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ALL SHALL SHALL AND A

COLLEGE OF AGRICULTURE

VOLUME 18 • NUMBER 2 • SPRING 2009

"If not you, then who? If not now, then when?"

Hillel

University of Wyoming

Dear Friends and Colleagues,

I hope the spring season is going well for all of you. For many of you in animal agriculture, calving and lambing are well underway or complete. For others, it is planting time. We are all hoping moisture continues to come our way this spring to help the range and aquifers.

The Wyoming State Legislature and Governor Dave Freudenthal this year demonstrated wonderful support for our programs in teaching, research, and service. If you have a chance to visit with one of your legislators, please take time to thank him or her and point out the positive impact our programs and support by the legislators have on the state.

One of the projects approved by the legislature is the addition of a biosafety level 3 (BSL-3) laboratory to the



Dean Frank Galey

Wyoming State Veterinary Laboratory. This laboratory will create space where our faculty and staff members and students can study diseases such as brucellosis, plague, rabbit fever (tularemia), and Q fever in a safe and legal environment. While all state-funded projects are subject to availability of funds and the state's budget situation, we're anticipating construc-



(Continued from Page 1)

Che BSL-3 addition will create space where our faculty and staff members and students can study diseases such as brucellosis, plague, rabbit fever, and Q fever in a safe and legal environment. ?? tion will begin soon and, once begun, should be completed within 24 months. When completed, the BSL-3 laboratory will significantly increase our ability to diagnose and then do needed research about these disease agents.

The state also allocated \$2 million in Abandoned Mine Land (AML) funds to our programs in the Wyoming Reclamation and Restoration Center. With energy development and drought impacting the state, we are developing and distributing more science-based information about restoring arid lands and maintaining critical wildlife habitat.

We are also working to develop more productive rangelands for ranching and wildlife interests. Hand-in-hand with that research is developing more knowledge about water quality and availability. The majority (\$1.5 million) of this funding will begin an endowment to support rangeland and water restoration long-term. The rest of the funds, or \$500,000, will immediately augment our program to allow for more applied research and extension in the field. We will now begin work with private donors to build the endowment that was so generously seeded by these AML funds. Our goal is to build the endowment to a level that supports the program long-term. The benefits of a strong program would be widespread, and your help in this endeavor would be much appreciated!

New funds have also been received to support brucellosis research. The state allocated \$100,000 to the university to create a research consortium of scientists interested in brucellosis. This group will be charged with developing a program to attract funding and conduct research to develop a new vaccine and better diagnostic testing for brucellosis. In addition, Senators Barrasso and Enzi, and former Representative Cubin, attracted a special grant in the federal FY 2009 budget to allow UW to continue initial development of a vaccine for brucellosis. This assistance is critical as brucellosis is not considered to be a priority nationally by the competitive U.S. Department of Agriculture programs that exist right now.

This issue of *Ag News* has articles featuring the work our faculty and staff members and students are doing including one about research on brucellosis in western Wyoming elk, and another about sagebrush research and how it is helping manage range and habitat. Teaching and transfer of new ideas is central to the university mission. The interaction between our molecular biology program and Little Big Horn College in Montana is also highlighted. Student activities of interest, including our student farm on campus and use of remote sensing in forest, range, and crops, are also described.

The support shown will allow your college to continue to work to address key needs expressed by the people in the state. Thanks to all who are helping us continue support of your college! We can be contacted at (307) 766-4133 or by e-mail at agrdean@uwyo.edu. Our Web site is http:// uwyo.edu/UWAG.

Dean Frank Galey College of Agriculture



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FIRST CUTTING

Ag students place in Rangeland Cup national competition

Two teams from the College of Agriculture placed in the top five at a competition attracting nearly 400 students from throughout the United States, Canada, and Mexico.

The competition was during the Society for Range Management's (SRM) 62nd annual meeting February 8-12 in Albuquerque, New Mexico.

During the meeting, Mike Smith, a professor in the Department of Renewable Resources and a range management specialist with the University of Wyoming Cooperative Extension Service (UW CES), was awarded a service citation as an outgoing associate editor of the SRM publication *Rangeland Ecology & Management*.

In the Rangeland Cup competition, the team of Sage Askin, a junior from Douglas, Leena Horton, a senior from Riverton, and Lucas Bindel, a senior from Greeley, Colorado, placed second.

All three students are majoring in rangeland ecology and watershed management (REWM). They were coached by Pete Stahl, an associate professor in the Department of Renewable Resources.

Teams were tested on management issues relating to the settlement of the West. Chadron State College, Chadron, Nebraska, placed first, and Utah State University was third.

Another College of Agriculture team placed fifth in the Undergraduate Range Management Exam (URME).

Team members were Askin, Horton, Bindel, Sarah Hanlon of Cheyenne, Matt



The College of Agriculture's Rangeland Cup team placed second in national competition during the Society for Range Management's 62nd annual meeting. Members include, from left, Sage Askin, coach Pete Stahl, Leena Horton, and Lucas Bindel.

Ley of Cheyenne, Rives White of Daniel, Adam Teeter of Laramie, Rollin Winter of Leiter, Kaylee Reed of Newcastle, Charles Busby of Centennial, Colorado, Meghan Reedy of Vale, South Dakota, Leah Estill of Eagleville, California, and Dean Houchen of Jonesville, Michigan.

All of the students are majoring in REWM with the exception of Reed (animal and veterinary sciences), Estill (agricultural business), and Houchen (a double major in REWM and environment and natural resources).

The team was coached by Jeff Beck, an assistant professor in the Department of Renewable Resources. Brigham Young University placed first in the URME, Colorado State University second, University of Alberta third, and University of Saskatchewan fourth.

URME teams answered questions on grazing management, inventory and assessment of grazing lands, ecology, multiple use, rangeland regions, and range improvements.

Co-chairs of the Rangeland Cup competition were Rachel Mealor, a UW CES range specialist, and Brian Mealor, director of stewardship with The Nature Conservancy in Wyoming and an adjunct faculty member in the Department of Renewable Resources.

FIRST CUTTING

Former college Legacy Award recipient new UW trustee



UW Trustee Brad Mead

A member of a family that was the recipient of the college's 2006 Legacy Award is a new UW board of trustee appointed by Governor Dave Freudenthal.

Brad Mead along with his father, brother, and sister were honored in 2006 for their efforts on behalf of the College of Agriculture. Mead is a member of the Mead & Mead law firm in Jackson. His appointment was confirmed by the Wyoming Senate in February, and his trustee term expires in 2015.

"I extend my congratulations to Brad on his recent appointment to the UW Board of Trustees," says Frank Galey, dean, College of

Agriculture. "Brad has been very supportive of UW and the college. We are looking forward to working with Brad in his new role."

Mead is in his second term on the College of Agriculture's Dean's Advisory Board. His term ends in 2010. The board is a voluntary group that acts as a conduit funneling agricultural concerns to the dean.

The Legacy Award recognizes those who have provided meaningful and lasting support for the college.

The Meads are fourth-generation ranchers in Wyoming. Father Pete, Matt, Brad, Muffy Mead-Ferro, and their families have continued Cliff and Martha Hansen's legacy of support for the college. They helped with the establishment of the Cliff and Martha Hansen Livestock Teaching Arena and the Mary Mead Educational Wing. The family endowed the Mary Hansen Mead Scholarship for Women in Agriculture to support one or more outstanding young women in agriculture. This scholarship is named in memory of Pete's late wife, Mary – mother of Matt, Brad, and Muffy, and daughter of Cliff and Martha Hansen.

UW professor part

George Vance, a University of Wyoming J.E. Warren Distinguished Professor of Energy and the Environment, was a member of a National Commission on Energy Policy (NCEP) study that identified seven major issues facing the future of coal production in the United States.

Vance, who specializes in soil and environmental science in the College of Agriculture's Department of Renewable Resources, was one of five expert members of the group.

A final report, "Meeting Projected Coal Production in the USA: Upstream Issues, Challenges, and Strategies," has been published as a 258-page book as well as a summary brochure that contains a pdf of the report.

The report will be distributed to federal legislators and will become available for free download at the Virginia Center for Coal and Energy Research Web page www. energy.vt.edu/.

As the only member from west of the Mississippi River, Vance was invited to be on the committee to evaluate environmental issues confronting future coal production.

"Our report involved surveying past and present coal activities in order to provide an assessment of some issues confronting the coal industry and various recommendations for the industry to be successful in the future," says Vance. "If policy is made, we wanted to provide information that could be used for sciencebased decisions."



of study identifying major issues facing coal production

The focus of the report is to address what the industry calls upstream issues; a focus Vance says has not been addressed adequately in previous studies. Upstream issues concentrate on concerns related to initiation of the coal mining process to delivery, and they include the entire coal sector involving government, equipment suppliers, academic institutions, communities near coal mining, environmental groups, and others.

Downstream issues are those that deal specifically with the effects of coal combustion such as carbon dioxide emissions.

The major upstream issues identified in the report are:

- A need for better and timelier data related to all aspects of the coal sector,
- Development and adoption of better technologies in all facets of the upstream cycle,
- Changes needed in the culture of the coal sector to one that focuses on beyondcompliance approaches to dealing with regulations and public trust,
- Addressing economic uncertainty, avoiding supply interruptions, and promoting production stability,
- Identifying and addressing potentially significant workforce shortfalls,
- Improving education and training,
- Addressing societal acceptance of coal mining and use.



Professor George Vance

The NCEP contracted for the study with the Virginia Center for Coal and Energy Research at Virginia Tech.

The effort began in 2007 with kickoff meetings in Washington, D.C., and Denver, Colorado. The study team, including the expert committee members and staff and the NCEP, met several times in Washington, D.C., and once in Charleston, West Virginia.

Whether the upstream as well as downstream issues are addressed may play an important role in coal production projections. Based on information from the U.S. Department of Energy's Energy Information Administration, projected 2030 coal production will increase from current levels of 1.16 billion tons to 1.6 billion tons.

"Will future coal production levels drop? That's a good question," Vance says. He believes future coal production is probably going to be affected based on legislative directives.

"We currently need coal, and I don't envision the nation giving up electricity since coal is used to produce more than 50 percent of our electricity. It's a question of acceptability. We have changed administrations, and I think we will see more emphasis placed on environmental regulations. It could be a lot more expensive to produce coal in the future."

Each committee member contributed a chapter in the final report. Vance wrote Chapter 6 "Environmental Protection, Practices, and Standards."

Vance says he entered the project expecting extensive data production.

"That was not the real focus of the project," he says. "My thought process on the use of coal changed as I went through the project. I didn't understand some of the issues associated with coal resources versus reserves, the different mining techniques, coal processing, and the problems related to these operations, and the many health and safety issues. I am much more aware of what it takes to mine coal and have a better appreciation of both positive and negative environmental consequences that come with upstream coal production issues."

