

ANIMAL & RANGE SCIENCES NEWSLETTER

Volume 8, Issue 1

February 2015

Introduction from Dr. Glenn Duff, Department Head



Welcome to the latest edition of the Animal and Range Sciences Newsletter. First and foremost, I would like to thank Dr. Pat Hatfield for serving as Interim Department Head for the last 15 months while I served as Interim Dean and Director of the College of Agriculture/Montana Agricultural Experiment Station. All the faculty, staff, students and supporters also are given kudos for helping me serve in the Dean's office. I believe this experience will help us further the efforts of our department to provide science-based information to clientele including producers and students.

This newsletter highlights all the new faces in our department. Over the last 15 months, we have added an Assistant Professor, Forage Specialist; an Assistant Professor, Wildlife Habitat Ecology; an Assistant Professor, Beef Specialist for Fort Keogh; and an Assistant Professor, Sheep Specialist. In addition, we have interviewed for an Animal Physiologist. We also hired a Non-Tenure-Track Instructor to teach the applied courses and coach the livestock judging team. We were able to hire a laboratory manager to run all aspects of the laboratory from safety to ensuring assays are completed.

Our graduate students contribute greatly to our research program. Without their hard work and efforts, our research program would suffer. Some of our research faculty and research programs are highlighted in this newsletter. Our research programs address a variety of issues facing agriculture in our world today.

Students continue to enthusiastically support our program in many different ways. Students are involved in clubs along with several local, national and international contests ranging from livestock and wool judging to the Undergraduate Range Management Exam (URME) and plant identification. We will soon be selecting the next team to compete in the Academic Quadrathlon. Equine students have several opportunities for extracurricular activities such as clubs, events and workshops.

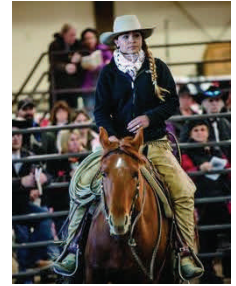
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New Faces in Our Hallways and Classrooms

Reata Brannaman **Instructor (Equine Science)**

Reata taught Starting Colts (EQUH 253) during Fall Semester 2014 and is currently teaching Developing the Young Horse (EQUH 256) during Spring Semester 2015. Reata started helping her father Buck Brannaman with clinics when she was ten years old and still continues to accompany him as much as she can. In addition to working with her dad, Reata teaches colt starting at Montana State University, where she is an undergraduate studying business. She is the main organizer of the Brannaman Pro Am Vaquero Roping and a frequent competitor at other ranch roping events.



Faye McNew **Research Associate (Pat Hatfield)**

Faye has joined Pat Hatfield's lab as a Research Associate. She is currently assisting with grant applications and editing of manuscripts. Faye has more than 15 years of professional experience in wildlife management and research, as well as a Bachelor and Master's degree in Wildlife Ecology. Her previous experience includes setting wildlife policy and working with diverse stakeholders to manage natural resources. She previously worked as a waterfowl and wetland biologist for three state wildlife agencies and was responsible for statewide waterfowl and wetland conservation programs, including science-based population management and formulation of regulations and policies pertaining to migratory game birds.

Julie Buono-Geddes **Research Assistant (Carl Yeoman)**

Laboratory technician, Julie Geddes, is at the heart of most research projects taking place in the Yeoman lab, overseeing all laboratory activity. Julie fronts many of the Yeoman labs collaborative efforts with a broad group of internal and external collaborators ranging from the Crow Water Quality projects source tracking of microbial contamination of the Chief Plenty Coup stream, to investigating the impact of colostrum-seeded microbes on the development of the microbiota of the various regions of the bovine gut with Brian Aldridge at Uillinois, to the impact of woody feeds on rumen microbiota with Travis Whitney at Texas A&M, to the relationship between the chicken cecal microbiota and kinome with Mike Kogut from USDA-ARS at College Station. In addition, Julie fronts the Yeoman labs commitment to provide MSU researchers with sequencing capabilities for their own research projects.



