'S RUMINANT NUTRITIONIST POSITION

An opportunity in 2009 to collect samples at the University of Wyoming for her dissertation was a key turn for the new ruminant nutritionist in the Department of Animal Science.

Assistant Professor Allison Meyer began August 1, filling the position vacated by Professor Bret Hess when he became director of the Agricultural Experiment Station and associate dean for research in the College of Agriculture and Natural Resources.

Some of Meyer's research had been collaborative work between her adviser at North Dakota State University and Hess. "That was the trip that made me fall in love with Laramie and the university," says Meyer, who received her bachelor's degree from Michigan State University, her master's degree from the University of Missouri, and her Ph.D. from North Dakota State University. "When I saw the position come open last fall, I was excited about the chance to possibly get back here because of my enjoyment of my time here."

Her research focus had been developmental programming. Professor and Rochelle Chair Stephen Ford was also involved in some of Meyer's dissertation research. He had also trained several people at NDSU.

Meyer's focus now is cow-calf nutritional management and examining strategies to improve efficiency. "One of those strategies is looking at gastrointestinal effects of nutritional management," says Meyer.

She is especially interested in strategic supplementation strategies and grazing systems to improve the beef cow's efficiency and her offspring's development and later efficiency.

"And, within that, how that affects the gastrointestinal tract, and especially the small intestine, of both the dam and offspring" she says. "Much of my Ph.D. was looking at some specific growth characteristics of the small intestine and how it was affected during nutritional schemes because the small intestine is the final site of digestion of feed and plays a major role in absorption of nutrients."

Meyer will teach nutritional management this fall, team-teach beef production next spring, and will develop an upper-level course.



Assistant Professor Allison Meyer

CHRONIC WASTING DISEASE RESEARCH ARTICLE GETS TOP HONOR IN UW RESEARCH PUBLICATION

Chronic wasting disease (CWD) research into white-tailed and mule deer herds in Wyoming claimed the top story for 2011 *Reflections*, the research magazine of the College of Agriculture and Natural Resources.

Economic research into what drought-response strategies by producers work best received second place.

An anonymous peer group of faculty members reviews articles and awards first and second places. The magazine is published by the Wyoming Agricultural Experiment Station.

Animal and veterinary sciences doctoral students Melia Devivo and Dave Edmunds are part of the two-stage research study into CWD. Edmunds is finishing investigating effects of CWD on population sustainability and behavior related to the spread of the disease in free ranging, white-tailed deer near Glenrock. Devivo is now examining the effects of CWD in mule deer near Douglas. Working with them is Todd Cornish, associate professor in the Department of Veterinary Sciences.

CWD is a 100-percent fatal disease of white-tailed deer, mule deer, elk and moose, for which there is no vaccine or treatment.



The helicopter crew delivers the first two deer of the day for pregnancy tests and testing for chronic wasting disease by graduate students Dave Edmunds and Melia Devivo and personnel from the Wyoming Game and Fish Department and University of Wyoming.

Radio-telemetry and Global Positioning System collars provide some of the data, including survival, home range size, habitat use, migration patterns, dispersal rates, daily activity patterns, and reproductive success.

Among white-tailed deer findings by Edmunds:

- Females had a higher prevalence than males
- Pregnancy not significantly affected by CWD
- All white-tailed deer equally susceptible to CWD infection
- Migration and dispersal rates were lower in CWD-positive white-tailed deer than CWD-negative deer

Preliminary findings by Devivo include:

- CWD is less common in female mule deer than bucks in the sample area
- CWD does not affect pregnancy in mule deer

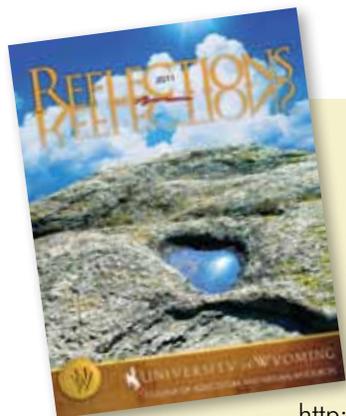
DROUGHT RESPONSE RESULTS

In drought-response research, faculty members built a model ranch on paper, based on a 600-cow ranch in central Wyoming, and then subjected it to drought of various lengths to determine what strategies would work best for ranchers.

The study compared alternative drought strategies across 86 years of precipitation and 27 different cattle price cycle scenarios. Authors are Chris Bastian, associate professor, and John Ritten, assistant professor, in the Department of Agricultural and Applied Economics; Michael Smith, professor in the Department of Renewable Resources and extension range specialist; and Steve Paisley, associate professor in the Department of Animal Science and extension beef cattle specialist.

The research examines late calving, late calving with benefits, early weaning, retaining steers over winter and summer feeding scenarios. Researchers found that, generally, retaining ownership of steer calves over the winter, with the option to sell if forage supplies become scarce, outperforms both partial liquidation and summer feeding.

Reflections is available at UW research and extension centers at Powell, Sheridan, and Laramie, the James C. Hageman Sustainable Agriculture Research and Extension Center near Lingle, and UW Cooperative Extension Service offices. Copies can also be obtained via mail by calling the AES office in the College of Agriculture and Natural Resources at (307) 766-3667.



The online version of *Reflections* in flip-page format and with videos is at <http://bit.ly/qfPRhQ>.



PAISLEY RECEIVES REGIONAL ANIMAL SCIENCE SOCIETY'S EXTENSION AWARD

Associate Professor Steve Paisley, University of Wyoming Cooperative Extension Service (UW CES) beef cattle specialist with the Department of Animal Science, received the Extension Award at the Western Section, American Society of Animal Science summer meetings in Miles City, Mont.

The award recognizes one individual from the Western U.S. for his or her extension programming and education and research efforts.

Paisley has been with UW as beef cattle specialist for 10 years. He works from the James C. Hageman Sustainable Agriculture Research and Extension Center (SAREC) near Lingle.

“Steve has done a fantastic job of fulfilling his duties as our UW extension beef specialist,” says Doug Hixon, professor and head of the Department of Animal Science.

“He has been a tremendous resource for the beef producers, beef organizations, and extension educators in Wyoming. In addition, he provides the University of Wyoming with a beef extension presence both regionally and nationally.”

Paisley was recognized in 2007 by *Cattle Business Weekly* as one of the Top 10 Industry Leaders Under the Age of 40 and received the National Association of County Agricultural Agents Achievement Award in 2008 and its Distinguished Service Award in 2010.

He has completed four master's students and is advising two more. He has contributed 21 peer-reviewed publications, 11 abstracts, and published 10 proceedings papers since coming to UW.



Steve Paisley with his Extension Award in front of the James C. Hageman Sustainable Agriculture Research and Extension Center, where is he based.

His formal research efforts have focused on using ultrasound to monitor muscle and adipose (fatty) tissue development throughout the feeding period of beef cattle while developing implant strategies to enhance the economics while producing a desirable beef end product, says Hixon.

Paisley provides training in the use of the ultrasound technology, is secretary/treasurer of the Wyoming Beef Cattle Improvement Association, administers its feedlot test and carcass evaluation program, and is UW's representative and past chair of the Four-state Range Beef Cow Symposium. He serves as chair for the Profitable and Sustainable Ag Systems initiative team with UW CES.

Paisley was responsible for initial feedlot facility design planning and with the construction of the GrowSafe System to measure individual feed intake in group-fed cattle. He has coordinated GrowSafe, feedlot, and bull evaluation studies at SAREC.

Since 2005, he has received, as principal investigator or co-principal investigator, nearly \$2.18 million in grants and gifts to support his research and extension programs.

“Paisley is a major asset to our department in interacting with and meeting the needs of Wyoming's beef industry clientele,” adds Hixon.

Paisley and his wife, Carrie, have three children, Ty, Todd, and Hadley. They live north of Wheatland in Platte County.

UW GRADUATE STUDENTS WORK WITH BP TO ID EFFECTIVE RECLAMATION PRACTICES

Two graduate students are compiling and sifting through a database from BP of more than 1,000 gas well pads to glean the best restoration and reclamation practices in Wyoming's natural gas fields.

Renewable resources students Benjamin Wolff and Michael Curran, working with the Wyoming Reclamation and Restoration Center (WRRC) and BP, are collaborating with Conservation Seeding and Restoration (CSR), a reclamation contractor for BP, to identify effective and timely reclamation practices.

Both BP and WRRC are funding the project, notes Pete Stahl, director of the WRRC, which is in the College of Agriculture and Natural Resources.

"BP is contributing its large reclamation database developed over the past seven years working in Wyoming gasfields with an estimated value of \$1.2 million," he says. BP is paying the salaries of two CSR employees to work on the project, and the WRRC is paying for the students' graduate assistantships and travel costs.

CSR is based in Kimberly, Idaho, with a field office in Rock Springs.

Gary Austin, BP America's regional regulatory adviser, and CSR restoration ecologist Steve Paulson, who have worked together on gasfield reclamation in western Wyoming for several years, initiated the project. They met with Steve Williams, a professor in the Department of Renewable Resources, who works with the WRRC, and Stahl, Wolff, and Curran.