FIRST CUTTING

Outstanding UW ag students, alumnus, and producers receive

Outstanding College of Agriculture students received honors, and an outstanding agriculturalist and alumnus were honored by the University of Wyoming Chapter of Gamma Sigma Delta (GSD), the international honor society of agriculture.

The honors were presented during the organization's annual awards brunch Saturday, February 28, in Laramie.

Rick and Klodette Stroh of Powell received the outstanding agriculturalist award. They own 200 acres of cropland and lease 1,300 additional acres, and also have a herd of 100 Angus.

Gary Darnall of Harrisburg, Nebraska, is the honored alumnus. He graduated from the College of Agriculture with an agricultural economics bachelor's degree in 1960 and a master's degree in 1962. In addition to farming, he has a 20,000-head feedlot operation.

Students honored, with their majors and hometowns, are:

Outstanding Freshman Male – Brett Cherni, animal and veterinary sciences (ANVS), Ranchester.

Outstanding Freshman Female – Cara Noseworthy, rangeland ecology and watershed management (REWM), Medford, New Jersey.

Outstanding Sophomore Male – Brandon Greet, agroecology, Ten Sleep.

Outstanding Sophomore Female – Stephanie Schroeder, ANVS, Douglas.

Outstanding Junior – Sarah Gregory, molecular biology, Gillette.

Outstanding Senior Male – Travis Allen, ANVS, Cheyenne.

Outstanding Senior Female – Sarah Hanlon, REWM, Cheyenne.

Outstanding Master's Student – Guinevere Jones, entomology, Slidell, Louisiana.

Outstanding Ph.D. Student – Mary Williams, REWM, Puyallup, Washington.

Department Awards

Departmental awards were also presented. They include:

Agricultural and Applied Economics

Western Agricultural Economics Association Outstanding Senior Award: Amber Phillips, Dubois; Senior Honor Book Award, Trent Roberts, Walsenburg, Colorado; Outstanding Senior in Agribusiness Award: Kaytlyn Cooksey, Roggen, Colorado.

Agricultural Communications

Honor Book Award: Geneva Good, Custer, South Dakota.

Animal Science

Honor Book Awards: Caitlin Blackburn, Cody, Brooks Fry, Evanston.

Family and Consumer Sciences

Verna J. Hitchcock Award for Outstanding Senior: Charli Raben, Torrington, Heidi Henderson, Troy, Idaho.

Microbiology

Honor Book Award: Sandra Smylie, Douglas.

Molecular Biology

Honor Book Award: Kimberly Cranford, Alpine; Irene Rosenfeld Award: Evan Abbaszadeh, Gillette.

Plants Sciences and Renewable Resources

Agroecology Honor Book Award: Kyrre Stroh, Powell, Nevin Lawrence, Casper.

Renewable Resources

Range Honor Book Award: Andrew Telander, Laramie; Entomology Honor Book Award: Alex Smeaton, Camden,



Stephanie Schroeder, Outstanding Sophomore Female



Brandon Greet, Outstanding Sophomore Male

Maine; Soils Honor Book Award: Travis Yeik, Veteran.

Veterinary Sciences

Honor Book Award: Travis Allen, Cheyenne, Colleen Thompson, Sheridan.

The awards brunch photo gallery is at http://uwadmnweb.uwyo.edu/gsd/2009_photo_gallery.htm.



Gamma Sigma Delta honors



Professor Steve Horn and Brett Cherni, Outstanding Freshman Male



Professor Scott Shaw and Guinevere Jones, Outstanding Master's Student



Associate Professor Pam Langer and Sarah Gregory, Outstanding Junior



Animal science Department Head Doug Hixon with Gary Darnall, outstanding alumnus recipient



Professor Ann Hild, Outstanding Ph.D. Student Mary Williams, and Assistant Professor Ginger Paige



Professor Ann Hild and Cara Noseworthy, Outstanding Freshman Female



Professor Ken Mills and Travis Allen, Outstanding Senior Male



Rick and Klodette Stroh (front) with Department Head Steve Herbert (left) and Dave Wilson, senior lecturer, of the Department of Plant Sciences



Associate Professor Jim Waggoner and Outstanding Senior Female Sarah Hanlon

FIRST CUTTING

Sarah Hanlon wins national range competition

College of Agriculture senior Sarah Hanlon of Cheyenne placed first among 171 students from throughout the United States and Canada in a rangeland management competition.

Hanlon earned an expense-paid trip to Washington, D.C., after winning top honors among students from 23 colleges and universities in the annual Society for Range Management's (SRM) Undergraduate Range Management Exam (URME).

The test was during the SRM's 62nd annual meeting February 8-12 in



Sarah Hanlon

Albuquerque, New Mexico. The meeting attracted 1,600 people from throughout the United States, Canada, and Mexico, including nearly 400 college students.

"The competition at the top was very close, and experience and knowledge as a young range professional enabled Sarah to outdistance the others in the URME event," says her academic adviser, Jim Waggoner, an associate professor in the Department of Renewable Resources.

"The test is extremely difficult," adds the team's coach, Jeff Beck, an assistant

able Resources. "Students interpret scientific tables and figures relating to

rangeland management. They calculate grazing capacities and vegetative attributes such as cover and rangeland production. They have to be very familiar with rangeland ecosystems from hot deserts to sagebrush steppe to short and tallgrass prairie to alpine tundra and others."

Beck says, "Winning this competition is a mark about everything Sarah has learned and digested here at UW and beyond."

Hanlon is majoring in rangeland ecology and watershed management in the Department of Renewable Resources. After graduating this spring, she will join the federal Natural Resources Conservation Service office in Springfield, Colorado, as a rangeland management specialist.

The U.S. Forest Service (USFS) is paying for Hanlon's trip to Washington, D.C. The trip is this summer, and Hanlon will meet with top officials from the USFS and other land management agencies, and she will visit with a number of congressional delegates and tour the D.C. area. The trip emphasizes the federal government's role in managing the nation's rangeland resources.

Hanlon is the daughter of Leslee Gallion and Theodore Hanlon, both of Cheyenne.

Katie Nelson earns national SRM range science scholarship



Katie Nelson

College of Agriculture student Katie Nelson, of Philip, South Dakota, is this year's recipient of the national Society for Range Management's (SRM) Masonic-Range Science Scholarship.

Nelson, a sophomore majoring in rangeland ecology and watershed management in the Department of Renewable Resources, will receive approximately \$6,000 over the next two school years.

The scholarship was announced at the SRM's 62nd annual meeting February 8-12 in Albuquerque, New Mexico.

"This scholarship will help me continue to attend UW, and I encourage other students from here to apply for it," Nelson says. "It's a great opportunity for undergraduate students who are studying range management or a closely related field."

Nelson is the daughter of Mary and Jerry Nelson of Philip. Information about the scholarship is at www.rangelands. org/education_masonicscholarship.shtml.

College's Didactic Program

The Didactic Program in Dietetics (DPD) was given accreditation status by the American Dietetic Association's (ADA) Commission on Accreditation for Dietetics Education (CADE) at its November 2008 meeting, according to Associate Professor Rhoda Schantz, DPD director, in the Department of Family and Consumer Sciences.

"Accreditation is important because it upholds the standards for educating students in a program," notes Schantz, who specializes in food and nutrition. "The evaluative process is used to assure the accrediting body students are getting the content and meeting competencies for – in this case dietetics – a professional area."



Butterfly bill flies through Wyoming State Legislature

The "butterfly bill" flew through the Wyoming State Legislature and was signed into law by Governor Dave Freudenthal in February.

"It will be fun developing the marketing plan for the state of Wyoming promoting our newest symbol, Sheridan's green hairstreak," says one of the bills co-sponsors, Representative Rosie Berger, R-Big Horn. "Maybe even this spring I will identify the butterfly while taking a hike in the Big Horn Mountains, listening to meadowlarks, our state bird, and finding my first Indian paintbrush, our state flower."

Berger credits Big Horn Elementary School students Tanner Warder and Lydia Mayer and Department of Renewable Resources Professor Scott Shaw for the success of Senate File 16. On two occasions, the trio testified before legislative committees.

"I believe because of the excellent presentations given by Tanner and Lydia of the research they did with their class members, and, with Dr. Shaw, the committees were confident the state butterfly should be the



Sheridan's green hairstreak," Berger says.

"I believe Dr. Shaw's work helped with passage of the legislation, and if anyone gets the opportunity to read his article in the *Reflections* magazine of 2007, it will prove why we should have a state butterfly and that it be the Sheridan's green hairstreak," she adds.

The article is at www.uwyo.edu/agexpstn/reflections/2007/reflections%20 2007%20web.pdf, or copies can be ordered, free of charge, by calling (307) 766-3667 or e-mailing kathbert@uwyo.edu.

Shaw stated in the article that *Calloph*rys sheridanii is a lovely insect, being one of the few green butterflies in the region. It was discovered in 1877 near the location of present-day Sheridan. Both the town and the butterfly are named after Lt. Gen. Philip H. Sheridan, a famous Civil War commander.

The butterfly occurs widely across Wyoming in mountains and foothills, wherever its primary food source (the sulphur-flower) is found, says Shaw, who, as curator of the UW Insect Museum, estimates Sheridan's green hairstreak is one of at least 12,000 insect species found in Wyoming.

Warder, now a fourth grader at Big Horn, launched the project last school year for extra credit as part of a program led by third-grade teacher Laurie Graves and Big Horn's gifted and talented teacher, Marcia McChesney.

He then collaborated with classmate Mayer to get input from other Big Horn students, and they also consulted with Shaw to learn more about the butterfly before presenting their idea to Sheridan County legislators, including the bill's chief sponsor, Senator Bruce Burns, R-Sheridan.

in Dietetics receives accreditation

The credential of Registered Dietitian is attained through meeting course requirements in the undergraduate program, completing an accredited dietetic internship, and passing the registration examination for dietitians.

Accreditation is for 10 years.

The Eligibility Requirements and Accreditation Standards of Entry-Level Dietetics Education Programs were met through the self-study submitted by the department, a site visit by the CADE review team, and follow-up paperwork.

A two-member team – one dietetics practitioner and one director of the DPD – was on campus in November 2007 for three days and visited with faculty members, administrators, and students.

The three standards set forth by CADE – Program Planning and Outcomes Assessment, Curriculum and Student Learning Outcomes, and Program Management – were evaluated to ensure the quality and continued improvement of the DPD, says Schantz.

CADE is the American Dietetic Association's accrediting agency for education programs preparing students for careers as Registered Dietitians. For a complete viewing of the accredited DPD, visit the Web site at www.uwyo.edu/FAMILY/Dietetics.asp.



Associate Professor Rhoda Schantz

FIRST CUTTING

Students use satellite images to evaluate crop, forest, rangeland

By Steven L. Miller, Senior Editor Office of Communications and Technology

Agriculture students are using remote sensing information to analyze crop, rangeland, and forest areas they are either familiar with or farm and ranch upon.

