# September 2017

# AGADEMICS

SEPTEMBER 2017

UW COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

# Table of Contents

# New publications including Reflections 2017 and the 2017 Field Days Bulletin

By Tanya Engel | September 2017

Reflections 2017: College of Ag and Natural Resources' science magazine

2017 Field Days Bulletin

Introduction to UW's Rogers Research Site

This is the first in a series of bulletins focused on research, teaching, and extension at the Rogers Research Site, a 320-acre property in the Laramie Mountains that Colonel William C. Rogers bequeathed to the University of Wyoming in 2002. RRS Bulletin 1 includes (1) a story about Colonel Rogers; (2) details about the property, including history, site characteristics, and initial planning; (3) information about the surrounding lands in the Laramie Mountains of southeast Wyoming; and (4) a discussion about the 2012 high-intensity Arapaho Fire and how it changed research opportunities at RRS.

Wide Constituency Guides Early Activities and Research at Rogers Research Site, north Laramie Mountains, Wyoming

This is the second in a series of bulletins focused on research, teaching, and extension at the Rogers Research Site, a 320-acre property in the Laramie Mountains that Colonel William C. Rogers bequeathed to the University of Wyoming in 2002. RRS Bulletin 2 includes (1) a story about Colonel Rogers; (2) details about early activities, including field days; (3) results from a 2005 public survey about what activities should take place on the land; and (4) a summary of early research, including studies relating to forestry and wildlife resources.

An Effective Combination: Partial Budgeting and Sensitivity Analysis

Decisions can affect overall ranch profitability, yet the impacts of changes can sometimes be difficult to quantify.  The essential question is, "Will I be better or worse off for implementing a decision?"
A relatively simple and effective approach for answering this question is using a combination of a partial budget and sensitivity analysis.

Which Market Gives Me the Best Price for My Cattle? Think About Marketing Costs as Well as Price!

Think about the offer prices for your cattle, but also consider marketing costs the next time you are thinking about marketing alternatives.  You need to calculate the net price after all marketing costs to make a fair comparison.

## Net Present Value (NPV)

Many decisions on a ranch require significant capital investment to facilitate a change.  This type of investment typically includes initial costs but also provides returns over a period of time.
Because these returns occur over time, the time value of money must be included in an investment analysis. Net Present Value (NPV) analysis is a tool that allows us to compare future returns with current costs (or vice versa).

# New Videos

By Tanya Engel | September 2017

Tent Caterpillars

Hantavirus

How Mosquitoes Find People

Wildlife Scat

Cirrus Clouds

ExploreWYO app now available

El Nino

Apple Variety Study

Bare Root Tree Planting

European Paper Wasp

Growing Mushrooms Indoors

# Presentations

By Tanya Engel | September 2017

**Gerace, S., C. Jones-Ritten, C. T. Bastian**, and O. Phillips. “Gender Differences in Negotiation Behavior and Negotiated Market Outcomes.” Selected for the Graduate Student Paper Competition/Presentation. Annual Meeting of the Western Agricultural Economics Association, June 9-11, 2017. Lake Tahoe, Nevada. (Presented by S. Gerace – ***Received Third Place in the Competition***).

**Rahman, M., C. T. Bastian, C. Jones-Ritten**, and O. Phillips. “Subsidy Incidence in Privately Negotiated Spot Markets: Experimental Evidence.” Selected for the Graduate Student Paper Competition/Presentation. Annual Meeting of the Western Agricultural Economics Association, June 9-11, 2017. Lake Tahoe, Nevada. (Presented by M. Rahman).

**Beaman, B. C., C. T. Bastian, B. S. Rashford**, M. Al Amin, D. W. Howerter, J. H. Devries. “Cost-Effective Conservation Targeting in the Face of Climate Change: Integrating Land-Use Change and Biological Response to Target Waterfowl Conservation.” Selected Paper Presentation. Annual Meeting of the Western Agricultural Economics Association, June 9-11, 2017. Lake Tahoe, Nevada. (Presented by C. T. Bastian).

**Ritten, J., C. T. Bastian**, J. Derner, and **J. Tanaka**. “Flexible Stocking as a Strategy for Enhancing Ranch Profitability in the Face of a Changing and Variable Climate.” Selected Paper Presentation. Annual Meeting of the Western Agricultural Economics Association, June 9-11, 2017. Lake Tahoe, Nevada. (Presented by J. P. Ritten).

Dyer, H., **J. P. Ritten, J. Tanaka, D. Taylor, K. Maczko**, and J. Kucera. “Valuing Soil Health Benefits for Wyoming Ranchers.” Selected Paper Presentation. Annual Meeting of the Western Agricultural Economics Association, June 9-11, 2017. Lake Tahoe, Nevada. (Presented by J. P. Ritten).