Stacy Davis **Research Associate (Bok Sowell)**

Stacy grew up in the small town of Plainfield, NH. She went to college at Fairfield University in Connecticut, majoring in Biology and minoring in Environmental Studies. After graduating, she worked a variety of field technician jobs, from researching habitat corridors in forests of South Carolina to monitoring piping plovers and studying the effects of overbrowsing by deer on Fire Island National Seashore in New York. She moved to Montana in 2011 to begin a Master's program in the Ecology Department of Montana State University. Stacy collaborated with the U.S. Fish & Wildlife Service and J-L Ranch to complete a project on the effects of timing of cattle grazing on native grassland wildlife habitat and forage at Red Rock Lakes National Wildlife Refuge (RRLNWR). Stacy is now working on developing a habitat management plan for grazing at RRLNWR. The final product of a habitat management plan will provide refuge managers with recommended habitat management strategies that were formed utilizing existing studies and monitoring done at RRLNWR, scientific literature, and staff expertise.

New Faces in Our Hallways and Classrooms (continued)



Racquel Lindroth
Instructor (Equine Science)

Racquel has recently moved with her family to Bozeman, MT and is a dedicated educator, equine veterinarian, wife and mother. Presently she is teaching as an adjunct instructor at Montana State University and service as a committee member designing educational programs for the American Association of Equine Practitioners. In addition, she has just launched her own business offering veterinary consultation services and relief work, maintaining special interest in equine reproduction and performance horse care. Prior to moving to Montana she had been practicing as an equine veterinarian in the northern Colorado area for over fourteen years. She earned her degree from Colorado State University in 1995. She then completed an equine medicine and surgery internship at Rood and Riddle Equine Hospital in Lexington, KY followed by an internship in clinical equine reproduction at the Equine Reproduction Laboratory of Colorado State University. Racquel brings forward a unique combination of experiences from both the academic and the private sectors. While practicing as an equine clinician, Racquel taught veterinary students for four years as an assistant professor at Colorado State University as well as in Queensland, Australia through a delightful sabbatical year with the University of Queensland and the Oakey Veterinary Hospital. At play, Racquel enjoys riding horses with her daughter, scuba diving or discovering a good fly fishing destination in the Gallatin Valley.

Tiffanie Nelson
Postdoc Research Associate (Carl Yeoman)

Tiff moved to Bozeman in October 2014 with her husband, Tom, and their 7 month old daughter, Nina, to take up a postdoctoral position with Carl Yeoman. She completed her PhD at the University of New South Wales in Sydney, Aus. in 2012. Her PhD research focused on the gut microbiota of leopard and elephant seals, involving many months living in Antarctica catching seals and collecting samples. This project sparked her interest in microbes and their relationship to the habitat or host. Prior to this, she worked in the private sector at an IVF company as a fertility scientist after completing her Bachelor's Degree in Marine Biology. For the last two years, Tiff held a postdoctoral position at the Australian Institute of Marine Science in Darwin. She worked on a research project identifying the impacts of saltwater intrusion in Kakadu National Park – a hotspot for sea-level rise. Now at MSU, Tiff is working on a research project with Carl Yeoman and Seth Walk (Dept. Microbiology) investigating the vaginal tract microbiota of women in relation to bacterial vaginosis and metabolite production



Tamara Parrott
Instructor (Equine Science)

Tami grew up on a small farm in New Jersey showing Morgan horses. A semester of wildlife research in Kenya and finishing her undergraduate degree at Brown University left Tami with prerequisite courses to complete before applying to veterinary school. While taking courses she taught chemistry and biology and coached sports at a private secondary school in New Jersey. Summers she worked as a backcountry trail guide for a guest ranch in Wyoming. An interest in science and love of horses as well as a growing appreciation for the mountain West led Tami to Colorado in pursuit of a career in veterinary medicine. In May of 2011, she graduated from Colorado State University with a Doctorate of Veterinary Medicine and then interned at Montana Equine Medical and Surgical Center in order to gain clinical knowledge and experience. She was subsequently hired as an associate veterinarian, practicing two years at Montana Equine. Tami is excited to now be a member of the team of veterinarians at Hardaway Veterinary Hospital.