The students, in a class taught by Ramesh Sivanpillai, remote sensing scientist with the Wyoming Geographic Information Science Center (WyGISC) in the College of Agriculture building, examined crop and pasture lands using satellite images obtained through WyomingView.

WyomingView is a consortium, headed by WyGISC and the University of Wyoming, aimed at increasing opportunities for remote sensing applications through outreach, data distribution, education, and training and research activities in Wyoming. WyomingView is part of AmericaView (www.americaview.org), which is funded by the U.S. Geological Survey (USGS).

Student Eyes Wyoming Pastures

Student Vince Holton of Fort Lupton, Colorado, obtained Landsat satellite images (landsat.usgs.gov) of his Wyoming pasture that were available through WyomingView.

He had a "prove it" attitude. "I wanted to see how it worked, if it actually showed what I had observed on the ground," he says.

The images provide variations in light reflectance of vegetation, which can show levels of plant vigor.

"That tells you if it's real productive, dormant, or dead," notes Holton. "But you have to know what you are looking at. You can't take somebody else's place; not having been there, you only can guess. You still have to do the groundwork to know what you are looking at. It works slick on farm ground, and it works good on rangeland, too. But you need help on which satellite image to use and how to configure it so you get the right values."



Garrett Klein, left, of Pavillion and Laramie Wiginton of Kinnear examine satellite remote sensing images of cropland near Fort Washakie.

Holton says he'd like to use remote sensing in future operations. "I'd like to get more advanced so I know what I'm doing," he says. "I got enough out of it I sure could see a heckuva value, especially in farming."

Forest Burn Area Data

Adam Stephens of Rapid City, South Dakota, and Brice Stanton of Newcastle used the Landsat eyes in the sky to examine burn ratios within the 2001 Grizzly Gulch fire near Lead, South Dakota (Figure 1).

"We found the burn severities (high, moderate-high, moderate, moderate-low, and low) relative to the slopes on the digital elevation model," says Stephens.

Both are from the Black Hills area and are interested in fire effects in the region.

"By looking at our results, one can gain a better idea of how a fire burning under similar conditions, ecosystems, and topography will behave," says Stanton, "and it may provide insight to the post fire conditions for better management decisions."

The two presented their work during the University of Wyoming's Undergraduate Research Day in May.

Analyze Center Pivot Cropland

Garrett Klein of Pavillion and his lab partner, Laramie Wiginton of Kinnear, northwest of Riverton, looked at center pivots on Klein's family land near Fort Washakie.

"We changed from flood irrigation to pivot irrigation in 1998," says Klein, who is working toward a bachelor's degree in rangeland ecology and watershed management (REWM). He received a bachelor's degree in ag business from UW in December 2007. "I wanted to see if the crop yields were increasing or if helping improve the ground (fertility)."



Figure 1. Landsat images acquired before and after a fire in the Black Hills National Forest in South Dakota. Post-fire Landsat image (displayed in infrared bands) shows burnt areas in different shades of red. Using these images, students Adam Stephens and Brice Stanton in 2008 quantified the severity of burn, which is useful for assessing the extent and magnitude of wildfires.

The project was of particular interest to both. "I grew up a half-mile away from the ground," notes Wiginton, who graduated in December with a bachelor's degree in REWM. "We have worked on the same ground together since elementary school."

They examined Landsat images from July and August from 1998 to 2006. The software program illustrates crop vigor through the years. "It allows us to see if an area of the field is consistently good or consistently bad," says Klein.

Klein, familiar with the farm ground, says he remained a skeptic of the process while using the program, but, "So far, it's been correct," he says.

Using satellite images, they were able to match the growth patterns observed in barley and alfalfa fields and distinguish areas where barley grew well or poorly due to alkaline soil, notes Sivanpillai. "However, Landsat images were less useful when portions of the field were covered with weeds. For smaller farms, they concluded that high-resolution imagery taken at the right time of the growing season could be more helpful."

Although some of the fine details of farm boundaries and growth patterns might not be visible in the Landsat images, they are useful for monitoring crop growth because they are acquired frequently, Sivanpillai notes. Landsat images are updated every 16 days.

Sivanpillai says he is also glad students from this class are presenting their work in avenues such as UW Undergraduate Research Day. Last year, Vincent Salerno (right) presented the use of Landsat images to monitor sugar beet growth at a Worland farm. Sivanpillai says he encourages his students to take advantage of such opportunities for showcasing the work they did for his class.

The USGS has made the entire Landsat image archive (going back to early 1970s) free, enabling everyone to use these applications for monitoring their agricultural lands, Sivanpillai says.



Student Vince Salerno in 2007 characterized sugar beet growth in a farm near Worland using Landsat images acquired during the growing season. Information generated from these images helps farmers identify areas of expected or poor crop growth. This information can assist a farmer to devise suitable management strategies for maximizing growth.



RING 2009

Researchers seek to unravel elk

By Rachel Knutson University of Wyoming journalism senior

Finally free, the elk sprints full speed from the holding pen. A few hundred yards from the corral, she abruptly stops.

Turning her head, she slowly looks wide-eyed at the human capturers. For a brief second, the very different creatures are caught in a silent exchange. Then the cow elk marches away triumphantly, head held high, no longer looking back.

"One of the most significant memories of the research is watching the elk that do not test positive run to rejoin their herd," says Todd Cornish, an associate professor in the Department of Veterinary Sciences.

Cornish and Laura Meadows, who is working on a master's degree in animal and veterinary sciences, are involved in a project with the Wyoming Game and Fish Department (WGFD) to decrease the brucellosis seroprevalence in Wyoming's feed-ground elk.

"The term seroprevalence is used to indicate the number of animals that test positive on a series of blood tests. This method gives us an estimate of the number of brucellosis cases in the population," says Meadows, who grew up in Wilson, which is near several of the feed grounds in northwestern Wyoming.

Cornish adds, "We're working to determine if changes in seroprevalence are statistically significant, but we don't have that answer yet."

Brucellosis infects reproductive organs and associated tissues, typically causing pregnant animals to abort their fetuses. The disease occasionally is transmitted from feed-ground elk to cattle when the cattle are exposed to the aborted fetus or amniotic fluids of a brucellosis-positive elk. The problem occurs when elk calving locations overlap with cattle grazing areas (see separate story, Page 16).

When two or more herds of cattle in a state are infected with brucellosis, the state loses its brucellosis-free status. In 2004, one cattle herd in Sublette County and another in Teton County became infected, and Wyoming lost this status for two years.

Losing the label can be detrimental to a state's cattle marketing efforts, and it can be detrimental to ranchers whose herds become infected.

"What drives the whole elk brucellosis issue is the risk of transmission to cattle," says Mark Gocke, WGFD public information specialist in Jackson. "Obviously, Wyoming is a cattle-producing state, and we place great emphasis on the marketing of cattle."

In 2005, the Wyoming Governor's Brucellosis Coordination Team, which

College of Agriculture Dean Frank Galey chairs, released a report with 28 recommendations to help prevent the state from losing its status again.

Included was a suggestion to implement a test-and-slaughter pilot program. The program requires blood to be drawn from elk on designated feed grounds in western Wyoming. Because the blood tests cannot show for certain an animal has brucellosis, the researchers must take an educated guess based on their knowledge of the bacterium and the disease.

Elk having blood test results showing likely contact with brucellosis are slaughtered in order to perform further tests at the Wyoming State Veterinary Laboratory (WSVL), which is managed by the Department of Veterinary Sciences, and the WGFD's Wildlife Disease Laboratory (WDL), which is in the WSVL. "We are asking the question: Will test and slaughter reduce seroprevalence over time by removing positive animals?" says Gocke.

And this is exactly the question Meadows, Cornish, and the WGFD are working to answer.

The test-and-slaughter study is being conducted on three feed grounds southeast of Pinedale: Fall Creek, Scab Creek, and Muddy Creek. The study is conducted in that part of the state, says Gocke, because that is where brucellosis is most prevalent.

Twice a year, Meadows and Cornish travel to the feed grounds to help WGFD personnel with trapping.

"Round traps are set-up on feed grounds with good hay to lure elk in. There are doors on both sides narrow enough to prevent bulls from entering the traps," explains Meadows, who stretches her hands out beside her head indicating large antlers.

brucellosis mystery



Laura Meadows releases a calf elk from a trap at a western Wyoming feed ground after the animal was checked and fitted with an ear tag. (Photo by Dave Edmunds)



Graduate student Laura Meadows

Teams then count the number of captured elk, a seemingly easy task when temperatures are balmy but an arduous one when the thermometer reads 10, 20, or even 30 below zero.

"Up to 200 elk can be in the trap at once. We sort them into chutes with five elk per chute, then into individual squeeze chutes for testing. The elk become skittish easily so we try to work quickly," continues Meadows, who is familiar with this process as she has been involved in the study for four years.

Once the animals are inside the individual squeeze chute, Meadows and a contingent of WGFD personnel take a blood sample from each cow or yearling, outfit the animals with numbered neck collars and ear tags, and return the female elk to the holding pen.

"The trap itself is as easy on the elk as possible," Meadows says.

Next, the blood samples are sent to the WSVL and WDL for testing. This is when the waiting game begins in the field.

> -Correction Correction Correctio

At the WSVL and WDL, the work of Hank Edwards is anything but a waiting game. The blood must be processed and tested quickly so elk that do not test posi-



Wyoming Game and Fish Department Wildlife Disease Specialist Hank Edwards studies the results of one of three preliminary screening blood tests. The samples were from Muddy Creek feed-ground elk in western Wyoming, and they were analyzed at the Wyoming State Veterinary Laboratory. (Photo by Rachel Knutson)

tive for brucellosis can be released as soon as possible.

"It is a hurried atmosphere when the samples arrive, but things slow down as the testing proceeds for the next four or five hours," says Edwards, a WGFD wildlife disease specialist who has been working on the test-and-slaughter project for four years and studying brucellosis for 15.

Each sample is put through three preliminary screening tests. If the results are positive in any of these tests, the sample proceeds through two additional tests.

"It is not cut and dry by any stretch of the imagination," Edwards says. "Brucellosis can be a wretched disease in terms of diagnostics."

Many of the tests adopted by the U.S. government in the 1930s and '40s are still being used today, he says, because a more accurate method has not yet been developed.

Throughout the procedures, Edwards is not looking for the *Brucella abortus* bacterium, which causes brucellosis. Instead, he is looking for antibodies against the bacterium, which signify an animal has been exposed to brucellosis. A greater number of antibodies indicate a greater chance the elk was exposed. Thus, Edwards' team cannot say for certain an animal has the disease but only has been exposed to brucellosis.

"Hank has to take an educated guess as to which ones are actually infected," Gocke says.

Adds Meadows, "The blood tests are the only way to estimate the prevalence in a minimally invasive, ante-mortem way."

To determine if an elk is brucellosis positive, tissue samples must be taken for culture tests. Animals likely infected must be slaughtered.