**Jones-Ritten, C., D. Peck, M. Ehmke**, and B. P. Appuhamilage. “Efficiency Losses in the Pollination Services Market: A Data Envelopment Analysis.” Selected Paper Presentation. Annual Meeting of the Western Agricultural Economics Association, June 9-11, 2017. Lake Tahoe, Nevada. (Presented by C. Jones Ritten).

# Proposals submitted

By Tanya Engel | September 2017

**Bisha, Bledar**, Aliyar Fouladkhah, Janey Camp, John Ricketts, Fur-Chi Chen, Bharat Pokharel, and Jaheon Koo: $544,712 to U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA) for “An Integrated Approach to Assist Producers of Raw Agricultural Commodities Meeting the Water Requirements of FSMA.”

**Ernest, Holly**: $4,945 to Wyoming Wildlife Foundation for “Investigating Great Gray Owl Genetic Health.”

**Hansen, Kristiana, Virginia Paige, Chris Bastian, Bridger Feuz, John Ritten, Glenn Owings**, and Anne MacKinnon: $701,216 to USDA NIFA for “Incentives, Markets, and Water Management to Enhance Agricultural Production in the Upper Colorado River Basin.”

**Hess, Bret**: $30,069 to USDA NIFA for “Animal Health and Disease Research.”

**Keith, Jill**: $3,000 to USDA NIFA for “Get Fruved.”

**Scasta, John**: $76,404 to Bureau of Land Management for “Fire Effects on Regeneration across an Invasion Gradient of Grasslands and Shrublands.”

# Calendar

By Tanya Engel | September 2017

**September 23**: 35th Annual Ag Day BBQ, southwest corner of the Pepsi Pre-game Zone in the Cowboy Joe Club Tailgate area inside the Wyoming Indoor Practice Facility, prior to the Cowboys vs. Hawaii game. Ticket prices: $12 adults, $5 6-12 years old, children under 6 eat free. Proceeds benefit the College of Agriculture and Natural Resources student organizations.

# Changing Faces, Changing Places

By Tanya Engel | September 2017

**Welcome**

- **Garcia, Sofia**: Animal Science, accountant (8/21)
- **Jay, LJ**: Plant Sciences and Ecosystem Science and Management, office associate (7/17)
- **Jepsen, Sierra**: Animal Science, lecturer, assistant (7/11)
- **Smith, Kaci**: Administrative Business Office, accounting associate, senior (8/22)
- **Stewart, Whit**: Animal Science, assistant professor (7/31)

**Farewell**

- **Meredith, Tamara**: UW Extension Communications and Technology, educational technology integration specialist (9/30)

# Carbon emissions project outreach coordinator joins extension

By Tanya Engel | September 2017

*NSF EPSCoR Track II research and extension project outreach coordinator Selena Gerace*

Selena Gerace has joined the University of Wyoming Extension as the outreach coordinator for a recently funded NSF EPSCoR Track II research and extension project exploring the socio-economic and ecological implications of reducing carbon emissions in the upper Missouri River Basin.

She will work with project team members across UW, Montana State University, and the University of South Dakota to deliver project-related outreach and engage with regional stakeholders.

Gerace, originally from Mount Shasta, California, completed her bachelor's degree in politics at Whitman College and just completed her master's degree in agricultural and applied economics at UW. She has worked with the Ruckleshaus Institute at UW on the Wyoming Public Lands Initiative and has experience in facilitation and negotiation.

# UW scientists find soil bacteria require two-layer security just like in digital world

By Tanya Engel | September 2017

*UW Ph.D. student Chris Vassallo*

Those people at Google think they're sooooo smart. So, too, the Apple and Microsoft wunderkinds.

Their software (and many others) use two-factor authentication in the digital world to verify identity, but they're a little behind. A one-celled soil bacterium beat them to it by who knows how many millions of years.

University of Wyoming Ph.D. student Chris Vassallo in molecular biologist Dan Wall's laboratory found the bacterium *Myxococcus xanthus* perform its equivalent of a secret handshake after an initial meet-and-greet encounter in their social world. The second-level of verification is important. They die if not recognized.

Their results are described in "Infectious polymorphic toxins delivered by outer membrane exchange discriminate kin in myxobacteria" published in August in the open-access journal *eLife*.

Earlier research in Wall's lab found these bacteria recognize kin through the cell surface receptor called TraA and transfer cellular goods to each other when touching via a process the lab calls outer membrane exchange (OME). This current research is about the cargo that's exchanged.