"I think they could see how much benefit could come from this kind of

"Not only is this research going to be helpful to BP and CSR, but it will be a valuable tool for all of those involved with land reclamation associated with oil and gas extraction in the Rocky Mountain region."

Michael Curran

research – advancing the state of land reclamation in the cold, high deserts of Wyoming, not only for BP and CSR, who will certainly benefit, but for the whole industry and state of Wyoming," says Wolff of Laramie, who took on the project for his thesis.

"We all have very strong interests in reclamation and also in improving our ability to accomplish good land reclamation in the challenging environments we have in Wyoming," says Wolff.

Working out the details took time but, "All agreed the research and potential benefits are too important to let details get in the way," he notes.

The database could help identify trends that lead to successful reclamation of sites disturbed by oil and gas drilling, says Curran of Manasquan, New Jersey, who will also develop his thesis from the project.

"If we can pinpoint and understand these trends leading to successful reclamation, that knowledge is going to play a huge role in implementing successful practices on future reclamation projects," he says.

Organizing the database is the first phase. The database will incorporate more than 1,000 BP well pads undergoing reclamation. General reclamation trends will be isolated and techniques for further examination identified.

The infusion of Geographic Information System information will boost the database horsepower.

"Without the geospatial component, essentially all we have is a database that can perform limited operations," says Wolff. "The geospatial component allows us to take the analysis several steps further by integrating space and time with data transformation to produce complex models and thematic maps. This allows us to better understand reclamation by isolating gaps in knowledge and identifying reclamation trends."

The results could have wide-ranging effects.

"Not only is this research going to be helpful to BP and CSR," notes Curran, "but it will be a valuable tool for all of those involved with land reclamation associated with oil and gas extraction in the Rocky Mountain region."

Results and any recommendations coming out of the study, including best management practices, will be made publicly available, says Stahl.



RESEARCHERS TOUT CROP, LIVESTOCK RESEARCH AT SAREC

Academia-speak met agriculture-for-a-living-speak during the July 21 field day at the James C. Hageman Sustainable Agriculture Research and Extension Center (SAREC).

Producer Larry Cundall, who is also on the SAREC Citizen's Focus Group, presented information about training cattle to eat Scotch thistle and about the value of forage kochia amidst University of Wyoming researchers offering results of fenugreek, forage legumes, soil fertility, and winter protein supplementation effects on livestock, among many others.

His topics ended three separate tours those attending could take: dryland crops, irrigated crops, and livestock research.

"One of the things we had talked about from the very beginning, when we closed the Archer and the Torrington research stations and started SAREC, was we wanted to engage the community and get the information out to the farmers and ranchers in a way that will help them," says Jim Freeburn, SAREC director of operations. "Do meaningful research and get it disseminated; discovery, dissemination, and engagement. Larry is big on all

three of those. He wants to make sure we are doing things that are local and valuable to the agricultural community. Their tax dollars are supporting this work that we do."

SAREC staff members said about 93 people were on hand to eat lunch. Freeburn noted he saw people he had not previously seen attending the tours. "It was nice to see some of the people who had not been here for some years and who said, 'Man, the place looks nice. I can't believe the amount of flags, stakes, and research projects going on here. Make sure you get the word out to the people.'"

This past year, the facility hosted public school students, 4-H and FFA members, cattlemen and stock growers associations members, and the Wyoming Bankers Association agricultural meeting.

Freeburn has an open invitation to anyone wanting more information about the facility.

"Any group or individual who wants to come out and learn about what is going on here, we will always try and host them and show them what we have and what we are doing," he says.



Dean Frank Galey talks about the importance of ag research to the nation.



Wendy Cecil, research associate in plant sciences, provides an update of fenugreek research.



Producer Larry Cundall presents information on forage kochia research.

FOR MORE INFORMATION

For a video about weed research by Andrew Kniss, see: <http://bit.ly/oLKQ1R>

For Dean Frank Galey's discussion on importance of agricultural research, see <http://bit.ly/pglEWw>

For Larry Cundall's presentation on forage kochia, see <http://bit.ly/pfU7z2>

To view the 2011 Field Days Bulletin, which shows research at all the research and extension centers, see http://www.uwyo.edu/UWEXPSTN/_files/docs/Field%20Days%20Bulletin%202011.pdf



Ph.D. candidate Nate Storey describes in these videos how the hydroponic system works and how vegetables are grown.

- How the system works http://www.youtube.com/watch?v=_Nfcat6jXBo
- What vegetables are being grown <http://www.youtube.com/watch?v=wKbPjrCp4AM>

GROW UP, NOT SIDEWAYS

Nate Storey tilts traditional greenhouse practices to save space, increase production

Sounds of chattering water like a waterfall play upon the ears, and the aroma of cool, fresh air washes over the faces of those venturing into the vertical world of Nate Storey.

Visitors walk near long, skinny, square white towers that stretch from just above large tubs of water to the greenhouse roof. Plants with roots firmly anchored into the growth media (a major hurdle Storey solved) tap into the nutrient-rich water piped to the top and percolating through the towers in a few seconds. The square tubes' verticalness and solid swag of green give the impression of trees.

To some, Storey's aquaponics project is a vertical greenhouse. To others, it's an idea generator, a problem solver, a model

that integrates several systems, an enabler facilitating growth for its plants and also its designer.

The Ph.D. student, who expects to defend his dissertation next spring "if nothing awful happens" became interested in the aquaponics project when he completed his bachelor's degree ("Miraculous in itself," he quips) and identified problems to solve for the project during his master's. His Ph.D. will be in agronomy, "Which is kind of ironic because there is no soil involved in what I do here," he says. "It's mostly a crop."

What sits at the Laramie Research and Extension Center Greenhouse eagerly producing vegetables culminates several years of work.

FISH AND PLANTS

Its production emphasis is vegetables and not fish. Fish provide plant nutrients. Storey wanted to integrate fish and plant culture and eliminate waste from both. His end result recycles every input; nothing is wasted.

"I discharge zero water," he says. "The water in the tanks has been circulating for years now. All my fish waste goes into worms. I keep worm bins and use them to produce worm castings for compost forming, and the waste from plants goes into compost bins. I use the compost for seedlings. Everything recycles."

Aroma of fresh earth emanates from the media in which the plants grow. All the bacteria remain, and the water runs

through the towers in as little as 10 seconds from top to bottom. By using the material he eventually found for the media, water percolates through a high-surface volume, the worms are happy, and everything stays aerobic and healthy.

HARD TIME FINDING FUNDING

While science built the system, money fuels the vertical greenhouse, something Storey had a hard time finding. He credits his mentor and committee member, lecturer Dave Wilson.

Wilson encouraged Storey to pursue a doctorate. “Dave has been a real mentor, in addition to being a great professor,” says Storey. “He talked me into pursuing a master’s and kind of coaxed me into it, giving me somewhat free rein of research. Of the possible research projects, integrated systems seemed really interesting to me.”

Storey had difficulty seeing the significance of academia. “Honestly, I didn’t see it, but the College of Agriculture and Natural Resources helped with an assistantship here and there and Dave managed to find me funding in obscure corners of the college, putting things together when no one would. I wrote so many grants, thousands of hours I’ve spent grant writing and never funded. The research was perceived as too risky or as not really fitting into one category. Dave found me money to do this – not a lot of money, but enough to keep going.”

TIED FOR TOP ENTERPRISE

Storey has had an infusion of cash. His project tied for first with another ag Ph.D. candidate – Christoph Geisler – for first in the 2011 Wyoming \$10K Entrepreneurship Competition through the UW College of Business.

Still, despite the frustration over money, he’s enjoyed the ride.

“The fun thing about this project is I kind of introduced people to small segments as I go along,” he says. “If at the beginning I introduced all I wanted to do, I would have gotten shot down.”



Fish provide nutrients for the vegetables grown in the system. The water stays fresh; Storey has not changed the water in years.

WATER STAYS FRESH, VEGETABLES GROW, FISH ARE HAPPY (WELL, WE THINK SO, ANYWAY)

The how sounds simple now. Putting it into practice was more difficult.

Ammonia from fish waste is oxidized into nitrates, which provide nutrients for the plants. Worms (“They’re incredible biological machines,” says Storey) munch their way through algae, roots, and other organic matter turning out worm castings, which are high in plant-available nutrients.

The water stays fresh, the fish and worms do what they do, plants grow, and nothing is wasted.

“Every plant we have put in has done well,” says Storey. “The principle behind the towers is to take horizontal, growing plants and put them vertical. A lot of people say, well, how does this give you anymore beyond that?”

“The reality is, if you look at a single plant in a horizontal greenhouse, there is a lot of wasted space for people to gain access (to seedlings), those seedlings have limited foliage, and the shoots coming off the seedlings are not well developed,” he says. “This is treating greenhouse space as a function of floor space. Think about it volumetrically. There is 14 feet of greenhouse space but you are only using 6 inches of it for greens production. You are wasting 13½ feet of volume.”

By flipping the plants, light can be manipulated how it gets to the center of the mass. “You can stack young plants up front and successively put older generations to the rear and then harvest from the rear and slide the young ones back,” he notes.