"This is the crux of the problem," Meadows says. "If we are too conservative with the antibody cut-off levels, we may leave animals in the field that could continue to transfer the disease, but if we are too liberal, we are unnecessarily removing too many elk."

While there is no certain range of antibodies that guarantees an animal will be culture positive, Meadows does believe the study is bringing the researchers closer to being able to determine accurate cut-off levels.

-Ho

Back in the field, the results from the lab arrive early in the morning, and elk that test negative for brucellosis are released from



Associate Professor Todd Cornish

the holding pen.

This winter, eight of 114 (7 percent) of cow elk tested at Muddy Creek feed ground were seropositive.

Seven percent (11 of 160) also tested seropositive at Fall Creek, while 31 of 151 (21 percent) were positive at Scab Creek.

When asked why Scab Creek's percentage was so much higher, Meadows responds, "This is the million dollar question!" She says seroprevalence can vary widely from year to year. On one particular feed ground, which has been tested consistently since 1993, seroprevalence has varied from zero to 59 percent.

In addition, Meadows says, the average seroprevalence of feed-ground elk is about 24 percent, so Scab Creek is right about at the average. It is also difficult to compare feed grounds because they are all a little different in terms of elk density, elevation, and size of the feed ground, among others.

There is another possibility for the difference at Scab Creek, Meadows says. The team has been trapping and slaughtering positives at Muddy Creek for four years now and at Fall Creek for two in an attempt to reduce seroprevalence. This year is the first for testing at Scab Creek.

"The goal of this program is to achieve a statistically significant reduction in seroprevalence. So we are trying to determine if the seroprevalence at these feed grounds is decreasing as a result of the test-andslaughter program or from numerous other factors," she says.

Animals that test seropositive are sent to a slaughter plant in Idaho. Meadows, Cornish, and WGFD wildlife veterinarian Cynthia Tate accompany them.

"It is an interesting experience moving from the cool, quiet, open air of Wyoming where it often reaches below zero to the hot, steamy slaughter plant where they play loud music all day...but it gives you a real appreciation of how slaughter plants work," Cornish says.

At the slaughter plant, Cornish and Meadow are also acutely aware of the dangers of their work.

"We are collecting tissues most likely to be infected at a time of year when they harbor the most bacteria," Meadows says. "But the 'gear' we are using and safe labora-



Laura Meadows collects tissue samples from elk fetuses to culture for Brucella abortus, the bacterium that causes brucellosis. (Photo by Todd Cornish)



Laura Meadows collects tissue samples from an elk carcass. Elk likely infected with brucellosis are slaughtered and taken to the Wyoming State Veterinary Laboratory and Wyoming Game and Fish Department's Wildlife Disease Laboratory in Laramie for testing. (Photo by Todd Cornish)

tory practices combine to provide a good barrier for *Brucella abortus* transmission."

The primary risk of transmission to humans is through direct contact with placental or fetal fluids and tissues of infected animals. Despite the dangerous and often unpleasant conditions involved in the research, Meadows does not lose sight of her greater goal.

"In all research involving wildlife, we have to appreciate and respect those animals that are utilized in order to answer questions for the greater good of the species or managing the disease. As part of that respect, we need to strive to gather as much information as possible and to design research projects that effectively utilize each animal."

Meadows and Cornish collect reproductive organs and tissue samples at the slaughter plant to bring back to the WSVL and WDL, where culture data and statistical analysis are performed. The remainder of the elk meat is donated to people in need in Wyoming. The meat is not affected by the *Brucella abortus* bacterium because brucellosis only infects the reproductive organs of an animal.

Meadows compares culture data with blood test results to draw closer to determining the antibody cut-off levels. She says the ultimate goal is to have a better understanding of these tests and the disease in elk.

"We have an unmatched sample size compared to any other elk brucellosis research so that allows us to confer positive results," says Meadows as she quietly watches another cow elk leap to freedom.

Editor's note: Rachel Knutson, of Pierre, South Dakota, is a senior majoring in journalism at the University of Wyoming. She was mentored during the 2008-09 school year by Robert Waggener, an editor in the UW Cooperative Extension Service's Office of Communications and Technology.

Ag college, WGFD studying ecology of elk births and abortions

By Rachel Knutson University of Wyoming journalism senior

Department of Veterinary Sciences graduate student Laura Meadows and Associate Professor Todd Cornish are collaborating with the Wyoming Game and Fish Department (WGFD) in a study called the Ecology of Elk Abortion and Parturition in the Brucellosis Endemic Area of Wyoming.

The study, called Vaginally Implanted Transmitter (VIT) for short, is in addition to their involvement with the test-and-slaughter research (see separate story, Page 12).

The VIT project has contributed additional information to facilitate the understanding of brucellosis in elk. Those involved place and trace radio transmitters in pregnant feed-ground elk, says Meadows, who notes portable ultrasound is used to determine pregnancy.

The transmitters emit one signal when warm inside the elk and a different signal when they have been expelled and cooled. This allows researchers to help determine if an elk has given a live birth or aborted her calf.

The results of tracking these transmit-



Laura Meadows studies an aerial map marking the locations in western Wyoming's Wind River Mountains where vaginally implanted transmitters have been expelled from cow elk, indicating either a birth or an abortion.



ters (in Meadows' case sometimes a twoto four-day ride into western Wyoming's backcountry on horseback) have been used to produce habitat location data of elk abortions and births.

Mark Gocke, WGFD information specialist in Jackson, says, "Elk are calving in places beyond what was originally documented. The implications of tracing elk allow us to determine areas we should exclude cattle from in the spring, preventing them from coming in contact with elk calving areas and thus brucellosis."

The results also contribute to information about the circumstances of an abortion and assist researchers in determining if brucellosis was the cause. Meadows hopes the data will eventually help predict which elk are going to abort.

In 2007, the WGFD produced a comprehensive report of the VIT project that can be accessed at http://gf.state.wy.us/ wildlife/Brucellosis/index.asp.

Meadows says both the test-andslaughter and VIT studies are important because brucellosis is a prominent problem worldwide and in certain portions of the United States for the livestock industry and for wildlife in general. She says she hopes the results of the research will help people better manage livestock and wildlife and the interactions between them.

Cornish agrees, and adds the methods used for brucellosis research may also be applied to the study of other diseases, like tuberculosis. In addition, he says, the studies are significant because it is important to many, including ranchers, that Wyoming retains its brucellosis-free status.

Cornish and Meadows also feel a personal connection to the research. They have made good friends with and learned a great deal from their WGFD counterparts in the field. Cornish says he will continue studying brucellosis, while Meadows hopes to continue working with livestock and eventually attend veterinary school after graduating in May.

Meadows, though, says she will miss the opportunity to be so close to so many elk at the feed grounds, something she describes as "an awesome sight." In addition, her family has a history of working with elk.

"My great-grandfather was involved with starting the National Elk Refuge, and my father fed elk on the South Park feed ground."

So, as she moves on, Meadows won't soon forget her experience with brucellosis research and the elk. It is in her memory and in her blood.



Associate Professor Anne Sylvester (right), Senior Research Scientist Dorothy Tuthill, of the Department of Molecular Biology, and Roger Dilts, a faculty member at Salish Kootenai College in Pablo, Montana, stand ready for questions while workshop participants from Little Big Horn College last year participate in laboratory exercises. From left are student Heather Beaumont, faculty member Shonna Dominquez, and students Miranda Rowland, Justin Hugs, Audrey Plenty Hoops, and Crescentia Cummins. Plenty Hoops is now a student at the University of Wyoming. (UW Photo Service)

Learning how to succeed in a place so unlike home

By Robert Waggener, Editor Office of Communications and Technology

Anne Sylvester arrives at Slade Elementary School in Laramie on a windy Wednesday afternoon, where she greets fourth grader Ote Plenty Hoops with a big smile.

"Hey Ote! How's it going?" asks Sylvester, an associate professor in the Department of Molecular Biology who is involved in a tribal outreach project with Little Big Horn College (LBHC) in Crow Agency, Montana.

Sylvester is doing everything she can to help Ote and his mother, Audrey Plenty Hoops, succeed in a place so unlike home.

If Sylvester is unable to meet Ote (pronounced Ōat), then her husband, Associate Professor Steve Herbert, head of the Department of Plant Sciences, makes the trip.

"Dr. Anne and Dr. Steve have both been very supportive. They have become like family," says Plenty Hoops, a member of the Crow Indian tribe from Crow Agency who was inspired to enroll in the University of Wyoming last fall after taking science workshops co-taught by Sylvester as part of the tribal outreach project with LBHC.

"Without Dr. Anne's help, support, and faith in me, I would not have been able to go to UW," Plenty Hoops says. "She has turned into a mentor, and that is so precious to me."

Sylvester, David Jackson, a professor at Cold Spring Harbor Laboratory in Cold Spring Harbor, New York, Agnes Chan, a staff scientist at J. Craig Venter Institute in Rockville, Maryland, and others received a \$4.8 million grant from the National Science Foundation for their research project "Characterizing Sub-Cellular Compartments in Maize Using Fluorescent Protein Tagged Lines."

Maize cells consist of interconnected but discrete compartments that help main-

tain cellular function and order, Sylvester says. Identifying proteins that localize to these compartments is critical to understanding developmental and physiological processes in corn, which in turn provides key information for crop improvement. For details about the research, see http://maize. jcvi.org/cellgenomics/index.shtml.

An important component of the project is educational exchanges between the researchers and American Indian students. The outreach started in 2006 and will continue through 2010.

"One of our goals is to provide educational opportunities for students at tribal colleges so they can become engaged in science, attend four-year institutions, and then take science back to their tribal colleges and communities," says Sylvester, who has focused her outreach efforts on working with LBHC students and faculty members.

"Their science program tends to be focused on ecology, natural resources, and



Audrey Plenty Hoops, now a student at the University of Wyoming, was one of the Little Big Horn College students who participated in workshops. Here, Plenty Hoops centrifuges a water sample.

health sciences, particularly issues that are relevant and impact life on the reservation. We believed we could augment the curriculum in the areas of our expertise – cell and molecular biology," Sylvester says. "Many of the natural resource and health-related issues they are trying to resolve can be dealt with using current molecular genetic techniques."

Sylvester, Jackson, Chan, and Dorothy Tuthill, a senior research scientist in the Department of Molecular Biology, travel to Crow Agency each May to teach a five-day workshop on genetics.

Last year, about 20 LBHC students, including Plenty Hoops, and faculty members learned how genetics plays an important role in horse breeding and determining horse hair color. They were also taught how genetics can be used to improve water quality and land and how it can help researchers understand and discover cures for diseases such as diabetes.

Molecular genetics methods are used to track sources of bacterial contamination in water supplies, Sylvester explains. "Once contaminating water sources are identified, a community can make plans for cleaning up the source of the bacterial contamination or pollution. The methods used are similar to DNA fingerprinting used in paternity testing and in forensic science," she says. "In our workshops, the DNA signature of a contaminating bacterial species is used to identify its location and its source from a body of water. Often, the contaminating bacteria come from land pollution nearby."