"It's very important these cells know who they are cooperating with," says Vassallo, from Cheyenne. "They don't want to give beneficial treatment to another cell they are competing with if it's not their self. One way they do this is through toxin exchange."

**Swap Potent Potions**

The cells exchange potentially toxic proteins during OME. The process takes a couple minutes.

"If their identities don't match, they'll kill each other with the toxins," notes Vassallo.

The toxic cocktail of proteins moves from cell to cell, chewing up DNA or RNA if the cell is not immune. Vassallo says these bacteria don't die immediately. Although sick, they are able to infect other cells, similar to humans with a transmittable disease.

Wall's laboratory found the bacteria use a receptor that is unique to *M. xanthus*. In the wild, underfoot outdoors, there are hundreds of different recognition receptors within the myxobacteria group.

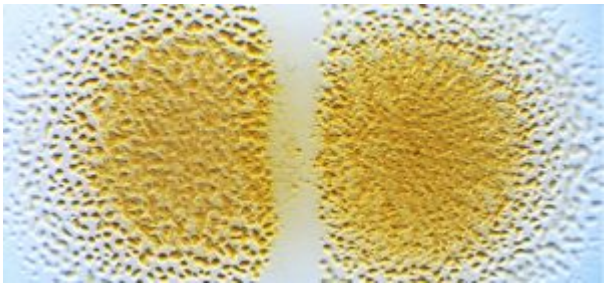
Just using the TraA receptor for identity verification is not sufficient. A few grams of soil might contain a hundred distinct *M. xanthus* social groups, all living together but not necessarily wanting to cooperate with each other, says Wall.

Vassallo discovered the second layer of specificity, he says.

“The first layer is, ‘Do you have a compatible TraA receptor?’ If you do, you exchange components,” says Wall. “Then the next layer is, ‘Do you have immunity to the collection of toxins I’m going to give you using this exchange process?’”

**Not all Death and Destruction**

The bacterial decimation where kin kill non-kin as packs of cells converge results in a kill zone. Not all exchanges result in death and destruction. Vassallo found in previous research healthy bacteria repair damaged kin. He designed an experiment where cells had defective membranes and left on their own would die. But if mixed with healthy kin, the clonemates would give them healthy material, and the sick cells become rejuvenated.



*Two otherwise identical colonies that express different toxins moving toward one another. The toxins cause a barrier between the two colonies (due to cell death) and are unable to merge. (Photo: Christopher Vassallo)*

Wall’s research is part of a $1.2 million grant from the National Institutes of Health. It follows a prior $1.6 million, five-year grant. The research helps address how multicellular animals and plants came into existence.

The evolutionary transition from single cell to multi-cell life is apparently very difficult, Wall says. The event is thought to have occurred only once for animals and perhaps twice for plants.

“In the microscopic world, it might have happened separately a couple dozen of times,” Wall says. “In the case of myxobacteria, they appear to have made this transition to multi-cellularity, a fairly primitive transition that’s based on an aggregation strategy, and OME plays a role in this process.”

# Dietetics student receives $5,000 scholarship

By Tanya Engel | September 2017

*Bruce Cameron, head of the Department of Family and Consumer Sciences, presents the Phyllis S. Howe Scholarship check to Julie Lyon.*

Julie Lyon of Laramie, a dietetics student in the Department of Family and Consumer Sciences, has received a $5,000 Phyllis S. Howe Scholarship.

Scholarships are awarded to members of Phi Upsilon Omicron, the national honor society in family and consumer sciences, pursuing bachelor's degrees in family and consumer sciences. The scholarship is split across two semesters.

Howe was initiated into Epsilon Chapter at Montana State University in 1933. During her career, she wrote several text books on nutrition including "Nutrition for Practical Nurses" (1958) and "Basic Nutrition in Health and Disease: Including Selection and Care of Food" (1971 and July 1981).

# Research team studies how sage grouse conservation efforts affect ranch economics

By Tanya Engel | September 2017

*John Tanaka, director of the James C. Hegeman Sustainable Agriculture Research and Extension at the start of the 2017 field day. Tanaka is also assistant director of the Wyoming Agriculture Experiment Station.*

How greater sage-grouse conservation practices have affected ranch economics across six states is being studied by a research team. In the Department of Ecosystem Science and Management.

Members will draw input from local ranchers across Wyoming, Idaho, Montana, Nevada, Oregon, and Washington, says John Tanaka, professor and associate director of the Wyoming Agricultural Experiment Station.

The team will develop cow-calf ranch enterprise budgets for use in models to estimate the economic impacts of different conservation practices on ranches, notes Holly Kirkpatrick, one of the research assistants.