Storey claims the process lets him triple what he could produce in the same area horizontally.

But where the project becomes really tantalizing is his views toward commercialization. By not having to hire people to harvest and package the vegetables, and by meeting a demand for locally grown food, Storey reduces costs.

There would be live, in-store sales.

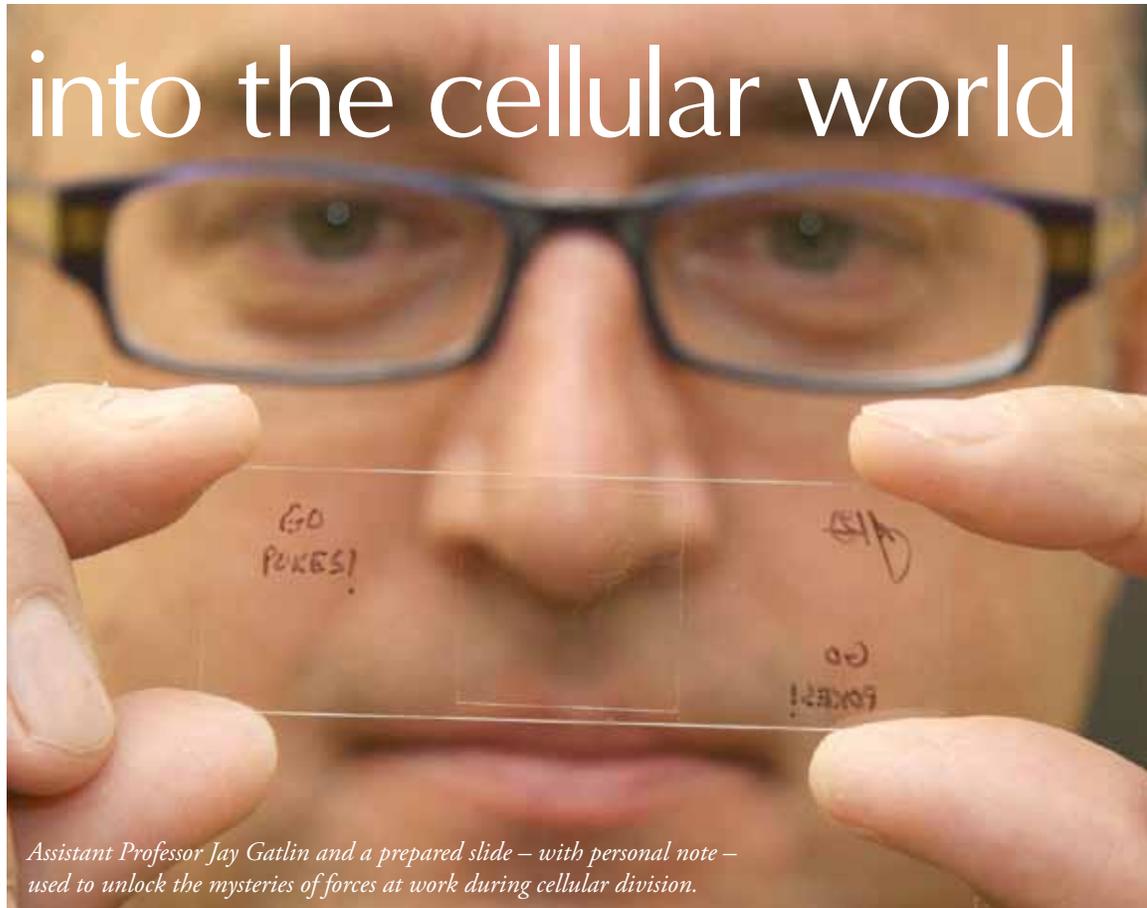
“That accomplishes several things,” he says. “Live sales for producers reduce labor costs dramatically.”

Consumers would harvest what they want on the spot.

“That’s the end ideal,” he notes. “I can outsource a lot of costs to the consumers, and they will be much happier doing that kind of labor for me.”

Peering into the cellular world

Jay Gatlin wants to increase resolution of the measurements used to gauge mechanics in the delicate ballet of cellular division



Assistant Professor Jay Gatlin and a prepared slide – with personal note – used to unlock the mysteries of forces at work during cellular division.

A researcher in the Department of Molecular Biology is peeling away the mysteries enshrouding a cellular process occurring billions of times a day in a body, is absolutely precious to life, and traces back through the murky eons of time to our origins – a living Xerox copier set on automatic.

It's cell division, something every high school biology student studies, but Assistant Professor Jay Gatlin and his laboratory team take such study exponentially higher, of course.

For example, he measures the amount of force (measured in picoNewtons) exerted to pull chromosomes toward opposite ends of the mitotic spindle, the football-shaped form with two distinct poles that takes shape during cell division. One Newton roughly corresponds to the weight of a cup of tea. If a Newton is divided by 1 million, the result is a microNewton. If a microNewton is divided by 1 million, the result is 1 picoNewton



African clawed frogs provide the egg extract used in Gatlin's research.

Such work fits nicely with his undergraduate mechanical engineering degree. He'll say words like protein motor and cantilever and phrases like "proteins walking."

Gatlin received his mechanical engineering degree from the University of Colorado at Boulder, took time off that included a year as a ski instructor and work as an acoustical



"MAKING QUALITY SPINDLES IN FROG EGG EXTRACT SINCE 2010"

engineer. He received his Ph.D. in cell development biology from the University of Colorado at Denver School of Medicine in 2005.

IT'S MECHANICAL

He notes cell division is very much a mechanical process.

“This structure (spindle) is assembled by the cell, and its function is to physically pull duplicated chromosomes apart. The spindle has to pull apart chromosomes attached through linkages. During mitosis, all the chromosomes align and a checkpoint becomes inactivated and – Bam! – the cell divides,” he says. “This movement requires the generation of force. We know very little about what sort of forces this thing is capable of generating. By understanding the forces, the dynamics, we can learn a lot about the structure itself, how it is assembled, how it works.”

Gatlin and his lab associates' accomplices are a stable of African clawed frogs (*Xenopus laevis*), which supply eggs that are crushed into an extract, sperm nuclei are added, and then calcium to induce the eggs to go through the life cycle. The DNA replicates and then the calcium is removed, which coaxes the interphase nuclei (the state in which the cell spends most of its time) to go into mitosis – the segregation of duplicated chromosomes.

“The beautiful thing about the system is that, not only can we induce the cell cycle to progress forward, but we can stop it as well,” he says. “They form these beautiful mitotic spindles that are stuck there for hours. So, now I have this system that is completely open to manipulation. I can add purified proteins that have fluorescent markers and pharmacological agents. It's very easy. You simply add them to the test tube and see what effect you have on the spindles and on the assembly process.”



Eggs extracted from Xenopus laevis.

INSIDE CELL DIVISION

He'll simplify the process for those who aren't cell biologists. The spindle is made up of microtubules, which act as structural elements like trusses and beams in a building. In the spindle, however, these elements are not static; they're constantly falling apart and rebuilding themselves and also being moved around by protein motors.

“Imagine making a house of bricks that can move and disintegrate after only a couple of days,” says Gatlin.

This results in a constant flow of microtubules from the middle of the spindle

toward its poles, a phenomenon called flux. This generates forces that push the poles apart. Other forces work to pull the poles together, and this tug-of-war results in a spindle with a constant length. Microscopic probes can be inserted into the spindle to measure the forces involved in the inward and outward pulls on the microtubules. Gatlin's lab uses a machine replete with joy sticks to manipulate the probes.

WANTS TO DEVELOP NEW APPROACHES

Gatlin wants to improve the resolution of these types of measurements by developing new microscopy-based approaches.

“There are forces that want to bring the two poles together and forces that want to keep them apart,” he says. “I'm interested in measuring the magnitude of the forces in hopes that, by understanding or characterizing these forces, we will begin to have a better understanding of spindle function in general, how it pulls the chromosomes apart, and what it is capable of doing.”



Assistant Professor Jay Gatlin and where his African clawed frogs are housed.

AG APPRECIATION

Schedule of Events

The College of Agriculture and Natural Resources outstanding alumni, research partner, and legacy winners for 2011 will be honored September 9-10 as part of Ag Appreciation Weekend, a celebration of the importance of agriculture to Wyoming's history, culture, and economy.

Ag Appreciation Weekend events include:

FRIDAY, SEPTEMBER 9

- Dean's Ag Appreciation Dinner. Attendance by invitation only.

SATURDAY, SEPTEMBER 10

- 29th annual Ag Appreciation Day Barbecue, 1:30-3:30 p.m. at Tailgate Park. Tickets can be purchased at the event or prior to the event by contacting Laurie Bonini in the Office of Academic and Student Programs at (307) 766-4034 or lbonini@uwyo.edu.

College of Agriculture and Natural Resources student organizations will prepare and serve the meal. Proceeds provide scholarships for College of Agriculture and Natural Resources students and help fund various agriculture college student organizations. Sponsors include the College of Agriculture and Natural Resources, local businesses, agricultural groups, and individual donors.