In addition to working at Hardaway Veterinary Hospital, Tami feels fortunate to be a member of the team of professors in the Animal and Range Sciences Department at Montana State University. Since 2013, during the Spring semester, Tami has taught the Equine Exercise Physiology course. When not at the veteri-

Awards, Publications & Presentations

Lance McNew was honored Oct. 26 in Pittsburgh at the 21st annual conference of The Wildlife Society. McNew was lead author of a scientific article selected as the 2014 outstanding article in wildlife publications. It ran in the Journal of Wildlife Management and described findings about greater prairie-chickens, an indicator species for tallgrass prairie in North America. The Wildlife Society publishes more than 200 articles each year in its three peer-reviewed wildlife ecology journals. It then selects one of those as the year's outstanding article. The article must show originality of research or thought and a high scholastic standard in presentation. The article must have been published within the last three years. McNew wrote his article with three co-authors from Kansas State University. The paper, titled "[Demography of Greater Prairie-Chickens: Regional Variation in Vital Rates, Sensitivity Values, and Population Dynamics](#)," summarized a four-year study in east-central Kansas. The research is complete, McNew said, but the team is finishing up some analyses this fall.

New publication: **Davis S.C.**, Burkle L.A., Cross W.F., **Cutting K.A.** 2014. [The Effects of Timing of Grazing on Plant and Arthropod Communities in High-Elevation Grasslands](#). PLoS ONE 9(10): e110460. doi:10.1371/journal.pone.0110460.

Thomas Wolfe, has been granted Emeritus status and is now Emeritus Director of the MSU Farrier School. Congratulations Tom!

Four faculty members of the Dept. of Animal & Range Sciences were recently awarded equipment project proposals for teaching and/or research. The College of Agriculture (COA) and the Montana Agricultural Experiment Station (MAES) awarded the following: **Shannon Moreaux**, COA Teaching Award for Equine Healthcare Tools; **Lance McNew**, MAES Award for Null-peak Antenna System; **Bok Sowell**, MAES Award for OHAUS Balance; **Carl Yeoman**, MAES Award for Eppendorf EPMotion 5075 Automated Pipetting System. Congratulations to these faculty members.

New publication: Miller Z.J., Menalled, F.D., Sainju U.M., Lenssen A.W., and **Hatfield P.G.** 2015. [Integrating Sheep Grazing into Cereal-Based Crop Rotations: Spring Wheat Yields and Weed Communities](#). Agron.J. 107(1):104-112. doi:10.2134/agronj14.0086.

Mike Frisina was recently invited to the Central Asian Conservation Initiative in Quito, Ecuador. Mike gave testimony regarding a proposed Action Plan for Conservation of Asian Wild Sheep.



Lance McNew presented an invited paper at the annual meeting of the International Mountain Section of the Society of Range Management titled: Effects of Rangeland Management on Tallgrass Prairie Obligates."

Mike Frisina was asked to do two Book Reviews for the Society of Range Management Journal Rangelands. The first review was: [The Carnivore Way: Coexisting With and Conserving North American Predators](#). by Cristina Eisenberg. Island Press 2014. Rangelands Dec 2014. The second review was: [Keeping the Wild, Against the Domestication of the Earth](#). Edited by George Wuerthner, Eileen Crist, and Tom Butler. 2014. Island Press. Rangelands Dec 2014.

New publication: Winder, V.L., **L.B. McNew**, A.J. Gregory, L.M. Hunt, S.M. Wisely, and B.K. Sandercock. 2014. [Space use of female greater prairie-chickens in response to wind energy development in north-central Kansas](#). Ecosphere 5:art3.

New publication: Winder, V., **L.B. McNew**, L.M. Hunt, A.J. Gregory, S.M. Wisely, and B.K. Sandercock. 2014. [Effects of wind energy development on seasonal survival of greater prairie-chickens](#). Journal of Applied Ecology 51:395-405.

Awards, Publications & Presentations (continued)

New publication: **Boles, J.A., K.S. Kohlbeck, M.C. Meyers, K.A. Perz, K.C. Davis, J. M. Thomson** (2015). [The use of blood lactate concentration as an indicator of temperament and its impact on growth rate and tenderness of steaks from Simmental Angus steers.](#) Meat Science 103:68-74.

New publication: Yildirim S., **C.J. Yeoman**, S.C. Janga, S.M. Thomas, M. Ho, S.R. Leigh, P.M. Consortium, B.A. White, B.A. Wilson and R. M. Stumpf. 2014. Primate vaginal microbiomes exhibit species specificity without universal Lactobacillus dominance. ISME J. 8:2431-2444.