Partnerships between federal and state agencies and private landowners have reduced threats to greater sage-grouse in 90 percent of the species' breeding habitat, says Tanaka. He notes the practices have changed the way livestock are grazed on millions of acres of land across the western United States, especially on public lands.

"Ranchers manage extensive areas of those lands and are critical to help keep the bird from being listed as threatened or endangered in the future," says Tanaka. "The project will assess how ranchers and the communities in which they operate have been affected."

The project is part of an initiative through the Sustainable Rangelands Roundtable and funded by the Natural Resources Conservation Service. The SRR is a partnership of agencies, non-governmental organizations, producer groups, scientific societies, environmental groups, and multiple land-grant universities (http://sustainablerangelands.org).

The UW team of four research assistants and two research scientists will develop four cow-calf ranch enterprise budgets, which document management practices, available resources and technology used, from nine major land resources areas within the six states.

The budgets, once finalized, will be made available to ranchers.

The ranch types are:

- Small, private land only.
- Small, private and public land.
- Large, private land only.
- Large, private and public land.

The rancher focus groups will ensure the validity of the representative ranching operations in the budgets,

says Kirkpatrick.

“These enterprise budgets will be drafted as representative cow-calf ranching operations, which requires no private information from ranchers,” Kirkpatrick says. “Rather than sharing personal information about their specific operations, focus group participants will be asked to consider the typical procedures and cost estimates for cow-calf operations of a given size throughout their region.”

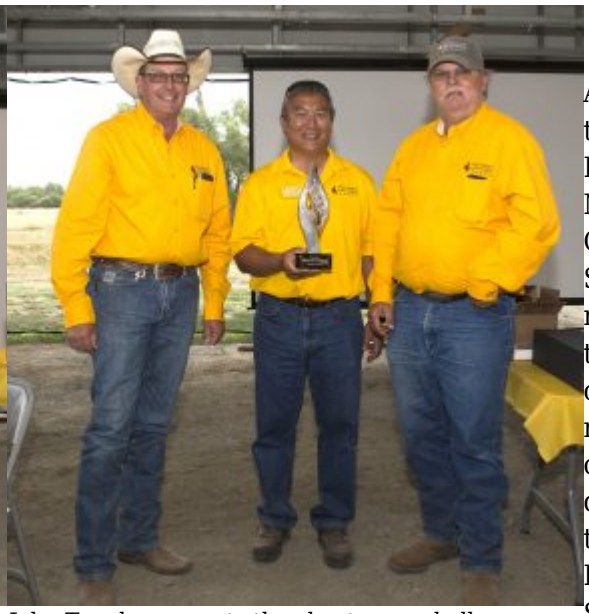
There can be a win-win for producers and sage-grouse if habitat management recommendations can be designed to also help ranchers be more productive or enhance profitability, says Tanaka.

“There is a saying out there, ‘Good for the bird, good for the herd,’” he says. “This project is the first range-wide effort to see if that is true from an economic perspective.”

# Platte County NRCS-Glendo Rancher team wins cheatgrass challenge

By Tanya Engel | September 2017

*SAREC director John Tanaka, right, presents the cheatgrass challenge championship trophy to team members of the Platte County Natural Resources Conservation Service-Glendo Ranchers. From left, George Gamblin and Sydney Burek, both rangeland management specialists, and producer Larry Cundall.*



*John Tanaka presents the cheatgrass challenge People's Choice award to SAREC team member representatives farm manager Kevin Madden, left, and assistant farm manager Troy Cecil.*

A collaborative team from the Platte County Natural Resources Conservation Service and Glendo ranchers won the three-year competition to resuscitate cheatgrass-decimated land at the James C. Hageman Sustainable Agriculture Research and Extension Center near Lingle.

The NRCS-Glendo Rancher team bested more than a dozen others in the cheatgrass challenge. The team from SAREC received the People's Choice Award. Both awards were presented during the center's field day August 24.

Teams were invited to the cheatgrass challenge in fall 2014 with their first meeting in April 2015 to agree on competition criteria, says Brian Mealor, director of the Sheridan Research and Extension Center. He was extension's weed specialist at the time and initiated the challenge. Each team drew for a plot of land to treat.

Mealor says he wanted to see how others were approaching cheatgrass control and not just those agency or academia personnel.

"As a side story, I got tired of people asking me how to get rid of cheatgrass and me not knowing the best answer," he says. "Let's see how other people do it."

The criteria included how much cheatgrass was reduced, how much forage and productively improved, the diversity of species, the educational component, and the scalability of the practices – whether they could be transferred form a small plot to 10,000 acres.