- UW vs. Texas State football game, 4 p.m. The College of Agriculture and Natural Resources has reserved Ag Appreciation Weekend group football tickets. The tickets are in section G – adults \$22, children \$10. Go to www.wyomingathletics.com and scroll over Tickets and click Promotions; click Here to enter the promotion code, which is AGDAY; enter the code into the box and click Go; click on the Texas State game; enter the ticket quantity and then click Add to Cart; enter the word verification and click Continue; select ticket delivery method and click Check Out; click on Register Now to enter customer information and complete transaction. Go Pokes!

Outstanding Alumni Award

World's wool industry relies on Yocum-McColl for industry standards

Angus McColl graciously got out of his vehicle in the mid-day blazing heat of July in Denver, having driven to a parking lot not far from his business to rescue a lost sheep, taking pity on the writer who followed all the directions to McColl's business near I-25, except one.

This College of Agriculture and Natural Resources Outstanding Alumni Award recipient with the iconic first name of Angus has been a stalwart of the U.S. wool business for decades.

PRAISE FROM INDUSTRY

"The Angus McColl-led transition to an internationally accepted standard was instrumental in stopping the extinction of the wool business in the USA," states Terry Martin of Anodyne Inc. of San Angelo, Texas.

Adds Rick Powers, trading manager at Lempriere USA Inc., "Without his testing house, our business would completely stop. I just want to thank Angus for his dedication over the years."

And one more – "For nearly 50 years, the entire U.S. wool industry has depended upon Angus as contracts are written and value is determined," wrote Larry Prager, president of the UW Alumni Association and general manager of Center of the Nation Wool Inc. of Belle Fourche, South Dakota. "Millions and millions of pounds of wool have gone to market with the stamp of Yocum-McColl test results. Few can comprehend the importance of Angus' role."

More about Yocum-McColl later.

EPICENTER OF WOOL TESTING

For now, McColl, who graduated in 1960 with a bachelor's degree in animal science, acted as shepherd leading the writer to Yocum-McColl Testing Laboratories Inc., the center of wool testing activity in the United States. A wide range of wool samples awaited for average fiber diameter, staple length and strength, as did llama, cashmere, llama, and alpaca samples. McColl has contributed to several studies that changed the way animal fibers are sampled, tested, and sold, says Professor Christopher Lupton of the Bill Sims Wool and Mohair Research Laboratory at Texas A&M University in San Angelo.

Those studies included evaluation and different coring tube sizes for sampling wool in bags and bales; evaluation of instruments that use laser and automatic image analysis to measure characteristics of animal fibers; and new studies about near-infrared reflection spectrometry for clean yield, ash content and residual grease in wool, as well as evaluation of developing technologies to measure luster in alpaca and mohair.

WOOL VALUES DEPEND UPON ACCURACY

"The core tests his lab issues report fiber fineness detail and percentage of yield," notes Prager. "The values our producers receive each year for their wool depend on the accuracy of the test results. The wool mills that purchase the wool also depend on the test results as different wool lots are combined for processing. The entire wool marketing chain takes for granted the accuracy and integrity of

WEEKEND

winner builds international reputation

Yocum-McColl because we know Angus McColl and his clinical procedures are in place. Even our export customers accept his tests without question. Yocum-McColl is truly an international business, and his reputation is known wherever fiber testing is to be done.”

Not more than nine years after emigrating to the U.S. from Scotland (see related story), McColl became co-owner of Yocum-McColl in 1964 with his former manager, Ira Yocum. The original building was on Blake Street, and, in 1972, the business moved to West Elk Place, both locations close to downtown Denver.

McColl, drawing upon his experience working with machinery on his grandfather’s farm in Scotland, designed many of the machines in his shop because he knew what he wanted was not available.

“I went to a machine shop and found someone good with machines,” he says. “I told him what I needed.”

DECISIONS THAT BOLSTERED HIS BUSINESS

He easily ticks off the major changes that propelled Yocum-McColl to the forefront: the development of the subsampler for reducing wool samples to meet testing specifications and the introduction of the Sirolan LaserScan to measure fiber diameter.

Measuring the fiber diameter of wool had been a laborious process – individual operators sat in the dark peering at images of wool hairs displayed onto a flat surface by microprojectors. The operator would then hand-measure and then record up to 800 hairs per sample.

McColl knew there was a better way. When Professor Robert Stobart in the De-



2011 Outstanding Alumni Award recipient Angus McColl with wool samples at his testing facility in Denver.

partment of Animal Science at the University of Wyoming asked if McColl would be interested in bringing a laser scanner into the country, he jumped at the chance.

“He asked if I was interested in working with the University of Wyoming, and I replied, ‘You bet I would!’” McColl says. “I told him what I would like to do is have the LaserScan with the understanding we would keep it long enough so the mills could use it in their quality control labs.”

The Sirolan LaserScan had arrived in the U.S. duty-free because it was used for education. When the LaserScan had to be returned to Australia, McColl found out how much the machine cost and purchased it.

“That way we exposed wool industry people to the instrument and what it could do,” he recalls. “From then on, it was a big turning point in the whole testing procedure. We were getting swamped with the projection microscopes. At that time, I was also voting on two instruments that were being accepted into international trials for fiber measurement (Sirolan LaserScan and OFDA100). We actually participated in international trials, and we were right on the money on both instruments, which gave us a lot of confidence the new laser scanning and image analysis instruments would work for us here.”

ALPACA INFUSION

Getting involved in the alpaca industry was a second major development. “It helped us tremendously,” he says. Individual animal fiber measurements for alpacas, angora goats, llamas, and, of course, sheep, expanded the customer base of Yocum-McColl in the U.S. and abroad.

Since 2007, the facility has provided fiber testing for expected progeny differences (EPD programs). He has been a proponent of using wool samples as a means for selecting animals and has written articles and given numerous talks to producers on the value of objective measurement in their selection programs.



State-of-the-art equipment helped propel Yocum-McColl to the forefront.

- A leader in wool testing
<http://www.youtube.com/watch?v=Tz6lrKjEBIY>

OUTSTANDING ALUMNI

AG APPRECIATION

Lack of opportunity propelled McColl to America

Angus McColl's first views of Wyoming were nothing to write home to Scotland about.

McColl and his wife emigrated from Scotland in 1954, bound to the United States and a better life than working on the farms of Scotland. Most of the land was leased by farmers from the nobility.

There were few opportunities.

In America, the couple was met by friends in Rawlins before driving to Lander. He was by then second-guessing his ocean-hopping venture. "The wind was blowing and cinders were blowing along Front Street," he remembers. "I was thinking this might not be the best plan in the world."

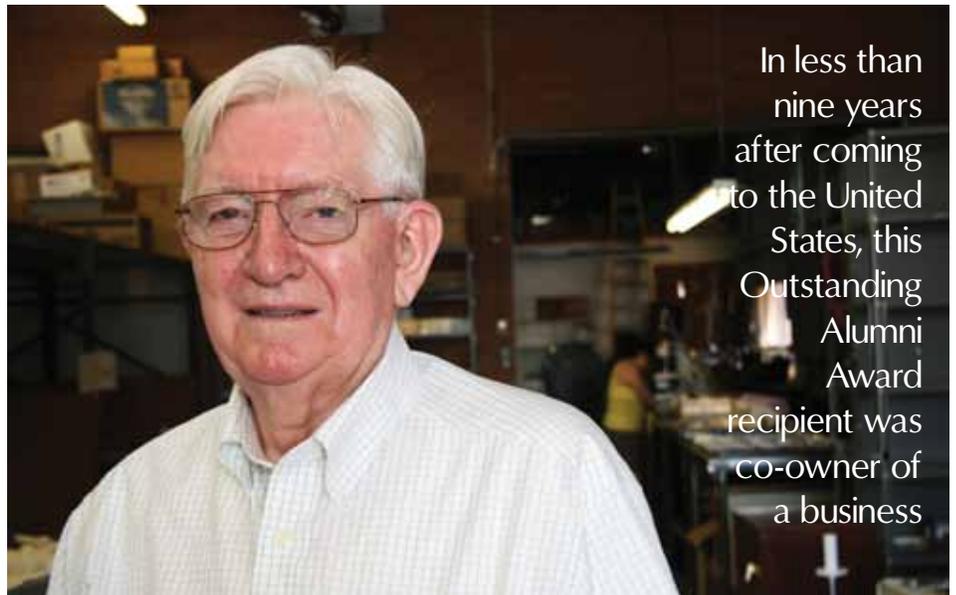
At that time, it was too wild a thought he would become co-owner of a business within nine years of his arrival in America and become a national and international force in the wool industry.

INITIAL REACTION TO WYOMING SCENES

His trip to Lander did not help. Compared to the pristine fields of Scotland, he saw dead coyotes hanging on fences and dead cows and horses on the range. "I had some concerns about what I had done," he recalls.

One of the provisions of his coming to America was a job awaiting him, and so his local connections promised he would be in demand working with sheep. His first job was unloading railroad cars for Purina Mills. He later worked for a transportation company as a truck and bus driver. His driving adventures eventually took him to Laramie and the University of Wyoming one homecoming weekend.