New publication: **Swartz, J.D., M. Lachman, K. Westveer, T. O'Neill, T. Geary, R.W. Kott, J.G. Berardinelli, P.G. Hatfield, J.J. Thomson, A. Roberts and C.J. Yeoman.** 2014. Characterization of the vaginal microbiota of ewes and cows reveals a unique microbiota with low levels of lactobacilli and near-neutral pH. Front. Vet. Sci. 1:19.

New publication: Amato, K.R., S.R. Leigh, A. Kent, R.I. Mackie, **C.J. Yeoman**, R.M. Stumpf, B.A. Wilson, K.E. Nelson and B.A. White. 2014. The role of gut microbes in satisfying the nutritional demands of adult and juvenile wild, black howler monkeys (*Alouatta pigra*). Am. J. Phys. Anthropol. 155:6

Carl Yeoman was an invited speaker for the Biological Sciences Seminar Series at the University of Idaho, Moscow, ID on December 5, 2014. Carl presented a talk titled: the uniqueness of the human vaginal microbial ecosystem: A derived trait or ecological anomaly.”

Carl Yeoman was an invited speaker at the University of Missouri, Columbia, MO on November 12, 2014. Carl presented a talk titled: From the vagina to the gut: Exploring the ecological development, function, and dysfunction of host-associated microbiota.

Rodney Kott received the American Wool Council's Wool Excellence Award during the American Sheep Industry's Annual Convention in Reno, NV on January 29, 2015.

Upcoming Dates

February 20-21, 2015	Beginning Blacksmith Course
March 9, 2015	Spring 2015 Session of the MSU Farrier School Begins
March 9-13, 2015	Spring Break (No Classes, MSU Offices OPEN)
April 3, 2015	University Day (No Classes, MSU Offices open)
May 1, 2015	Classes End
May 9, 2015	Commencement 2015
May 18, 2015	Summer Session Begins
May 25, 2015	Memorial Day Holiday (No Classes, MSU Offices closed)
June 4-6, 2015	Montana Stockgrowers Assoc. Mid-Year Meeting (Animal Bioscience Bldg.)

Research Highlight: Dr. Carl Yeoman's Lab

Research in the Yeoman lab is both disparate and always busy. With National Institutes of Health funding supporting research into human reproductive tract health led by postdoctoral fellow Tiffanie Nelson (see elsewhere for more information), to various U.S. Department of Agriculture funded projects, including an exploration of the inter-relationships among climate-change, environmental microbes, rainbow trout gut microbiota, and the trout's health and productivity to the successional dynamics of lamb microbiota and associated impacts on immunological development. The Montana Wheat and Barley Committee is supporting research into the Wheat Stem Sawflies endosymbiotic microbiota and APISM supporting research into bee microbiota as important factors affecting health and disease resistance.



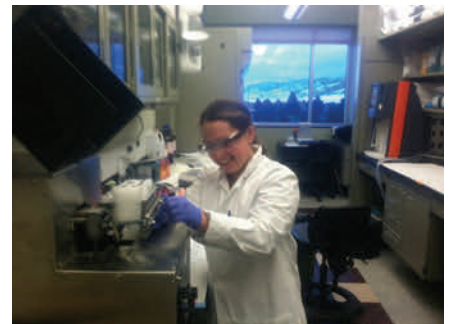
Schlumberger fellow, and Ph.D. candidate Omolola Betiku is working with Dr. Yeoman to determine how alternative protein diets influence the gut microbiota of rainbow trout. Fish is an important protein source in the diet of people all over the world. However, capture-fishery alone is not sufficient in meeting the demand for fish and the current fish meal-based fish feeding regimens utilized by aquaculture is not sustainable in the face of a rapidly growing human population. Omolola's work is to provide clearer insight on how diet and the water environment interact with trout gut microbiota. Omolola's results will help to determine the potential of pre- and/or pro-biotics for improving the effectiveness of these alternative diets. Omolola's research work is a collaborative study between Wendy Sealey and Gibson Gaylord of USFWS and Glenn Duff and Carl Yeoman of Montana State University.