Sylvester, nationally recognized for her genetics research involving maize, starts the workshops by using corn as an example of genetics and then delves into topics relevant to the Crow people, including horses. "They are such an important part of Crow culture we now use horse coat color as a perfect model for how genetics works," she says.

Sylvester works closely with faculty members and students at LBHC to develop workshops, taking cues from them about what is most relevant and important to learn. Among them was Mari Eggers, a LBHC research associate who is also a doctorate student in environmental health at Montana State University-Bozeman.

Sylvester says, "Mari inspired and guided me and my colleagues in curriculum development. We have been honored in the process to learn about Crow culture and contribute to the learning environment at LBHC."

Eggers emphasizes, "It was a great opportunity for our students and community members to learn from nationally known scientists who are currently researching genetics and genomics. It was a great opportunity because that expertise wasn't previously available to our students and community. Anne and her colleagues' flexibility in developing the curriculum have made the weeklong course really relevant to and interesting to our community. They are really committed to this outreach effort, and people recognize and appreciate that." Plenty Hoops was inspired from the get-go.

"I found it so interesting to learn about the science behind horse hair color and how our people can use genetics to breed for certain colors," Plenty Hoops says.

A month after the May 2008 workshop, Plenty Hoops and other LBHC students traveled to Laramie for a much more advanced workshop, an intensive four-day session to learn how to use the polymerase chain reaction (PCR) for molecular research and as a teaching tool for basic biology classes. Sylvester says PCR is a method for isolating and amplifying whole genes or fragments, and it is used extensively for most genetics research, for forensics, and for DNA study.

"It is particularly useful for DNA diagnosis," Sylvester says. "The students learned how to use PCR to test water samples for bacterial contaminants."

Plenty Hoops and her classmates collected water samples around Laramie and then went to work in a UW laboratory testing those samples. "We also studied DNA, something I had only seen on TV," she says.

Her fascination with science continued to grow, and soon she found herself visiting



Associate Professor Anne Sylvester

with Sylvester about what she thought would be an impossible chance to attend UW.

"LBHC opened the doors for me, and Anne Sylvester and her program really introduced me to UW and research science," says Plenty Hoops, who earned an associate degree in liberal arts from LBHC and then enrolled at UW as a junior, double majoring in agroecology and environment and natural resources (ENR).

The journey hasn't been easy for Plenty Hoops, now 41 and a senior at UW.

In fact, she admits, "It has been very hard, but I'm keeping my head up, working hard, reading, studying, going to class everyday."

Plenty Hoops, who was born on the Crow Indian Reservation, graduated in 1987 from a private Catholic high school on the nearby Northern Cheyenne Indian Reservation in southeast Montana.

She attended a junior college in Kansas for one year on a basketball scholarship. "I just got so homesick," she remembers.

She dropped out of school and went back to Crow Agency for a short time before deciding to give college another try, this time much closer to home at Montana State University-Billings. After one year, though, she quit because her mother, a single parent, wasn't making it financially, and Plenty Hoops believed it was more important to put her family ahead of herself. She again moved home.

As her family's financial situation slowly improved, Plenty Hoops enrolled in LBHC, taking classes from 2004 to 2008. That's when she met Sylvester and other scientists involved in the tribal colleges outreach project.

"Anne made a huge difference in Audrey's life," says Eggers. "To the best of my knowledge, Audrey is our first Little Big Horn College graduate to go on to pursue her bachelor's degree in a science discipline at the University of Wyoming, and I don't know if she would have ever gone on to UW had Anne not inspired and encouraged her."



Crescentia Cummins (left) prepares a DNA sample for Audrey Plenty Hoops as Plenty Hoops uses a pipet to add buffer to the sample. (UW Photo Service)

Plenty Hoops, who, like her mother, is also a single parent, worked hard to save money for college and worked equally hard to earn scholarships. "I needed to make sure I was financially stable to make the move to UW," she says.

That was only the beginning of many hurdles.

"I had a hard time finding housing for Ote and me, and then I had difficulty finding a school for him," Plenty Hoops says. "Then I faced more difficulties in the classroom because coming from a Native American heritage, our way of learning is much different. We learn a lot from our elders; they teach us verbally. We don't have the modern technology or the teachers who know genetics or DNA, and that is something I hope I can bring back to my people. We can use that technology and science to improve our waters and soils, our horses, our health."

Plenty Hoops is also learning how to let people outside her family and tribe help her to help herself.

"I have set down with Dr. Anne many times for advice, to brainstorm, and to debate about courses. I am developing stronger work ethics, responsibility, and lab tools; I am learning how to study better and how to challenge myself in the classroom," Plenty Hoops says about her experiences at UW. "I've had to work really hard to be an overachiever, not an underachiever, and I hope I can share all of that with my people."

On top of all this, Plenty Hoops now knows people like Sylvester and Herbert care enough about her success that they take the time to greet Ote after school each Monday and Wednesday, something she would never learn in a science classroom.

"Audrey serves now as an inspiration to others, a trailblazer of sorts, showing the ability and strength to stay focused on her goals in a challenging academic environment," Sylvester says. "She has about a year left to earn her degree, and then she hopes to go back to Little Big Horn College and teach in science, or she may go on to graduate school. I and my colleagues hope she will pave the way for other students from LBHC to feel welcomed at UW and expand their education here and elsewhere."

UW student farm starts composting

By Steven L. Miller, Senior Editor Office of Communications and Technology

Arthur Kneeland, wearing a leather jacket and stocking cap pressing down a pony tail, looked over at Peter Gallins dressed in work clothes. The two were standing in front of piles of food waste propped between large straw bales and wire.

Busy microbes working in tandem with whatever moisture is present or added in the piles will turn the waste into rich compost – "überfuel" for plants – that will be mixed into the soil.

"This has been definitely one of the best parts of coming to this college," Kneeland, an entomology major in the College of Agriculture, says to Gallins, "getting to work with the cool people on this amazing project."

The "amazing project" is the student farm nestled against the University Greenhouse and experimental crop plots. Students with the Agricultural Community Resources for Everyday Sustainability (ACRES) group operate the farm, which sold more than \$3,000 in produce last year at the Laramie Farmers' Market and provided about \$250 in produce to the community Soup Kitchen. The two say the farm is really operating at only about a third of what it could.



Arthur Kneeland scoops waste material collected for composting.



Arthur Kneeland, left, and Benjamin Bump hoist a container of waste from a downtown Laramie business during their collection run.

New Venture

Kneeland and Gallins, the greenhouse horticulturist, were showing off the farm's newest venture – mounds of compost gleaned from food waste from several Laramie businesses and the Wyoming Union, UW-Catering, and UW Early Care and Education Center, and spent grain from a local beer brewery. In another venture – a carrot dangling in front of the student farm – a possible biodiesel production facility that could fuel UW vehicles and could help pay for a student farm manager.

They Have Plans

"I can never say enough in praise of these students," says Rik Smith, an assistant professor of agroecology in the college. Students approached him three years ago about starting a student farm, and he helped them plant the seeds of the project then watched it grow.

"They have done an absolutely amazing amount of work and learned a great deal about growing vegetables in our climate," he says. "They have also gained a lot of experience in managing a group process and in solving problems. They may not always do things the way I would do them, but it's not my farm, it's theirs."

In the 1907 "The State of Wyoming, A book of Reliable Information Published by Authority of the Ninth Legislature," a passage reads that those in 1882 who suggested ag products might be raised with profit in Albany County were ridiculed. "Today," it stated in 1907, "hundreds of citizens are not only making a living, but are reaping large profits." The book boasted of all kinds of small grain, alfalfa, nearly all the vegetables, and sugar beets. The authors particularly liked the field pea.

Albany County ground will yield produce but needs a little help. "There is the realization the soil is low in organic matter," notes Kneeland. "Building up organic matter is the sustainable thing to do. To do that,

program; biodiesel production next?

you have to come up with a way of putting organic matter into the soil. It made sense to start composting."

Community Collaboration

Waste from Washakie Dining Center contained too much non-compostable items, such as plastics, so the students approached local businesses. Among those responding were Coal Creek Coffee, Sweet Melissa's, and Altitude Chophouse and Brewery.

Now, three times a week, students make the rounds of several businesses filling up plastic drums hauled in beds of personal pickups. Once a week, the Wyoming Conservation Corps donates the use of a pickup in exchange for food. Waste is dumped into piles formed by huge straw bales and allowed to simmer – the students don't have the ability yet to grind the waste to hasten the composting process.

"Since they are collecting large quantities of food waste, they are not able to build their piles with the classic layering of brown (carbon materials) and green waste



Peter Gallins (left) and Arthur Kneeland in front of a compost bin created by stacking large straw bales.

(nitrogen) that you want to practice in your backyard," says Smith, "but they develop plenty of heat in their piles. They've stayed above 80 in the piles all winter. They'll be able to turn the piles pretty soon, and then we'll see how those inner materials have broken down."

Gallins says some of the temperatures have approached 140 degrees. This spring, the compost will be incorporated into the soil.

The student farm has enjoyed community support. Dave Earnshaw is a community member who decided to become involved. He had attended Smith's one-hour seminar on starting a student farm.

"I think it provides students a new way to think about the way we grow food," says Earnshaw, 77, who also makes collection runs. "It might encourage them to have their own gardens, and it might encourage them to be farmers in sustainable agriculture."

Earnshaw sees two formidable hurdles – ensuring there is enough help in the summer and having enough water and power. Many of the students involved are juniors and seniors. "Every year, the student farm is two years away from extinction," he says. "I think it would be helpful to try to recruit freshmen and get them to stay involved."

Possible Biodiesel Production

A biodiesel facility could pay for a farm manager, which could help alleviate the work demand. Such a facility is in the planning stage, and Kneeland says a funding source has been identified. The fuel could be for use in university vehicles.

The facility could process up to 3,000 gallons of fuel a year, and use the more than 2,500 gallons of oil Washakie Din-



Volunteers collect waste material three times a week. Arthur Kneeland tips one of the containers he and Benjamin Bump brought to the piles.

ing Center now pays to be hauled away and processed. The students want to make the student farm a four-season facility by using greenhouses and alternative energy sources such as wind, biodiesel, or passive solar heating.

Don't count the students out. "The amount of support that exists is amazing. People are excited about it," says Kneeland.

Ag college teams with Malaysia university to combat hepatitis B

By Robert Waggener, Editor Office of Communications and Technology

Hepatitis B virus is a significant global health issue, and one of the areas where the disease is prevalent is the small Southeast Asia country of Malaysia.

A College of Agriculture graduate from Malaysia hopes to do something about the problem, and she has teamed with researchers in the Department of Molecular Biology to undertake experiments that could help lead to new treatments for those infected with the virus.

Janna Ong Abdullah returned to the University of Wyoming as a visiting faculty member this school year to conduct studies with a molecular biology research team led by Professor Peter Thorsness.