He was to meet a fellow Scot – Professor Alex Johnson ("Mr. Wool," says McColl, and smiles), who tried his best to recruit McColl as a student in wool science, and



In less than nine years after coming to the United States, this Outstanding Alumni Award recipient was co-owner of a business

McColl told him he would come back. But, he felt odd about returning to school at an older age.

"Finally, I realized it was a good idea. I thought it was time for me to attempt new challenges in my life in the United States," he says with his Scottish burr.

JOINS BOSS TO START OWN COMPANY

After earning a bachelor's degree in animal science, he toyed with working toward a master's degree, but at that time he saw many Ph.D.s without jobs. He took a position at a testing company in Denver with Ira Yocum as his boss. But his Scottish no-nonsense outlook – and his natural aptitude – saw several things he didn't like in the company, and he gladly left when Yocum asked if he would be his partner in starting a new business.

That was in 1963, and Pendleton Woolen Mills became the first client in 1964 of Yocum-McColl Testing Laboratories Inc.

"When we got started, the first two years were tough," McColl says. "We had

talked to people before we left that company asking if they would support us, and they said 'Yes. We know who you fellas are. We don't know who they're going to hire to replace you.'

"Ira and I worked together for years," notes McColl. He bought out his partner in 1981.

HAS LONGTIME EMPLOYEES

He now employs about 12. McColl with his wife, Margaret, and his sister, Sheena, are among the 12.

"Many employees have been working here years and years," he says, and introduced Diane Manzanares, in her 31st year at the lab.

"I always ask them, 'Do you know any way we can do something better?' The worst thing you can do is micromanage," McColl says. "If you do that, you erode the initiative of experienced people to perform their own jobs."

In January, McColl was presented the 2011 Wool Excellence Award by the American Sheep Industry Association during its meeting in Reno, Nevada.

WEEKEND

Donation bolsters college's wildlife-livestock disease research capabilities

A Riverside man's donation of the Riverbend Ranch west of Laramie to the UW Foundation will dramatically affect wildlife-livestock disease research in the College of Agriculture and Natural Resources and across the Intermountain region.

In honor of Tim Mellon's donation of the ranch, the college has presented him the Legacy Award. Mellon and other award recipients will be honored during the college's Ag Appreciation Weekend September 9-10.

The college will use the proceeds of the sale to fund the Riverbend Ranch Endowed Chair in Wildlife-Livestock Health.

"The gift is a tremendous opportunity for UW to further the great work our folks are doing in the wildlife-livestock disease area," notes Frank Galey, dean of the college, who also chairs the Wyoming Brucellosis Coordination Team.

The gift's benefits fit nicely with the biosafety level-3 laboratory recently completed at UW. The laboratory will allow research into select agents, including brucellosis.

"I was truly amazed when I looked at this facility," noted UW Trustee President Jim Neiman at the lab's dedication last fall. "The contribution this lab will provide to the state's management of wildlife and to our livestock industry will be second to none."

Mellon's contribution provides a link that was missing in the research capabilities



Tim Mellon

of the university, says Kermit Brown, of Laramie, also on the coordination team and who represents Mellon. "That was the researcher who could bring all the components together."

Mellon moved from Texas, where he had been in ranching, to the ranch in 2005. "We were intent on living in a rural area," he says. The family has since moved to Riverside.

"I had already donated a conservation easement to the Wyoming Game and Fish Department," he notes. "It is already protected from development."

One stipulation as part of the donation to the UW Foundation is that it never be divided. "My intent is to keep the land as one entity," says Mellon.

ORIGINAL RIVERBEND RANCH PART OF UNION PACIFIC LAND GRANT

The Riverbend Ranch grew out of the land grant given by the U.S. government to the Union Pacific Railroad as it made its way across the Western U.S.

UP had the odd-numbered sections in the 10-mile wide swath given to it on either side of the tracks. There is a certain closure of the relationship between the ranch and the University of Wyoming. The railroad was allowed 1 to 2 square miles of land per 36-square mile township to give to the states – to fund land-grant universities.

The first owner of the land, a much smaller parcel in the 1880s, was the Northwestern Land and Iron Company, notes Jill Zimmermann, manager of the ranch since 2001. Next came the Denver-Laramie Realty Company. The original land was later sold in individual parcels. According to Zimmermann, Oda Mason purchased and consolidated many of the smaller parcels in 1929.

Land has been added and sold through the years. The ranch now comprises about 6,500 acres, says Zimmermann.

LEGACY AWARD

AG APPRECIATION

Outstanding alumni award recipient's direction

This western Nebraska high school track standout went west for his college degrees but his compass always pointed home.

Outstanding Alumni Award recipient Gary Darnall always intended to return to the livestock and farming operation that grew from his great-grandfather's homestead nestled against the Wildcat Hills near Harrisburg. That homestead certificate is the only plaque hanging on one of the walls of the Darnall Feedlot offices. The room's other walls abound with certificates and plaques from his community service and achievements.

"My whole goal was to come back to production agriculture and, hopefully, to the ranch," says Darnall. His return to fulltime at the farm/ranch had to wait until farm economics changed in the early 1960s. The family was not sure if the operation would support Darnall and his wife, Emilie, and two children, Lisa and Lane, and his parents, Harvey and Mattie.

TAUGHT, FARMED, RANCHED FULL TIME

After teaching classes at Western Nebraska College and as a vocational agricultural teacher – all the while working at the farm/ranch – the economics changed and Darnall was able to join his father.

Darnall sought advice and expertise from others. The operation now employs 16, including three part-time employees, including his daughter, Lisa, and his son, Lane, who have joined the operation full time.

"We have grown the past few years. We've had several good economic times and made some money and invested in land," says Darnall.



2011 Outstanding Alumni Award recipient Gary Darnall in the Darnall Feedlot offices talks about skills needed to be successful in production agriculture and in life.

"We continue to grow as finances, regulations, and ag economics dictate. I was fortunate my father was very forward-thinking and willing to take risks in buying land. I could not have accomplished the present situation if it was not for my family, partners, and many friends. Partners include key employees, good friends, business partners, bankers, specialists such as university researchers and educators, consulting veterinarians, nutritionists, and agronomists."

ADVICE ABOUT CAREER IN PRODUCTION AGRICULTURE

That's a theme continually touched upon by Darnall, including his advice to young people thinking about a career in production agriculture.

"Be focused and have a goal," he says. "Know what you want in life. That goal

may change but keep your goal in mind and associate with people to help you gain that – whether a mother, father, a friend – they all contribute in some way. No one accomplishes on his or her own. I know that sounds simplistic, but I really believe that."

Then, he says, comes hard work and dedication.

"One of the greatest crises facing production agriculture is not having young people going into production agriculture," he notes. "The major concerns are the financial investment and the cash flow in production agriculture. The physical labor requirement versus other industry employment is another big factor. An individual has to have the drive to pursue production agriculture and seek help from others."

OUTSTANDING ALUMNI

WEEKEND

always pointed to production agriculture

RETURNED AFTER COLLEGE TO WORK WITH FATHER

Like with his son, Darnall returned from college to work with his father.

“I had a great relationship with my father and mother,” he notes. His father has died but his mother lives at the home place. “However, it was not always smooth. At times, we had to sit down and talk about things. If I had an idea and he was skeptical, we were fortunate enough to talk it through. As a result, the transition was smoother. I don’t think there is anything greater than a business father-son relationship if things are going well and nothing worse if it is not.”

Lane never planned on returning to the operation.

“I was ready to move on to the bright lights, the big city,” Lane says. “After four years of college and working on my master’s, I realized there wasn’t anything better than being home with my parents on the ranch. It didn’t look so bad anymore.”

Missed Production Agriculture

He missed being in production agriculture. “But the operation wasn’t big enough for three families – grandparents, parents, and my family,” says Lane. “My dad said, ‘Make a plan how to make this work,’” Lane recalls. “I sat down and made a plan for five years, for 10 years, to rent ground and make a living and yet be on the ranch.”

He leased land and started farming. Eventually, the operation grew enough to support both families.

“I think we have a really good father-son relationship,” says Lane. “But we also have a very good employee-employer relationship. We both know where we stand with each other.

“I think my dad is one heck of good

teacher, not just in production agriculture but in life and business. I feel lucky I was able to come back and learn from him. It’s an experience I hope to be able to pass on to my son, Tyler (19), and daughter, Shalane (21).”

Lisa, an accounting major at UW, has also participated in the operation.

“While involved full time in other business and family ventures with attorney husband Bob Brenner, Lisa does the payroll and various accounting functions for the operation,” says Gary. “Bob is also available to us for guidelines and legal advice, and together they have been a great asset to us and the business.”

“Be focused and have a goal.

Know what you want in life.

That goal may change but keep your goal in mind and associate with people to help

you gain that – whether a

mother, father, a friend – all

contribute in some way.”

—Gary Darnall

GIVES TIME TO HELP OTHERS

Gary Darnall is a member of many organizations, industry and service-oriented.

“The main thing is we feel so fortunate to have the opportunity to give back to our community and the industry we are in,” Darnall says.

Nomination letters for his Outstanding Alumni Award teemed with industry and service organization notes.