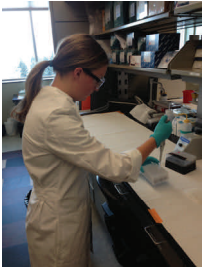
APISM scholar Laura Brutscher is using molecular biology-based approaches to investigate host-pathogen interactions of the honey bee. Laura is working with Dr. Yeoman and co-mentor Michelle Flenniken, (Plant Sciences and Plant Pathology) to determine if honey bee-associated gut microbes play important roles in antiviral-defense. Her research has found a potential relationship between bee colony gut microbes and colony health. In addition, Laura is working on genomically characterizing the bacteria associated with the Wheat Stem Sawfly in order to understand their potential for exploitation as methods to control this highly destructive wheat pest. With the support of the Montana Wheat

& Barley Committee, Laura has shown that the sawfly is primarily colonized by bacteria belonging to the genus *Spiroplasma*, a taxa that has previously been shown to impact the reproductive physiology of other insects. Laura is currently performing metagenomic sequence analysis in order to determine the *Spiroplasma* genome in order to determine their metabolic capabilities.

MS candidate Medora Lachman is working on a USDA and Land 'o' Lakes supported project characterizing the sources and successional development of the rumen microbiota in lambs and the impact of these early microbes on immunological development. Medora's work has shown that lambs are initially colonized by the dam's vaginal microbiota, but these microbes are rapidly replaced and the mouth, gut, fecal, and nasal microbial ecosystems become more like the parental type at various rates, with most reaching these states between 6 months and 1 year of age. The lambs were raised with different maternal and colostrum treatments and Medora is hoping to determine if these variations in rate are related to those treatments and how these rates, treatments, and the specific microbes relate to immune development.



Research Highlight (continued): Dr. Carl Yeoman's Lab



Recent departmental graduate, Sarah Olivio is working with Drs. Yeoman, Fabian Menalled (Plant Sciences & Plant Pathology), and Pat Hatfield defining the soil microbes in tilled, grazed, and chemically-treated pastures whose non-specific addition to soil has been shown by Dr. Menalled's group to increase the growth and competitiveness of various non-weed plants.

Joanna Borgogna is a Ph.D. candidate in the Molecular Biosciences program that spent her fall semester rotation with Dr. Yeoman exploring the effects of smoking on the metabolomic features of the vaginal environment. This is part of a collaborative project between Dr. Yeoman's lab and Dr. Rebecca Brotman (U. Maryland) and builds on data that has found that features of bacterial vaginosis can be exaggerated by smoking. Joanna's work revealed 16 metabolites that were significantly affected by smoking independent of changes in the bacterial community, including cotinine and nicotine showing perfusion of these smoking metabolites throughout the body. Joanna's findings are currently being prepared for publication.



Amy Baeza is a new Ph.D. student in the Yeoman lab who is exploring the effects of dried distillers grains (DDGS) with solubles on the abomasal microbiota of cattle and then attempting to tease apart the relative effects of DDGS nutritional-impact and microbial modulation on the colonization and host response to the nematode *Ostertagia ostertagi*. Amy is a lecturer on the faculty at Brigham Young University.

Laboratory technician, Julie Geddes, is at the heart of most research projects taking place in the Yeoman lab, overseeing all laboratory activity. Julie fronts many of the Yeoman labs collaborative efforts with a broad group of internal and external collaborators ranging from the Crow Water Quality projects source tracking of microbial contamination of the Chief Plenty Coup stream, to investigating the impact of colostrum-seeded microbes on the development of the microbiota of the various regions of the bovine gut with Brian Aldridge at U Illinois, to the impact of woody feeds on rumen microbiota with Travis Whitney at Texas A&M, to the relationship between the chicken cecal microbiota and kinome with Mike Kogut from USDA-ARS at College Station. In addition, Julie fronts the Yeoman labs commitment to provide MSU researchers with sequencing capabilities for their own research projects.



In addition, Dr. Yeoman is bringing research to the classroom. Last fall's ARNR 521, Advanced Ruminant Nutrition class undertook a project investigating the impact of feed particle size on sheep nutritional physiology and their rumen microbiota. This data supported the findings that reducing particle size increases transit rate of the feed through the gut but leads to a significant increase in ADG. The impact on the microbiota is currently being investigated by Dr. Yeoman's lab. The study is being prepared for publication.

Research Highlight: Cooperative Research Program between the Bozeman Fish Technology Center and Montana State University's Department of Animal and Range Sciences



Faculty, researchers and students lending a hand sampling fish.