# More accurate brucellosis test for swine, cattle project focus

By Tanya Engel | September 2017

*Ph.D. student Noah Hull*

Researchers in the Department of Veterinary Sciences at the University of Wyoming will use a $149,000 grant from the Foundation for Food and Agriculture Research to help develop a quicker, cheaper, and more accurate test to detect brucellosis.

The money will help fund studies to detect swine brucellosis (*Brucella suis*), which is prevalent among feral swine in most of the United States, but not yet in Wyoming. *B. suis* can also infect domestic swine and cattle where their populations overlap.

The money will help continue efforts toward creating a polymerase chain reaction (PCR) analysis, an ongoing effort by Associate Professor Brant Schumaker in the department.

There is a growing pressure for hog producers to move from confinement production to natural or pasture-raised swine. Serologic (blood) testing cannot discriminate between cattle brucellosis (*Brucella abortus*) and B. *suis* exposures.

“I think most of the state understands how much of a problem cattle brucellosis has been in the Greater Yellowstone Area,” says Schumaker, epidemiologist at the Wyoming State Veterinary Laboratory. He will lead the collaborative project with Texas A&M University.

“If this disease were to come to the state, we would have a hard time differentiating between the two organisms,” notes Schumaker.

UW and Texas A&M will match the grant for a total of $299,000 for the project. Funding is through the foundation’s Rapid Outcomes from Agricultural Research (ROAR) program.

Texas has had several instances during which cattle in contact with feral swine have tested positive for brucellosis.

“It’s very complicated to try and differentiate between swine and bovine brucellosis,” says Schumaker.

Culture testing is the current gold standard for detection, says Schumaker, but takes at least 14 days, is about $600 per animal and requires the animal be euthanized. Only 30 to 50 percent of animals that test antibody-positive in blood are culture-positive.

Schumaker notes the research is a continuation of Ph.D. student Noah Hull's studies at UW. The team is in the final stages of testing a PCR assay for bovine brucellosis. PCR can produce millions of copies of a section of DNA in only a few hours, yielding enough DNA required for analysis.

Preliminary testing has shown researchers are able to identify more than twice the number of serologically positive animals compared to culture and obtain results in two to three hours at one-fourth the cost.

Texas A&M researchers will collect and send swine tissue samples to UW for testing. Schumaker said there are more than 29 collaborators on the grant. Members include representatives from federal, state and local governmental agencies.

*Wyoming State Veterinary Laboratory epidemiologist Brant Schumaker.*

# Southeast Wyoming extension educator receives national achievement honor

By Tanya Engel | September 2017

*Brian Sebade, SE Wyoming Extension Educator*

University of Wyoming Extension educator Brian Sebade has received recognition for helping provide Wyoming residents agricultural and horticultural information.

Sebade, based in Albany County and serving southeast Wyoming, recently received the 2017 Achievement Award from the National Association of County Agriculture Agents (NACAA) during its annual conference Salt Lake City.

Sebade also serves Carbon, Goshen, Laramie, and Platte counties.

Only educators with 10 years or less of service in cooperative extension and exhibiting excellence in the field of extension education are eligible, according to the NACAA.

Sebade has worked in the northeastern and southeastern corners of Wyoming. Projects have included Master Gardeners, private pesticide applicator training, native plant identification and ecology, grazing management, invasive species ecology and management, small-acre outreach, and horticulture for cold climates.

Sebade has also published many outreach articles for homeowners, small-acre landowners, and agricultural producers in the Cowboy State, said the NACAA.

Sebade was an extension educator based in Crook County and served northeastern Wyoming for four years before transferring to Albany County in 2015 to work with residents in southeastern counties. Sebade received his bachelor’s degree in 2008 and master’s degree in 2010 in rangeland ecology and watershed management, both from UW.

# 2017 LREC Field Day

By Tanya Engel | September 2017

Tours of fields, flower trials, greenhouses, ACRES Student Farm, and a newly planted apple orchard opened the Laramie Research and Extension Center Field Day August 26. A Family Farm Day and presentations at Hansen Arena topped off the afternoon.

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# Yak Diaries

By Tanya Engel | September 2017

August 28, 2017, Up to the mountain

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# SAREC 2017 Field Day

By Tanya Engel | September 2017

Those attending the SAREC field day in August toured research plots and visited with scientists but also heard about the center's hail and crop research, and the Wyoming restoration cheatgrass challenge results. The cheatgrass challenge was a three-year competition at the center.

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# 2017 Wyoming State Fair

By Tanya Engel | September 2017

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**Annual Summer Extravaganza**

The Wyoming State Fair and Rodeo is the culminating event for many of the state’s 7,280 4-H’ers and 1,573 adult volunteers.