Steve Paisley, associate professor in the College of Agriculture and Natural Resources and the extension beef cattle specialist, grew up in western Nebraska and has known Gary and his wife, Emilie, since his childhood.

“What sets Gary and his family apart from other people, other families, and other businesses is his extremely generous attitude, willingness to help people, especially cattle producers, and his desire to help the beef industry in general,” says Paisley.

Long-time friend Robert Fiero notes one such example. A close friend of Darnall, Stan Murdock of Pinedale, died from injuries in a horse accident.

“Gary believed he had a moral obligation to assist Stan’s family in settling the estate, selling calves, harvesting the hay crop, and finding a suitable foreman to run the ranch operation,” notes Fiero. “He does not seek the limelight, but he is a man of wide vision and full of Christian love for his fellow man.”

AG APPRECIATION

Outstanding alumnus progressive in feedlot

Finding a cleaner feedlot than the Darnalls' might be difficult.

A tractor continually scrapes away the manure on the surface of the pens, keeping flies at bay. Pumpkin Creek runs west-east through the property and is one of the reasons Gary Darnall's great-grandfather homesteaded the site. However, feedlots and creeks don't mix. No feedlot effluent reaches Pumpkin Creek. The Darnalls built waste lagoons and pumping systems that catch the manure mix. Solids settle into an initial basin, and the liquid is pumped into the lagoons. The waste is then pumped through pivots onto crops and the manure spread on crop ground.

Vaccinations and other procedures take place in buildings at two locations.

CASTS A LARGE SHADOW

Darnall has "cast a very large shadow across the plains of southwest Nebraska," says Robert Fiero, who first met Darnall as a student in the college of agriculture and was also a member of the track team with Darnall.



Gary Darnall discusses his procedures and the policies that government feedlots.

- Skills needed in production agriculture <http://www.youtube.com/watch?v=d1tRgfpM7Hg>
- Feedlots require precise, consistent records http://www.youtube.com/watch?v=92_4FBZLRww
- Feedlots wrestle with many regulations <http://www.youtube.com/watch?v=LtHOIPH2Txw>

"Through hard work, dedication, devout faith, and willingness to take risks, Gary has transformed the Darnall Ranch operation into a 20,000-head feedlot, a quality commercial Angus herd and farming operation that supplies a large portion of the ranch's feed requirements," notes Fiero. "The feedlot is state-of-the-art and in compliance with environmental regulations."

"My one regret is that we cannot claim him as a University of Nebraska alumnus," exclaims Linda Boeckner, Institute of Agriculture and Natural Resources district director at the University of Nebraska's Panhandle Research and Extension Center near Scottsbluff.

She noted Darnall's participation in planning for Nebraska research and extension programs and in promoting and acquiring funds for building the expanded research feedlot in Scottsbluff.

COOPERATOR WITH UNIVERSITIES

Darnall has cooperated with the University of Nebraska integrated ranch management pen of five steer feeding program for many years, says Doug Hixon, professor and head of the Department of Animal Science at UW. "This has given cow-calf producers in Nebraska and Wyoming the opportunity to feed cattle to finish and evaluate both their genetics and retained ownership as a marketing alternative."

Darnall was one of the first to adopt integrated pest management to improve cattle performance, reduce herd health cost, and save pesticide costs, says John Campbell, professor emeritus at the University of Nebraska and an undergraduate classmate of Darnall at UW. He and his wife have been friends of the Darnalls for more than 50 years. Campbell and his colleagues could count



Gary Darnall has instilled procedures such as of lagoons and pumps so feedlot effluent never

on Darnall participating in trials and tests through the Panhandle station. "These included many studies for feedlot, background and range cow health and performance," he says. "Gary made his substantial integrated operation available to not only the University of Nebraska but the University of Wyoming."

SAYS RESEARCH IMPORTANT

Darnall notes the role of research by universities and its importance to him and the cattle industry.

"We need to learn about what is coming out, the analyses, and how that may work into our operations," he says.

His was one of the first in the area to use no-till farming. "It's very important to know what's going on in research and, when it's applied back on a farm or ranch, there is still a lot of research to take care of," he says.

He notes that several Russian tour

WEEKEND

operations



scraping pens each day for fly control and a system reaches nearby Pumpkin Creek.

groups have been through his feedlot. “There are two questions they always ask,” he says. “One, why would anyone lend you money? And the second, how has the university helped you? I tell them the university does all the research and through extension educators they show us the research information available and how it may be practically applied. The university is another very important partner in our operation.”

GENOMICS CREATES EXCITEMENT

The next exciting thing for Darnall is genomics – knowing and plotting which genes apply to which characteristics.

“The genomics tool will provide the information needed to engineer our genetics for the desired traits we’re looking for to have a more efficient beef production,” notes Darnall.



Syngenta is Outstanding Research Partner Award recipient

Pesticide and seed researchers in the College of Agriculture and Natural Resources nominated Syngenta for the college’s 2011 Outstanding Research Partner Award.

Plant sciences Professor Gary Franc and Assistant Professor Andrew Kniss have worked closely with Syngenta, especially with research and development scientist Pete Forster, who is based in Eaton, Colorado.

“Pete has been such a big supporter of a lot of our programs at the Powell Research and Extension Center and also at the James C. Hageman Sustainable Agriculture Research and Extension Center near Lingle,” notes Kniss. “He’s always there with information when you need it.”

The research partner award recognizes an organization that has sponsored significant research with the College of Agriculture and Natural Resource and/or provided long-term support to faculty member research, students, programs, or initiatives.

“Syngenta values working closely with our university research partners,” Forster says. “The collaborative projects with the University of Wyoming have been instrumental to Syngenta as well as ag producers across the country in the development of new ag products and new uses for existing products.”

Syngenta works with UW researchers in the areas of crop protection chemicals and drought mitigation research. “The company spans greater than just a pure, chemical basis,” Kniss says.

Support from Syngenta has funded graduate students, allowed extension tours, and the weed tour Kniss directs each year.

Syngenta was formed in 2000 when the ag businesses of Novartis and AstraZeneca merged; however, its roots can be traced to 1758 and 1884, when Geigy and Ciba were established, respectively (for more, see syngenta.com). The company has research and development sites in Switzerland, Britain, India, and the United States. Main production sites include those countries as well as Brazil, China, and France. Syngenta employs more than 26,000 people in 90 countries; about 5,000 employees work in research, technology, and development.

Syngenta is committed to advancing the science of agriculture, investing nearly \$1 billion a year or \$2.6 million a day in research and development, says Forster.

Its connection with the college spans many years. Syngenta sponsored research by Steve Miller, professor emeritus in the Department of Plant Sciences and former director of the Wyoming Agricultural Experiment Station, and also that of Kniss, who was a graduate student of Miller, and other scientists.

“Gary works with diseases, and I work with weeds,” says Kniss. “They’ve sponsored a lot of diverse research. Pete has knowledge about each aspect. He can make weed, disease, and insect control as well as seed treatment recommendations. He’s a great person to work with.”

RESEARCH PARTNER

PROGRAM NOTES

AGRICULTURAL AND APPLIED ECONOMICS

Researchers had two articles published in the June 2011 *Rural Connections*, a publication of the Western Rural Development Center. It is available at <http://bit.ly/pO9GBa>.

Authors of “State Fiscal Implications of Climate Change Legislation to Energy-Dependent States” are extension energy coordinator **Milt Geiger**, Associate Professor **Roger Coupal**, head of the department, and As-

sociate Professor **Don McLeod**. The edition had the theme of climate change effects in the West. The UW scientists found the potential for climate-change legislation to be beneficial despite Wyoming’s coal dominance. The legislation would devalue coal if used with existing technologies; however, the price of oil and natural gas would increase but with that an explicit price for carbon, which would have downward pressure on prices received by producers. The growth in demand for higher-value natural gas would overwhelm the loss

of coal and the growth in wind power.

Assistant Professor **John Ritten**, Assistant Professor **Ben Rashford**, and Associate Professor **Chris Bastian** wrote “Can Rangeland Carbon Sequestration Help Livestock Producers and Rural Economies Adapt to Climate Change?” They suggest that markets for rangeland carbon sequestration may help producers buffer the effects of climate change, especially if carbon prices rise high; however, they also state there is room for pessimism. Unless the political

climate changes faster than the actual climate, producers and rural communities will have to rely on their standard tools – resourcefulness and ingenuity – to adjust to the changing climate.

ANIMAL SCIENCE

Professor **Dan Rule** received the Distinguished Teaching Award from the Western Section, American Society of Animal Science (WSASAS). The award was presented during the organization’s meetings in Miles City, Montana, and recognizes distinguished teaching accomplishments in the animal sciences. Rule teaches undergraduate courses in domestic animal metabolism and companion animal nutrition and also teaches graduate-level courses.

Associate Professor **Steve Paisley**, beef cattle extension specialist, received the Extension Award from WSASAS. The award recognizes one individual from the Western U.S. for his or her extension programming and education and research efforts. Paisley has been with UW as beef cattle specialist for 10 years. He works from the James C. Hageman Sustainable Agriculture Research and Extension Center near Lingle.

The UW Academic Quadrathlon team swept the western regional contest at the WSASAS meetings. The team won all four individual categories and the overall category.