The goal of the cooperative research program between the Bozeman Fish Technology Center (BFTC) and Montana State University's (MSU) Department of Animal and Range Sciences is to strengthen and advance collaborations and fully utilize the expertise and capabilities of both institutions to increase knowledge of the nutritional needs of fish species. The substantial scientific, feed-making, analytical, and fish-culture resources of the BFTC coupled with the close proximity of collaborating nutritionists from MSU's Department of Animal and Range Sciences provides the opportunity to enhance the BFTC's applied research program on fish nutrition and diet development while increasing the collaborative involvement by MSU faculty and students in fish nutrition research.

Animal and Range Sciences faculty involved to date have been: Dr. John Paterson, Dr. Glenn Duff, Dr. Jane Ann Boles, Dr. Carl Yeoman and Dr. Clayton Marlow. BFTC researchers: Dr. Wendy Sealey, Dr. Gaylord Gibson, and Dr. Barrows.

The groups stated their collaboration in 2010 and since that time have graduated four "fish" MS student through the Animal and Range Sciences Department. These students were: Blake Hauptman (2012), Christopher Hooley (2012), Elizabeth Read (2012), and Brian Ham (2014). Projects also employ undergraduate technicians: Zachariah Conley and previously Jesse Peach and Thomas O'Neill.



Omolola Betiku working in the lab with fish samples.

Omolola Betiku is currently working on her PhD and hopes to graduate in Fall of 2015. Omolola is from Osun State, Nigeria, and her research focuses on using alternative ingredients in formulating cost-effective fish diets that support maximum growth and health of fish.

There are several papers that have come from this collaboration. Among those are:

Ham, B.R., F.T. Barrows, A. Huttinger, G.C. Duff, C.J. Yeoman, M. Maskill and W.M. Sealey. (In Press). Evaluation of Dietary Soy Sensitivity in Snake River Cutthroat Trout. *North American Journal of Aquaculture*.

Ham, B.R., C.A. Myrick, F.T. Barrows, C.J. Yeoman, G.C. Duff, M.G. Maskill and W.M. Sealey (In Press). Feed Characteristics After Growth Efficiently of Cutthroat Trout. *Journal of Fish and Wildlife Management*.

Sealey, W.M., T.J. O'Neill, J.T. Peach, T.G. Gaylord, F.T. Barrow and S.S. Block (In Press) Refining Inclusion Levels of Grain Distillers Dried Yeast in Commercial-Type and Plant-Based Diets for Juvenile Rainbow Trout (*Oncorhynchus mykiss*). *Journal of World Aquaculture Society*.

Hauptman, B.S., F.T. Barrows, S.S. Block, T.G. Gaylord, J.A. Paterson and W.M. Sealey (2014). Evaluation of the Potential for a Mycotoxin Deactivator to Improve Growth and Performance of Rainbow Trout fed High Levels of an Ethanol Industry Co-Product, Grain Distiller's Dried Yeast. *North American Journal of Aquaculture*. 76:297-304.

Research Highlight: Cooperative Research Program between the Bozeman Fish Technology Center and Montana State University's Department of Animal and Range Sciences (continued)

Publications continued:

Hooley, C.G., F.T. Barrows, J. Paterson and W.M. Sealey (2014). Examination of the Effects of Dietary Protein and Lipid Levels on Growth and Stress Tolerance of Juvenile Tilapia (*Oreochromis niloticus*). *Journal of the World Aquaculture Society*. 45:115-126.

Betiku, O.C., T.G. Gaylord, F.T. Barrows, C.J. Yeoman, G.C. Duff and W.M. Sealey (2013). Growth Performance of Rainbow Trout (*Oncorhynchus mykiss*) Fed Animal and Plant Protein Blend Feeds. *Proceedings of the Western Section, American Society of Animal Sciences*.

Read, E.S., W.M. Sealey, F.T. Barrow, T.G. Gaylord and J.A. Paterson. (2011). Comparison of Protein and Copper Sources on Bioavailability in Rainbow Trout. *Proceedings of the Western Section, American Sciences*. 62:1-5.

Equipment Updates

Departmental capabilities have been increased with the addition of new pieces of equipment.