"The successful accomplishment of our research goals will provide genetic and biochemical information that could lead to new treatments for those individuals chronically infected with hepatitis B," Thorsness says.

Ong Abdullah grew up in Malaysia and saw how the disease affected her country. Hepatitis B is usually transmitted by sexual contact or by injection of infected blood or other bodily fluids, and she says the lack of facilities for testing has been a major setback in her country.

After graduating from UW in 1992 with



Janna Ong Abdullah, a faculty member at the Universiti Putra Malaysia and a graduate of the College of Agriculture, is a visiting professor in the Department of Molecular Biology, where she is carrying out studies relating to hepatitis B with a research team led by Professor Peter Thorsness.

a bachelor's degree in microbiology and 1995 with a master's in molecular biology, Ong Abdullah returned to her native country where she earned a Ph.D. in plant molecular biology from the Universiti Putra Malaysia (UPM).

Ong Abdullah then became a faculty member at UPM, which encourages its researchers to carry out projects with other scientists both at the university and globally. She thought it would be a natural fit for UPM to team with UW because of the well-established hepatitis B studies at UPM in combination with particular strengths of the Thorsness lab with respect to mitochondrial function, a key component of the hepatitis B research.

On top of that, Thorsness says, "Janna had a lot of energy as a student here at UW and has lost none of her enthusiasm for science and research as a professor. She's a dynamo."

The Thorsness-Ong Abdullah team is using yeast as it pursues the basis for how the X protein that's encoded by the virus is important for pathogenesis, the origination and development of a disease.

"It has recently been reported the X protein adversely affects mitochondrial function in a very basic way, affecting a particular feature of mitochondria my lab has significant experience with," Thorsness says.

He explains that feature is the generation of the essential inner mitochondrial membrane potential.

"The idea is to use the simple system of yeast genetics to tear apart the function of the X protein as it relates to changing mitochondrial activity," Thorsness says. "Janna has already made some technical advances, and the genetic screen is up and running. We hope to get some idea of what the X protein is doing before she heads back to Malaysia in a couple of months, but we'll keep working on this together even after she returns home."

Thorsness says the research should provide preliminary data needed to submit a grant application to the National Institutes of Health.

uw/usda

By Robert Waggener, Editor Office of Communications and Technology

Research by the College of Agriculture and U.S. Department of Agriculture (USDA) should enable sheep producers to more easily, and cost effectively, improve genetics of their flocks.

The two-fold project focuses on semen collection/storage and an inexpensive yet effective method to artificially inseminate ewes.

"The availability of a costeffective AI (artificial insemination) procedure would facilitate and enhance genetic programs for sheep," says Bob Stobart, an associate professor in the Department of Animal Science and a sheep/wool specialist with the University of Wyoming Cooperative Extension Service.

"It will really assist in getting higher quality genetics throughout the United States," he says.

The team's lead scientist is Phil Purdy, an animal physiologist with the USDA Agricultural Research Service's National Animal Germplasm Program (NAGP) in Fort Collins, Colorado.

Collaborators are Stobart, Brent Larson, manager of the College of Agriculture's Sheep Unit west of Laramie, and Harvey Blackburn, an animal geneticist with the NAGP.

research should enable sheep producers to easily improve genetics



Brent Larson, manager of the College of Agriculture's Sheep Unit west of Laramie, feeds sheep involved in a research project to help producers more easily, and cost effectively, improve genetics of their flocks. Green chalk on the backsides of the ewes indicate they were mounted by a sterilized marker ram, which, in turn, indicates the ewes are cycling and ready to be artificially inseminated.

Phase one of the project revealed semen can be collected and held at 41 degrees Fahrenheit for up to 48 hours prior to cryopreserving without impacting sperm quality. Cryopreservation maintains the viability of semen by storing it at very low temperatures.

Purdy says this finding is important because it will allow sheep producers to perform collections on their ranch and then overnight ship the semen to distant laboratories for storage. It will also improve research potential at facilities such as the NAGP, he says.

The team is now in the final stages of part two of the research, which is exploring an alternative method of non-surgical AI.

To date, Stobart says, nonsurgical techniques have not been consistently successful because ewes have a cervix that is difficult to access because of folds within the cervix, unlike cattle, which have a cervix that can be physically manipulated.

Stobart says a surgical method to AI ewes, which involves the use of a laparoscope (a slender surgical device that is inserted through a small incision in the abdominal cavity), has produced the best results, but the procedure requires a high level of expertise to achieve acceptable levels of fertility. Also, this method is very expensive, costing \$40 to \$50 per head. Because of this, Stobart says, few producers use the technology. Instead, they turn rams loose with ewes, but this doesn't give producers the option to improve genetics by artificially inseminating ewes using stored semen from other rams.

"We're using a small device that works its way through the folds of a ewe's cervix," Stobart says. "It's a fairly simple and straightforward method that could be done by producers on the farm."

Stobart says good results have been obtained with test animals, but now they are trying to develop a way to determine when ewes are cycling naturally so good AI results can be achieved with large flocks at a ranch or farm.

A promising method involves using a "marker ram" equipped with a harness on its chest containing a block of chalk. In this study, rams were initially equipped with green chalk, and then red was used a couple weeks later to indicate if a ewe wasn't artificially inseminated during her previous cycle.

"A ewe won't let a ram mount her until she is cycling," says Stobart, who notes the method being tested would allow producers to regularly check their flocks and pick out ewes having chalk on their backsides. The chalk indicates they are cycling and could be artificially inseminated. Marker rams receive vasectomies prior to being placed in pens so they don't impregnate ewes.

"This method is much less labor intensive and expensive than laparoscopic surgery, it's non-invasive, and we believe it would allow any producer to AI their ewes," Stobart says.

The team is now fine-tuning the technique to increase fertility rates.



A ram is equipped with a harness containing red chalk, which will rub off on the backsides of cycling ewes when they are mounted by a ram. The ram was initially equipped with green chalk, and then red was used a couple weeks later to indicate if a ewe wasn't artificially inseminated during her previous cycle.



By Robert Waggener, Editor Office of Communications and Technology

To treat, or not to treat? That is the question researchers are trying to answer in their own version of A Sagebrush Hamlet.

A team of University of Wyoming Cooperative Extension Service (UW CES) specialists and College of Agriculture faculty members are nearly complete with a longterm sagebrush habitat study on a southcentral Wyoming ranch near Saratoga.

They determined that applying the herbicide 2,4-D to rangelands having sagebrush cover of 24 percent or more will result in a positive economic return in terms of increased forage for cattle and sheep in addition to quantifying the impact of seasonal precipitation on forage production.

"The treatments approximately double your forage production for livestock," says Professor Mike Smith, a UW CES range management specialist who launched the study in the spring of 1987. "The message we can relay is that if you have sagebrush cover at or above 24 percent, you can treat it with 2,4-D and realize an economic return from livestock grazing."

lo treat, or not to treat:

Smith quickly adds a point of emphasis.

When he and colleagues started the project, the entire focus was on forage production for livestock grazing. Since then, declining wildlife habitat, including sagebrush lands occupied by greater sage-grouse, has come to the forefront in Wyoming because of issues such as oil and gas development, rural housing, overgrazing, and drought.

"The sage grouse issue has eliminated the interest in sagebrush removal," Smith says. "At very best, we're now talking about sagebrush thinning."

Smith, however, still believes the study provides valuable information for ranchers and other land managers interested in improving rangelands.

"We believe they could use 2,4-D or tebuthiuron pellets (a broad-spectrum herbicide) to create a mosaic of varying amounts of sagebrush, grasses, and forbs of varying ages," says Smith, who notes that if such treatments are carefully planned and implemented, habitat for both livestock and wildlife could be improved.

For this to work properly, Smith stress-

es, a holistic approach to land management must be incorporated, including proper stocking rates to avoid overgrazing, the timing of grazing in terms of plant growth, livestock distribution, and keeping close tabs on precipitation. The team is studying how precipitation levels in a given year help determine the economic value of treating sagebrush.

A series of UW CES fact sheets that address livestock grazing and rangeland management issues are at www.uwyo.edu/ cessupport/agpubs/Search_Start.asp. Type MP-111 into the Publication Number box.

"I encourage all ranchers to keep precipitation records for the critical growing months of April and May. If you aren't close to a National Weather Service weather station, install a rain gauge at your house and another gauge some distance from your house and start logging numbers," Smith recommends.

"Precipitation received in April typically explains 50 percent of rangeland forage yield variations, while May precipitation generally only explains 25 percent of your variation in yields," Smith says. "If you go through April with half of your normal precipitation, you better think about culling or making other stocking adjustments early."

He adds, "The end of April is a really good time to be making these important decisions because you can generally predict your summer forage by then. Secondly, the prices for livestock are typically better in the spring than summer."



Professor Mike Smith



Assistant Professor Chris Bastian

that is the question A SAGEBRUSH HAMLET

Early stocking adjustments, says Smith, allow for adequate forage to get to the next growing season when producers would hope forage supplies will be better.

"Take advantage of the good precipitation times, but be able to pull back when you get less moisture," he notes. "That should be obvious, but you couldn't tell that by looking at many operations across the state during the drought."

Precipitation is also a key for Smith and his colleagues to finish the sagebrush study.

"What makes this study unique from my standpoint is we have 18 years worth of forage growth data and how it responded to controlling the sagebrush," says Chris Bastian, an assistant professor in the Department of Agricultural and Applied Economics. "Now, we hope to determine the economic value of treating sagebrush in years of good precipitation versus years of average or below average precipitation."

Bastian says sagebrush, which has deep root systems, is a horrible water hog ... a very inefficient user of water in relation to growth.

"Because of that," he says, "my hypothesis is if you control sage in a year of belowaverage precipitation, you won't get much forage response. The sagebrush is going to out-compete the grass for moisture. There might be an economic value to waiting for good soil moisture because you would have a much greater forage response early on."

Bastian notes, "We'll use some fancy statistical techniques and simulate forage response over different precipitation conditions to test the hypothesis."



Inspecting one of the sagebrush study plots near Saratoga are, from left, Matt Holloran, wildlife consultant in Laramie; Bob Budd, Wyoming Wildlife and Natural Resource Trust executive director; Justin Williams, Wyoming Department of Agriculture natural resource program coordinator; Assistant Professor Ben Rashford, University of Wyoming Cooperative Extension Service (UW CES) natural resources economics specialist; Jim Cagney, a field manager with the Bureau of Land Management in Wyoming; Everet Bainter, state rangeland management specialist with the Natural Resources Conservation Service in Wyoming; and Professor Mike Smith, UW CES range management specialist.

Leading this aspect of the study is Dannele Peck, an assistant professor in the Department of Agricultural and Applied Economics who has expertise in mathematical programming and simulation.

Jim Jacobs, professor emeritus in agricultural and applied economics, has also been involved in the project.