Members of the team are animal and veterinary sciences (ANVS) majors **Mandy Thomas** from Upperville, Virginia,



Assistant Professor
John Ritten



Assistant Professor
Ben Rashford



Associate Professor
Chris Bastian



Energy coordinator
Milt Geiger



Associate Professor
Don McLeod



Associate Professor
Roger Coupal



Associate Professor
Steve Paisley



Assistant Professor
Allison Meyer



Professor
Dan Rule

Stephanie Schroeder, Douglas, **Colin Yorges**, Torrington, and **Brice McIntosh**, agriculture education/ANVS, Wheatland. Professor Dan Rule serves as team adviser.

Assistant Professor **Allison Meyer** began August 1 as ruminant nutritionist, filling the position vacated by Professor Bret Hess when he became director of the Agricultural Experiment Station and associate dean for research in the College of Agriculture and Natural Resources. Meyer received her bachelor's degree from Michi-

gan State University, her master's degree from the University of Missouri, and her Ph.D. from North Dakota State University.

FAMILY AND CONSUMER SCIENCES

Melissa Bardsley started as the extension food and nutrition specialist in the department July 1. Bardsley has a bachelor's degree in human nutrition and dietetics and a master's degree in human nutrition, both from Colorado State University. She has worked previously as an associate extension specialist for CSU and as a clinical dietitian and a renal dietitian in Washington and Wyoming.

Assistant Professor **Christine Wade** was the recipient of a North American Colleges and Teachers of Agriculture Teaching Award of Merit, and graduate student **Michaella Kaszuba** was the recipient of a NACTA Graduate Teaching Award of Merit for the College of Agriculture and Natural Resources.

Awards were presented to the recipients by Associate Dean Jim Wangberg at the end of spring semester. **Mindy Meuli** was recently appointed to the Dietetics Licensing Board for the state of Wyoming by Governor Matt Mead.

Several departmental undergraduate students were recognized during the spring and summer. Three students had their work selected for presentation at the American Association of Family and Consumer Sciences annual convention in Phoenix, Arizona, in June: **Jessie Murphy-Johnson** presented a research poster, **Molly Janak** had a design exhibited as part of the Community of Apparel, Textiles and Design Juried Showcase and Exhibit, and **Kati Stoll** had her design selected as recipient of Undergraduate Best of Show for the same showcase and exhibit. **Skye Murphy** was selected as Outstanding Student of the Year by the Wyoming Dietetics Association at its annual meeting in Laramie. **Julianne Hughes** was named Big Sister of the Year for Laramie and also for the state of



Assistant Professor
Christine Wade

Wyoming by the Big Brothers, Big Sisters organization. **Emily Gran** was selected to be in charge of all volunteers for the Wyoming Special Olympics in Laramie this past spring. **Stoll** was selected as a National Phi Upsilon Omicron Scholarship recipient for the 2011-2012 academic year.

Professor **Sonya Meyer**, accompanied by Associate Professor **Bruce Cameron**, led a textiles study tour to Edinburgh, London, and Paris in May. There were 22 participants on this study tour, with 15 being UW



Melissa Bardsley



Mindy Meuli

PROGRAM NOTES

undergraduate students. The tour included visits to museums such as the Victoria and Albert Museum, Kensington Palace, and the Louvre as well as designer showrooms such as Zandra Rhodes and Alain Lalou. Additionally, a visit was made to the School of Textiles and Design, Heriot-Watt University in Scotland, where opportunities for student exchange and graduate study were investigated.

MOLECULAR BIOLOGY

Assistant Professor **Daniel Levy** is a new addition to the department. Associate Professor **Gerry Andrews** in the Department of Veterinary Sciences is now the chair of the microbiology program; Professor **Ken Mills** stepped down earlier this year. Professor Emeritus **Randy Lewis**, renowned for his spider silk research, has joined Utah State University. He is conducting research at the Utah Science Technology and Research BioInnovations Center.

Assistant Professor **Jay Gatlin** is studying the forces at



Associate Professor
Gerry Andrews

work in cell division by utilizing African clawed frogs (*Xenopus laevis*), which supply eggs that are crushed into an extract, sperm nuclei are added, and then calcium to induce the eggs to go through the life cycle. The DNA replicates, and then the calcium is removed, which coaxes the interphase nuclei (the state in which the cell spends most of its time) to go into mitosis – the segregation of duplicated chromosomes. “The beautiful thing about the system is that, not only can we induce the cell cycle to progress forward, but we can stop it as well,” he says. Gatlin wants to improve the resolution of the measurements of the forces by developing new microscopy-based approaches.

PLANT SCIENCES

Agronomic research was on full display at the Powell Research and Extension Center field day July 14, notes Associate Professor **Steve Herbert**, head of the department.

“Two projects represent important new directions for agricultural research in Wyoming,” he says. “The first of these is a highly quantitative study of how irrigation regime and drought stress impact productivity of irrigated corn.”

Soil moisture in the experimental plot is controlled with a high degree of precision using an advanced sub-surface irrigation system recently installed at the Powell center.

“As different blocks of corn plants are exposed to reduced soil moisture, infrared thermometers



Assistant Professor
Axel Garcia y Garcia

mounted above the plants record leaf temperatures, which indicate the timing of drought stress,” Herbert says. “Photosynthetic capacity of the leaves and the ultimate production of corn from the plots are also recorded. Data from the experiment will allow accurate recommendations to be made for how to irrigate corn for maximum productivity with a minimum of irrigation water.”

Assistant Professor **Axel Garcia y Garcia** is directing this study with support from various sponsors. “The Powell center provides an ideal location for this research project because summer rainfall is relatively rare, allowing nearly complete control of soil moisture by irrigation,” says Herbert.

A second project presented at the Powell field day is the Wyoming Agricultural Weather Network (www.wawn.net). The network is a newly established system of weather stations around the state that will provide information crucial to irrigation planning and management. For a video about the project, see <http://bit.ly/nILPPO>.

RENEWABLE RESOURCES

Faculty and students have been busy in the field conducting research and putting on educational programs, notes Professor **John Tanaka**, head of the department. The department is administering more than \$9 million in grants. “We expect to have at least 139 undergraduate majors and 59 graduate students in the fall – the largest classes we have had in the past decade and likely in our history,” he notes.

Rachel Mealor, extension range management specialist, traveled with a 4-H youth group to Mongolia. She and her husband, Assistant Professor **Brian Mealor** in plant sciences, served as subject experts for the group of students from around the West.

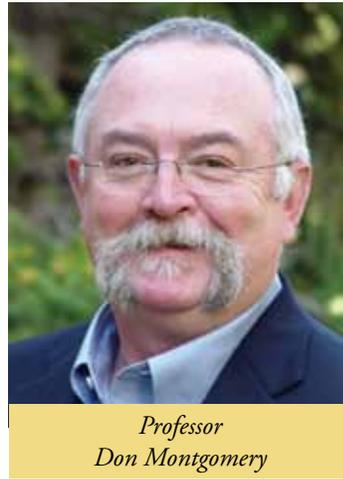
Several faculty members and students attended the annual meeting of the American Society for Mining and Reclamation in Bismarck, North Dakota. **Lisa Cox** won a travel award to attend the meeting, and **Cally Driessen** won the Memorial Scholarship for master’s students. The annual meeting of the Western Soil Science Society along with the Western Society of Crop Science and Western Division of the Agronomy Society recently met in Laramie. **John Tanaka** attended the Soil and Water Conservation Society annual meeting in Washington, D.C. Professor **K.J. Reddy**’s carbon capture and sequestration research was highlighted at the 10th International Carbon Capture and Sequestration Conference in Pittsburgh, Pennsylvania. He was invited by



*Range management specialist
Rachel Mealor*



*Assistant Professor
Jeff Beck*



*Professor
Don Montgomery*

the Oxford University Round Table Conference committee to give a presentation on carbon capture and sequestration processes at the Climate Conference in Harris Manchester College of Oxford University, Oxford, UK.

Associate Professor and extension entomologist **Alex Latchininsky** was named to the Agriculture Peer Review Committee for the Fulbright Specialist Program. Assistant Professor **Jeff Beck** served as an invited subject matter expert for research scientist promotion panels for the USDA Animal Plant Health Inspection Service/Wildlife Services, National Wildlife Research Center in June in Fort Collins, Colorado.

Professor **Pete Stahl** and Associate Professor **Scott Miller** (and others from the university) went to Nepal for fact-finding and initial development of collaborative education and research initiatives with Nepalese education and research institutions. John Taylor from the University of Queensland and Rangelands Australia stopped by to investigate graduate student exchange opportunities for field-based courses.

Scott Miller has been working on place-based education with faculty members in the College of Education and the Teton Science Schools at the Kelly campus near Jackson. This is an effort to link faculty members with primary school teachers in Wyoming to introduce new teaching strategies to participating teachers.

John Tanaka and **Kristie Maczko** (and others) conducted an informational briefing on rangeland sustainability related to sage-grouse, energy development, and food security in Washington, D.C., for congressional aides and federal agency managers.