Metabolic Crate

Construction in Dr. Carl Yeoman's garage over the past 6 months. This 4 ft. x 8 ft. x 4 ft. metabolic crate provides a controlled air environment. Designed to work with the respirometry equipment of Dr. Bret Olson and Dr. Yeoman, the metabolic crate allows the analysis of O₂, CO₂, H₂ and CH₄ respiration in sheep, calves and graduate students and will be incorporated into classroom teaching and departmental research. The equipment has already been successfully used by Dr. Jennifer Thomson and her graduate student, Kate Perz, to add calorimetric measurements to their investigations on feed efficiency.



Graduate student Andy Williams

Eppendorf EPMotion 5075



Drs. Yeoman, Thompson and Berardinelli were recently successful in obtaining competitive funds from the Montana Agricultural Experiment Station for the purchase of the Eppendorf EP Motion 5075 automated pipetting and thermal mixing station. The EPMotion system can be utilized to automate and expedite multiple scientific processes from making dilution series, setting up various molecular, radioactive and colorimetric assays, to ELISAs. The equipment will be used to expedite research activities within the Department and College, as well as to enable the practical implementation of molecular research in various College of Agriculture classes.

Meet our Graduate Students

Beaza, Amy (Rexburg, ID) Amy is exploring the effects of dried distillers grains (DDGS) with solubles on the abomasal microbiota of cattle and then attempting to tease apart the relative effects of DDGS nutritional-impact and microbial modulation on the colonization and host response to the nematode *Ostertagia ostertagi*. Amy is a lecturer on the faculty at Brigham Young University. Major advisor: Dr. Carl Yeoman. Expected PhD graduation: Fall of 2018

Omolola Betiku (Osun State, Nigeria) Omolola's research focuses on using alternative ingredients in formulating cost-effective fish diets that support maximum growth and health of fish. Major advisor: Drs. Glenn Duff and Wendy Sealey. Expected PhD graduation: Fall 2015

Laura Brutscher (Little Falls, MN) Laura is researching honey bee antiviral immunity and the role of the microbiome in colony health, as well as the wheat stem sawfly microbiome. Major advisor(s): Dr. Carl Yeoman and Dr. Michelle Flenniken (Plant Sciences & Plant Pathology). Expected MS graduation date: Spring 2017

Molly Butler (San Angelo, TX) Molly is evaluating the differences in confinement finishing and cover crop grazing systems on carcass characteristics, performance and parasite loads in sheep. Major advisor: Dr. Pat Hatfield. Expected PhD graduation: Spring 2015

Kyle Cutting (Lima, MT) Kyle is working with sage grouse and grazing in the Centennial Valley, MT. Kyle is currently the Wildlife Biologist for Red Rock Lakes Wildlife Refuge. Major advisor(s): Dr. Bok Sowell and Dr. Jay Rotella. Expected PhD graduation: Fall 2016

Neto Garcia (Brazil) Neto's research is generalizing and transferring a GIS-based bison distribution model from one hot spot to another hot spot. Major advisor: Dr. Clayton Marlow. Expected PhD graduation: Fall 2017

Emily Gates (Billings, MT) Emily's research is on the effects of wildfire on northern mixed grass prairie. Major advisor: Dr. Clayton Marlow. Expected MS graduation: May 2016

Rashelle Herrygers (Bozeman, MT) Rashelle is studying reproduction physiology and metabolomics in sheep, cattle, mountain goats and big horn sheep. Major advisor: Dr. Jim Berardinelli. Expected MS graduation: Spring 2016

Hailey Kisch (Stillwater, MN) Hailey is researching the effect of landscape position and land use on carbon sequestration. Major advisor: Dr. Clayton Marlow. Expected MS graduation date: Spring 2015

Medora Lachman (Polson, MT) Medora is working on a USDA and Land 'o' Lakes supported project characterizing the sources and successional development of the rumen microbiota in lambs and the impact of these early microbes on immunological development. Major advisor: Dr. Carl Yeoman. Expected MS graduation: Summer 2015

Ronald Lodgepole (Rocky Boy, MT) Ronnie's research is on Bison management for cultural and commercial production. Major advisor: Dr. Clayton Marlow. Expected MS graduation: Spring 2018

Rebecca Ozeran (Yuba City, CA) Rebecca's research project is quantifying relationships between cheatgrass invasion patterns and biotic and abiotic site characteristics in the Northern Great Plains. Major advisor: Dr. Craig Carr. Expected PhD graduation: Spring 2016