The study area is eight miles northeast of Saratoga. The average elevation is 7,300 feet, and the average precipitation is 13.5 inches annually. The dominant overstory vegetation is Wyoming big sagebrush along with western wheatgrass and needle and thread grass.

Smith established 42 test plots in 17 sections. Each measured 100 by 100 feet. Half were control plots with no treatment, and the other half were sprayed with two pounds of 2,4-D per acre in early June 1987.

Vegetation was measured in late July each year from 1987 to 2004.

The team presented a paper on its research at last year's meeting of the Western Agricultural Economics Association in Montana. Once the economic analysis is complete, Smith, Bastian, Peck, and Jacobs plan to publish the results in a journal and write a bulletin or fact sheet.

They summarized in their paper: "Overall, these results suggest that for a given climate and region, economic threshold levels of sagebrush infestation may be less sensitive to site characteristics and precipitation variability than one might hypothesize."

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Agricultural and Applied Economics

David "Tex" Taylor says it's been an interesting time to serve on the Wyoming Consensus Revenue Estimating Group (CREG), which is charged with estimating state government revenue for the next round of budget planning.

"The past year has been particularly interesting with the big run on energy prices followed by the stock market collapse and declining energy prices," says Taylor, a professor in the Department of Agricultural and Applied Economics and a community development specialist with the University of Wyoming Cooperative Extension Service.

Taylor represents UW on CREG. Other members are from the state Department of Administration and Information, Department of Revenue, Department of Education, State Treasurer's Office, State Auditor's Office, Legislative Service Office, Wyoming Oil and Gas Conservation Commission, and Wyoming Geological Survey.

Numbers generated by the group are used each year by the governor, the Wyoming State Legislature, and other state officials for budget planning.

"In October, there was a \$900 million surplus in the state general fund budget, and by January it was down to \$260 million," Taylor says. "The suspicion is that it has declined even more, and, because of that,



Governor **Dave Freudenthal** has requested we hold a special meeting in May. There is so much uncertainty, and the changes have been so quick."

Taylor, who notes the group typically meets twice a year, says his main role on CREG is to review estimates relating to mineral valuation, earnings on investments, and general fund revenue sources.

"We're there to ask questions about the analysis," Taylor says. "On a personal note, it's pretty interesting to see how the revenue system of state government works."

In other department news, Associate Professor and Department Head **Roger Coupal** and Assistant Professor **Matt Anderson** are studying economic issues relating to oil and gas reclamation in Wyoming and costs associated with the reclamation.

"We hope to get information out to help industry and agencies be more effective at reclamation," Coupal says.

Animal Science

Amy McLean will join the Department of Animal Science in August as she moves into the department's newly obtained assistant lecturer position with expertise in equine science, says Professor and Department Head **Doug Hixon**.

The academic professional position carries a 60-percent teaching, 35-percent extension, and 5-percent advising/service responsibility.

McLean is working on a Ph.D. in equine nutrition at Michigan State University in East Lansing, and she plans to finish her degree requirements after moving to Laramie.

"A Georgia native, Amy previously received B.S. (double major in animal science and dairy science) and M.S. (animal reproductive physiology) degrees from the University of Georgia in Athens after being heavily involved in the Georgia 4-H horse program as a youth," Hixon says. McLean brings extensive classroom teaching experience from both Georgia and Michigan State and also has experience developing online courses for the virtual My Horse University, Hixon adds.

"The Department of Animal Science is excited to add this dynamic, enthusiastic, and highly qualified equine professional to our staff to further develop courses that can provide an equine dimension to our existing options in the animal and veterinary sciences (ANVS) major," he says. "In addition, she will provide an extension presence by working with both youth programs and the growing Wyoming horse industry."

Associate Professor **Warrie Means** earned a Promoting Intellectual Engagement in the First Year (PIE) Award. The award honors outstanding faculty members who inspire students intellectually in first-year courses. It is sponsored by the



Amy McLean with miniature donkey and dogs RCA and Marshmallow





Associate Professor Warrie Means

University of Wyoming Learning Resource Network and the Ellbogen Center for Teaching and Learning.

Caitlin Blackburn of Cody, an ANVS major in the pre-veterinary medicine option, and **Oliver "Brooks" Fry** of Evanston, a double major in the ANVS production option and kinesiology and health, earned the 2009 Animal Science Honor Book Awards for their career academic achievements. The awards were presented at the Gamma Sigma Delta awards brunch March 1.

Family and Consumer Sciences

Students in the Department of Family and Consumer Sciences were accepted to present their work at the national level. **Chelsea Zenner** and **Tanya Halliday** (dietetics option), and **Nikki Peterson** (human nutrition and food option) had research posters accepted to the

American Dietetic Association's Sports, Cardiovascular and Wellness Nutrition Symposium 2009, April 16-19 in Scottsdale, Arizona. Zenner's poster was "Ad Libitum Fluid Intake During Submaximal and Race Effort Running," Halliday's was "Assessment of Vitamin D Status in Relation to Dietary and Lifestyle Habits of Collegiate Athletes," and Peterson's was "Vitamin D Status in Collegiate Athletes." All three students worked in Assistant Professor Enette Larson-Meyer's laboratory.

Six students from Associate Professor **Sonya Meyer's** flat pattern course, as well as Meyer herself, had apparel designs accepted to the American Association of Family and Consumer Sciences 100th Annual Conference and Expo June 25-28 in Knoxville, Tennessee. This year's theme is sustainability. The students with juried submissions include **Amanda**



Assistant Professor Enette Larson-Meyer



Associate Professor Sonya Meyer

Jenkins and Janet Van Scoyk, textiles and merchandising with an apparel design minor; Karissa Markum, textiles and merchandising; and Chelsey Byrd, Katrina Despain, and Nicole Watts, theater. Graduate student Ann Wasserburger's garment was also accepted. She designed and constructed her garment in Professor Donna Brown's graduate design submissions course.

Molecular Biology

Department of Molecular Biology Professor **Randy Lewis** was selected among applicants nationwide to participate in the 11th Food and Agricultural Science and Education Exhibition and Reception March 4 on Capitol Hill.

"Spiders, bacteria, goats, and alfalfa: The silk that binds" was the title of the exhibition by Lewis. His was among 32 exhibition topics aimed at increasing congressional awareness of the latest research and education across the country.

Lewis says, "Representative **Cynthia Lummis** visited us during the reception, and staff from several other states also stopped by to learn about our research."

Associate Professor **Mark Stayton**, chair of the molecular biology department, says, "One of the applied aspects of Randy's work is development of addedvalue products for ranchers and farmers. In this case, the addedvalue product is the production in goat milk of a high-value biomaterial. His principal interest is in the structure and function of spider silk. As a part of that effort, he has engineered goats to express various spider silk proteins in their milk."

Lewis' trip was funded by the University of Wyoming's Agricultural Experiment Station (AES).

The College of Agriculture considered several projects in



Professor Randy Lewis

PROGRAM NOTES

the college and selected the work by the Lewis research team because of its potential to produce improved medical sutures and lighter but strong bulletproof vests, and for other applications, says Associate Dean and AES Director **Stephen Miller**. The Lewis research also was selected because it closely fit the theme of this year's event, "Science Innovations for a Better Life: Celebrating the new National Institute for Food and Agriculture."

The exhibition is sponsored by the National Association of State Universities and Land-Grant Colleges.

Plant Sciences

The science of weed management in crop and rangeland has been an area of strength in the Department of Plant Sciences for many years, notes department head and Associate Professor **Steve Herbert**.

That tradition continues with the recent hire of invasive weed scientist Jennifer Vollmer. Vollmer earned her bachelor's degree in agronomy from the University of Wisconsin at Madison, a master's in weed science from Southern Illinois University, and a Ph.D. in weed science from Virginia Tech. She then spent 20 years as a research scientist, restoration specialist, and government accounts manager for agricultural chemical companies American Cyanamid and BASF.



Associate Professor Steve Herbert

Assistant Professor Andrew Kniss

Vollmer joins the department in August. "We were very fortunate to hire someone of Dr. Vollmer's stature to this position," observes Herbert. "She has extensive hands-on experience in weed science but also in developing regional strategies and government policies for invasive weed control at the local and national levels."

Vollmer has also been a resident of Wyoming for some years and is very familiar with local weed issues, making her an ideal hire for the needs of UW and the state. She joins agronomic weed scientist Assistant Professor **Andrew Kniss** and extension pesticide specialist **Mark Ferrell** to form a strong core of weed science expertise in the plant sciences department.

Agroecology major **Jared Unverzagt** won the best undergraduate poster award in the Student Paper and Poster contest at the recent Western Society of Weed Science meeting. Unverzagt presented a poster entitled "Feral Rye Response to Imazamox With and Without MCPA and Nitrogen" that described how new combinations of herbicidal compounds can effect better control of feral rye in winter wheat fields. Unverzagt's award-winning research was directed by Kniss.

Renewable Resources

Assistant Professor **Jay Norton** is leading a large-scale multidisciplinary project to be launched this spring at the James C. Hageman Sustainable Agriculture Research and Extension Center (SAREC) near Lingle this spring.

This four-year project will investigate the economic and environmental sustainability of different cash crop and beef calf production approaches. There are 24 investigators and collaborators on this interdisciplinary project from the departments of renewable resources, plant sciences, animal science, agricultural and applied economics, molecular biology, and family and consumer sciences in the College of Agriculture, the University of Wyoming Cooperative Extension Service (UW CES), the Department of Management and Marketing in the UW College of Business, the UW Science and Mathematics Teaching Center, and SAREC.

As Norton explains, "There are two primary goals: (1) provide a basis for comparing sustainability of three approaches for farms that produce beef calves and cash crops and (2) establish a baseline framework on plots large enough to facilitate more research."

An important aspect is that the project creates a rich interactive setting among researchers, educators, students, and producers in which they can discuss, design, and monitor particulars of the crop rotations, livestock management, pest control, and others, for each



Assistant Professor Jay Norton



management approach. Rangelands will be used for cow-calf grazing operations in summer, while livestock will be fed grain and forage from croplands during fall and winter. Researchers will monitor agricultural and ecological health simultaneous to measure and track economic costs and benefits of the various approaches.

A range of outcomes is anticipated from what Norton calls an ambitious project, including UW CES bulletins, workshops and conferences, high school and university-level teaching materials, and traditional scientific outlets such as journal articles and reports, with the intent of reaching a wide range of constituents interested in the findings.

Veterinary Sciences

The toxicology section of the Wyoming State Veterinary Laboratory (WSVL), which is managed by the Department of Veterinary Sciences, has acquired a Waters Corporation ultra performance liquid chromatograph-tandem mass spectrometer (UPLC-MS/MS).

"Marketing acronyms aside, the instrument permits isolation and detection of relatively small (parts per million or less) quantities of temperaturesensitive, water-soluble compounds such as plant toxins, drugs, and pesticides. In the past, we have been able to test



Department Head Don Montgomery

for these compounds only with a great deal of difficulty or not at all," says Department of Veterinary Sciences Professor **Merl Raisbeck**, the WSVL's toxicologist.