VETERINARY SCIENCES

Colleen Thompson, a 2009 graduate of the University of Wyoming and a soon-to-be third-year veterinary student at the College of Veterinary Medicine, Colorado State University, recently completed the inaugural 10-week summer Kelly Palm Memorial Veterinary Externship.

This externship, established and funded by Jerry and Peggy Palm in memory of their daughter, the late Laramie veterinary practitioner Kelly Palm, provides veterinary students who are graduates of the University of Wyoming an opportunity to spend 10 weeks at the Wyoming State Veterinary Laboratory (WSVL) prior to their third or fourth years of professional veterinary medical education. Externship experiences such as this provide veterinary medical students the opportunity to observe first-hand the practical realities and effects of animal disease as they happen and to augment their experiences during the course of a formal, four-year professional veterinary education, notes Professor **Don Montgomery**, laboratory director and head of the department.

During this externship, Thompson had the opportunity to assist faculty and staff members in various sections of the WSVL whose mission is to provide support for the diagnosis of disease in a variety of animal species. Thompson also had the opportunity to participate

in field investigations of naturally occurring animal disease outbreaks. A case in point was the outbreak of psittacosis this summer at a Wyoming Game and Fish Department pheasant hatchery and rearing farm. Her work in the laboratory and during field trips was anything but observational. “She pitched in as expected and actually did a lot of the work,” says Montgomery. “I’m sure I speak for all of us here at the Wyoming State Veterinary Laboratory in saying Colleen was an excellent choice for the inaugural year of this externship.” Veterinary sciences and the WSVL are grateful to the Palms for the opportunity to participate in this externship, he says. The extern and the lab both benefit from these interactions. “We actually learn a lot ourselves from veterinary students, and externships are an excellent avenue for the exchange of knowledge,” notes Montgomery.

AGRICULTURAL EXPERIMENT STATION

The Agricultural Experiment Station (AES) continues to conduct applied and basic research to help solve problems that affect the agricultural sector of our state, region, and nation, notes Bret Hess, associate dean and AES director.

Much of the applied research is conducted at our research and extension (R&E) centers within the state. These R&E centers are near Laramie, Lingle, Powell, and Sheridan. Research conducted at the R&E centers is often

PROGRAM NOTES



AES Director Bret Hess



Tessia Steingrebe



Mae Smith



Brian Sebade

focused on development of new technologies or farming practices that may be implemented by agriculturalists. The R&E centers facilitate transfer of the latest research-based knowledge by hosting a series of field days. At the time of this writing, very successful field days had been held July 14 at the Powell R&E Center and July 21 at the James C. Hageman Sustainable Agriculture R&E Center near Lingle. The Laramie R&E Center greenhouse open house and field tour August 11 seems sure to be equally successful.

Attendees of any of the field day events received a hard copy of the inaugural edition of the AES 2011 Field Days Bulletin. This publication documents results of R&E center research activities in a simple, reader-friendly format. Anyone unable to attend the field days need not worry about missing the opportunity to learn the most recent research-based information because the bulletin is posted on our website (www.uwyo.edu/uwexpstn) under the publications link. We hope you enjoy reading the bulletin.

COOPERATIVE EXTENSION SERVICE

Tessia Steingrebe began June 13 as the Converse County 4-H educator. Steingrebe is a May graduate of the University of Wyoming with a bachelor's degree in animal science.

Mae Smith started June 1 as the Southeast Area extension educator based in Carbon County. Smith is a May graduate of Colorado State University with a master's degree in rangeland ecosystem science. She received her bachelor's degree in rangeland ecology and watershed management from UW in May 2008.

Brian Sebade assumed the Northeast Area extension educator position June 6. This position is based in Crook County at Sundance. Sebade has both his bachelor's and master's degrees from UW in rangeland ecology and watershed management.

Brittany Johnson started May 25 as the 4-H military extension educator based in Laramie County. In this role, Johnson has a split appointment: half-time working with 4-H military programs and half-time with



Brittany Johnson



Kelly Crane

traditional Laramie County 4-H. In 2007, Johnson received her bachelor's degree from Viterbo University in La Crosse, Wisconsin, in broad field social studies. She has a strong 4-H background and has experience working for cooperative extension in Wisconsin as an interim 4-H educator and assisted the Jackson County 4-H educator with volunteer coordination, outreach, and after-school programs as an AmeriCorps volunteer.

Kelly Crane joined CES as associate director. Kelly received his Ph.D. in rangeland ecology and watershed management with a minor in statistics from UW in 2002. He has a master's degree in

range management from UW. He received his bachelor's degree in rangeland resources from the University of Idaho. Since 2008, Crane has been working as a range extension specialist with the University of Idaho. He brings experience as a private business owner, of Frontier Natural Resources Consulting, which he operated from 2003-2008. Crane served as the extension rangeland specialist at UW from 2000-2003. His knowledge of Wyoming and experience with cooperative extension in several states will be an asset in this leadership position.

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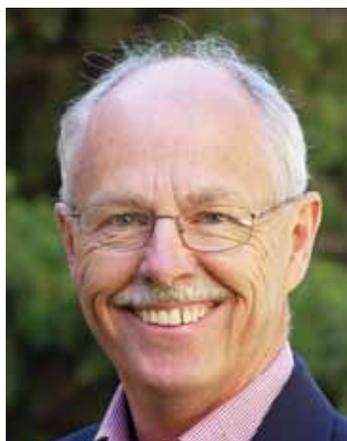
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Associate Dean
Jim Wangberg

ACADEMIC AND STUDENT PROGRAMS

The College of Agriculture and Natural Resources will produce a new and larger FIG crop this fall semester; however, these FIGs will not grow on trees and are not the succulent variety, notes **Jim Wangberg**, associate dean and director.

“The fall FIG crop is actually a menu of freshman-level courses that are part of so-called

Freshman Interest Groups. FIGs are also known as student learning communities because they are organized in ways to support communities of students who share common interests and learning goals,” he notes. For example, one of the college FIGs being offered for the third time is the “Critters and Communities FIG” taught by **Laurie Bonini** and Wangberg. It is a theme-based FIG for students with interests in varied aspects of agriculture and related life sciences and provides a broad overview and introduction to the diverse academic programs in our college, programs that essentially involve organisms (critters) and communities (human, plant, and animal).

“It attracts students from all majors within the college and some from disciplines outside the college,” says Wangberg. “The FIG students are very much part of a learning community because they are enrolled in three common courses during the semester, and they live on the same

floor in a UW residence hall. Hence they go to classes together, have opportunities to study and participate in outside-of-class activities together, and share the dormitory experience. FIGs and other types of learning communities have proven beneficial to student learning and retention during the first year of college.”

The other college FIGS offered this fall are:

Exploring Animal and Veterinary Sciences – This FIG is designed for students majoring in any one of the several curricular options in the animal and veterinary science bachelor’s degree program. Instructors are Assistant Professor **Kristi Cammack** and Associate Professor **Paul Ludden** from the Department of Animal Science

Molecular and Microbiology: Life at its Core – This FIG is of particular interest to students majoring in microbiology but also to other students in the life sciences who have interests in understanding the microbes around us. The instructor is

Kumaran Mani, associate research scientist, from the Department of Molecular Biology.

Discovering Careers in Veterinary Medicine – This FIG focuses on careers in veterinary medicine and attracts students who have declared or who are planning to declare the pre-veterinary option in the ANVS degree program. The instructor is Associate Professor **Todd Cornish** from the Department of Veterinary Sciences.

COLLEGE RELATIONS

Sometimes it seems programs for alumni focus exclusively on those who graduated many years ago. If a recent graduate, say in the last 10 years or so, good news – your day is coming, says Anne Leonard, director of College Relations.

The College of Agriculture and Natural Resources in the coming year will focus more on younger alumni and is ask-



ing young alumni to become more involved with the college. One of the first projects will highlight recent graduates on the college Web pages and new recruitment/promotional material for the college. Not only does your department want to know where you are and what you are doing, but the college is often asked where graduates are working. Please share your current career information or updates with us at agrdean@uwyo.edu or by phone at (307) 766-4134. If you would like to be involved with the college, either as a contact for prospective students, a career mentor for a current student, a volunteer for events in your area, or have



*Director of College Relations
Anne Leonard*

other ideas, please share them with me.

Facebook and Twitter are ways we share news and updates with our friends. Both the college and cooperative

extension also have videos on YouTube. If you would like to receive an electronic update on the college, please subscribe to our email distribution list by sending a subscription request to agrdean@uwyo.edu.

College of Agriculture and Natural Resources, Agricultural Experiment Station, and UW Cooperative Extension Service Facebook accounts include (insert in search function in Facebook):

- University of Wyoming College of Agriculture
- University of Wyoming Ag Publications
- Agricultural Applied Economics University of Wyoming
- University of Wyoming Animal Science Department
- Molecular Biology University of Wyoming
- University of Wyoming Department of Renewable Resources
- Wyoming Agricultural Experiment Station
- SAREC Sustainable Agriculture Research and Extension Center
- University of Wyoming Extension
- University of Wyoming Range Extension
- Barnyards and Backyards Property Improvement Project
- Wyoming Reclamation Restoration Center