"There is still quite a bit of work related to developing and validating testing methodologies before we can actually use the Waters system for diagnostic purposes, but, for starters, the WSVL hopes to be able to offer an ionophore (compounds used for increased feed performance in livestock and poultry) screen and a sudden death in livestock screen," Raisbeck says.

The main ionophores in the United States are monensin, lasalocid, narasin, and salinomycin. The common poisonous plants causing sudden death syndrome in cattle are camas, larkspur, and hemlock, Raisbeck says.

Professor **Don Montgom**ery, head of the Department of Veterinary Sciences and director of the WSVL, says, "Having



Professor Merl Raisbeck

the tools to accurately diagnose these causes of livestock poisoning will greatly increase the quality and timeliness of service for our clientele."

On the research front, Raisbeck adds, "We will use the instrument to continue the chemical exploration of *Xanthoparmelia* lichen toxins begun by **Becky Dailey** in her Ph.D. research into the cause or causes of the Red Rim elk die-offs (southwest of Rawlins) in recent years as well as similar suspected deaths of domestic livestock."

The cost of the machine in combination with remodeling work at the WSVL to house the equipment totaled approximately \$200,000. Funding came from the University of Wyoming Agricultural Experiment Station, UW Major Equipment Fund, Marlene Orchard Livestock Immunology-Toxicology Endowment in the College of Agriculture, and other, smaller sources of private funding.

Agricultural Experiment Station

After attending advisory meetings at Thermopolis and Lingle and concluding the annual planning conference in Laramie, it appears the Agricultural Experiment Station (AES) will have a wide range of projects at the research and extension (R&E) centers in 2009, says **Stephen D. Miller**, associate dean and director of the AES.

Projects include biofuels, transgenic crops, variety trials, weed control, organic gardening, composting, disease control, drip irrigation, livestock fetal programming, aftermath grazing, multi-species grazing, grass-fed beef, feedlot performance, prairie dog management, shelterbelt establishment, and sustainable farming and ranching systems.

Dates for field days are: July 9, Powell R&E Center; July 23, James C. Hageman Sustainable Agriculture R&E Center; August 6, Sheridan R&E Center; and August 28, Laramie R&E Center research greenhouse complex.

The College of Agriculture brought in more than \$14.5 million in external support this past year. That is up more than \$2 million from the previous year, says Miller. "The external grants received by the college greatly enhance our ability to conduct research and education programs across the state," he notes. "Money faculty members receive from a variety of sources

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AES Director Stephen D. Miller

ranging from state and federal governmental agencies to science foundations and industry fund hundreds of projects in the college and allow us to address critical and emerging issues in the state."

Various activities will occur at the R&E centers in the coming months. Interviews for the director position at Sheridan R&E Center will be conducted this spring both on campus and at Sheridan. Construction will begin at Powell on a new seed cleaning facility as well as initiation of research under drip irrigation and a lateral move sprinkler. At SAREC, students will be able to stay overnight on-site and conduct laboratory research in new state-of-the-art facilities recently completed. Construction will soon begin in Laramie on a new state-of-the-art biosafety level 3 laboratory, which will greatly expand opportunities for research on such diseases as brucellosis, rabies, chronic wasting disease, and tularemia.

Cooperative Extension Service

Jesica Lozier began November 24 as the University of Wyoming Cooperative Extension Service (CES) Lincoln County 4-H youth educator based in Kemmerer. She received a bachelor's degree in animal science from Tarleton State University in Stephenville, Texas.

Sarah Jackson joined CES as Laramie County 4-H military extension educator January 5. She has a bachelor's degree in agricultural journalism from the University of Missouri, Columbia. This position will be split between youth programs on F.E. Warren Air Force Base and National Guard installations and working with the traditional 4-H program in Laramie County.

A new position based in Laramie County, the Operation Military Kids (OMK) coordinator, is funded through an OMK grant from the U.S. Army. **Eloise Riley** started in this position December 1. The position has responsibility for implementing youth programs at F.E. Warren Air Force Base, U.S. Army Reserve, and National Guard installations across Wyoming specifically targeting youths who have parents deployed.

Allison Flynn began February 23 as the new Sheridan County 4-H youth educator. Flynn has both a bachelor's and master's degree in agriculture education with emphasis in extension from Montana State University (MSU). She has experience work-



Allison Flynn



Jennifer Jacobsen

ing with MSU Extension where she completed an extension internship and has also worked for the Montana 4-H Foundation and the Montana 4-H Center for Youth Development.

Jennifer Jacobsen began March 9 as the West Area assistant university extension educator specializing in nutrition and food safety based in Teton County. She holds a bachelor's degree in dietetics from the College of Saint Benedict and Saint John's University in Minnesota and also obtained her registered dietician certification.

Academic and Student Programs

The College of Agriculture has developed the Critters and Communities Freshman Interest Group (FIG), which will be available to incoming freshmen beginning this fall.

A FIG is a learning community where groups of students take linked or clustered courses during a particular semester. The students also live together on the residence hall floor assigned to their particular FIG.

Critters and Communities FIG was developed by College of Agriculture Associate Dean **Jim Wangberg** and **Laurie Bonini**, senior office associate, from the Office of Academic and Student Programs, and **Dave Wilson**, senior lecturer in the Department of Plant Sciences.

This FIG was designed for students interested in environmental studies, human and life sciences, agriculture, natural resources, ecology, and behavior.

"It will explore the diversity of creatures with whom humans interact, whether by choice or chance. The FIG will also explore the communities where we find ourselves and find these creatures," Wangberg says.

"Critters to explore in this class might include such things as Wyoming wildlife, domestic animals, insects, bacteria and other microbes, desirable plants and weeds, among others,"





Associate Dean Jim Wangberg

he adds. "Communities to be explored are the places and habitats where these critters live as well as the communities in which we and our children live, including learning communities like this FIG."

The three core courses students will be required to take include COJO1020, communication and civic engagement in the Department of Communication and Journalism; and AECL 1000, agroecology, and AGRI 1001, intellectual community, both in the College of Agriculture.

"AGRI 1001 is a new course created specifically for this FIG and will be comprised of a series of guest presentations by distinguished teaching faculty from diverse academic disciplines, supplemented by class discussions, case studies, field trips, and a variety of other learning activities," Wangberg says. "Topics will range from timely issues in science and



Senior Office Associate Laurie Bonini



agriculture as well as a broad overview of the diverse disciplinary and sub-disciplinary work underway in the College of Agriculture's research, teaching, and service programs."

For more information about FIGs and other learning communities on campus, contact Office of Academic and Student Programs staff assistant **Kelly Wiseman** at (307) 766-4135 or kellywis@uwyo.edu.

Ag Development and College Relations

Ron and Lynne Pulley of Huntley, Wyoming, raise mulefoot hogs, a hardy breed in which the normal cloven hooves are fused into a single toe. In the past, they've shown dogs, grown wheat, and raised yaks and Highland cattle.

They're also active in Wyoming's agricultural community, including the James C. Hageman Sustainable Agriculture Research and Extension Center (SAREC) near Lingle and Wyoming Leadership Education and Development (L.E.A.D.), which helps create highly motivated and well-informed leaders who speak for agriculture.

In 2008, the couple funded a charitable gift annuity to fund graduate assistants in the Department of Animal Science. Under the terms of a gift annuity, you transfer cash or property to the UW Foundation and receive generous fixed payments for life - how much is determined based upon your age the year the gift is funded, notes Stephanie Anesi, deputy director of development. A charitable gift annuity can create a fixed lifetime income for the joint lives of both husband and wife, or it may even benefit a third party such as an aging parent.

Explains Ron, "We started out looking at what to do with our retirement. Annuities are basically all the same, so we looked at places where we had



Ron and Lynne Pulley

a connection. We had several years to plan, and we got to talking, with an eye on the University of Wyoming. With UW, we have a relationship.

"We popped over to the Web site and then called to ask a question. The UW Foundation did an awful lot of work to help us. We went over it a lot, making sure we had the right cash flow and that we wouldn't outlive our savings. Annuities work great for people who are planning their retirement. It was really quite simple, and it was the most secure thing we could do."

If interested in more information on gift annuities or other planned giving options at UW, please call or e-mail Anesi at (307) 766-3078 or sanesi@ uwyo.edu.

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New X-ray machine housed at Powell R&E Center will peer at leaf-cutter bees

By Steven L. Miller, Senior Editor Office of Communications and Technology

There was no plan B, so if a 24-year-old X-ray machine at UW's Powell Research and Extension Center (PREC) used to detect fungus in leaf-cutter bees had died ...

A new \$135,000 digital X-ray machine should be on guard in the Big Horn Basin for alfalfa seed producers this fall, thanks to \$90,000 in state funding and a \$45,000 contribution from the Wyoming Alfalfa Seed Growers organization. The equipment is operated by the Wyoming Department of Agriculture (WDA). Kim Decker is a consumer protection supervisor with WDA and is the bee inspector. The bee lab is in the seed testing facility at PREC.

"Speaking for the WDA and myself, we are very appreciative of the support of Representative Dave Bonner of Powell, the legislature, and the Wyoming Alfalfa Seed Growers Association," says Decker. "Getting this new piece of equipment is very exciting!"

Bees are tested in the larval stage, and testing usually runs from November to early March.

"The new machine is head and shoulders above the old one," says Mike Moore, manager of the state Seed Certification Service at PREC. "The old machine had 24-year-old technology. While functional, company representatives servicing it say they could not guarantee they could get parts. If the machine went down, there wasn't a plan B. There was no other place to go."

Wyoming law requires testing leafcutter bees for diseases, including chalk brood, which is caused by a fungus. If present above the tolerance level, the bees must either be sold out of state or destroyed. No other state has such a bee law.

Their job as crop pollinators is essential. Wyoming produced about 6.8 million pounds of alfalfa seed in 2007, according to Wyoming Agricultural Statistics 2008. Travel around the Big Horn Basin and small huts will be seen at the edges of fields. That's where the bees are housed. "There really is an art to managing these bees," says Moore. "They are part of the successful alfalfa seed production. It's almost to the point of running livestock when you see how producers manage these bees."

Alfalfa seed producers really generate two crops: seed and bees with minimal disease, which they can keep for their own use or sell. About 30,000 bees are needed per acre at a cost about \$270 – an input cost Wyoming producers who have bees don't have to shoulder. Bees were sent to the company providing a bid to ensure the new X-ray machine would work, and the images from the new machine are a significant improvement.

"It's totally digital. No darkroom or chemical processing of film like they used to do," says Moore, who notes a cost savings of \$5,000 a year could be realized, as well as reduced time testing the bees.

Having the equipment at the PREC is a good fit, says Moore.

"The same guys getting bees tested are the same ones we are inspecting crops for from the seed certification standpoint," he says.

Leaf-cutter bee