Katharine Perz (Sayville, NY) Kate is investigating the molecular mechanisms that cause variation in livestock feed efficiency. Major advisor: Dr. Jennifer Thomson. Expected PhD graduation: December 2016

Brooke Regan (Loveland, CO) Brooke is studying grizzly bear utilization of spring deer and elk carrion on the Northern Yellowstone Winter Range. Her research is focused on temporal patterns in carrion abundance, the factors related to differences in grizzly bear scavenging outside versus inside Yellowstone National Park, as well as the most effective methods for detecting carrion resources on the landscape. Major advisor: Dr. Bok Sowell. Expected MS graduation: Spring 2016

Meet our Graduate Students (continued)

Joao Rossi (Sao Paulo, Brazil) Joao is conducting research on the effects of anthropogenic activities on grizzly bear habitat selection. Major advisor: Dr. Bok Sowell. Expected MS graduation: Fall 2015

Samdanjigmed (Sam) Tulganyam (Khovd, Mongolia) Sam is studying the potential ecological costs associated with bulldozed fire line (guard) including the potential for soil degradation, weed invasion and ecological threshold and associated barriers to restoration in Northern Agriculture. Major advisor: Dr. Craig Carr. Expected MS graduation: Spring 2015

Sean Schroff (Harrison, OH) Sean is researching the nest site selection of sage-grouse hens and how cattle grazing/presence effect the home range size/movement of sage-grouse broods. Major advisor: Dr. Bok Sowell. Expected MS graduation: Fall 2015

Nichole Walker (Ennis, MT) Nichole is researching how grizzly bears are using forest successional stages in Island Park, ID. This is interesting because of the long

history of clear-cutting and other timber treatments in that area. Major advisor: Dr. Bok Sowell. Expected MS graduation: Spring 2015

Jasmine Westbrook (Napa County, CA) Jasmine is studying the integration of sheep and crop production and the effects of grazing for cover crop termination on sheep weight gains, cover crop mortality, and winter wheat yield. Major advisor: Dr. Craig Carr. Expected MS graduation: Spring 2015

Andrew Williams (Murphys, CA) Andy is studying the relationship between current temperament measures and physiological responses to handling of feedlot cattle. Major advisor(s): Dr. Jane Ann Boles and Dr. Jennifer Thomson. Expected MS graduation: Fall 2015

Samuel Wyffels (Baker City, OR) Sam's research will involve looking at ecology and ecophysiology of late season grazing management systems. Major advisor: Dr. Lance McNew. Expected PhD graduation: Fall of 2018

Recent Events Held in the Animal Bioscience Building

September 9, 2014	Planning meeting with USDA Agricultural Research Service (Ft. Keogh)
September 11, 2014	Extension—New Agent Orientation
September 16-17, 2014	Montana Water Center—Annual Wetland Course
September 19, 2014	Montana Grain Growers Association Meeting
September & October, 2014	Teaching English & Achievement (MSU International Programs)
October 2014	ADVANCE Grant Writing Workshops
November 2, 2014	AGR Planning Session
November 6, 2014	Dept. of Animal & Range Sciences Advisory Committee Meeting
November 7, 2014	International Section of Society of Range Management
November 7, 2014	Stockgrowers Nominating Committee Meeting
November 7, 2014	FFA Alumni
November 11, 2014	4H Livestock Judging Workshop
November 13, 2014	Leadership MSU
November 19, 2014	Natural Resources Extension Specialists Meeting
November 25, 2014	High School Science Olympiad
December 6, 2014	MSU 4H Training
January 23, 2015	Stillwater Range Association Annual Meeting



Other News

The MSU Farrier School held an open house and fundraiser on December 5-6, 2014 with alumni coming from Montana, North Dakota and Idaho. A continuing education workshop for farriers was also held over the weekend.

The workshop was led by Josh Stanley, CJF, AWCF. Josh completed the course at MSU in 2006 and has since gone on to accomplish great things in the Horseshoeing world. In 2013 Josh was the team captain of the American Farriers Association farriers team, this is determined by being the high point American at the AFA contest during their annual convention. Josh is also on the team for 2014, he lives and works in the Gallatin Valley.



Josh Stanley, leading a continuing education workshop for farriers.

Rusty Wells, CJF of Virginia and MSU alumni was also on the AFA team in 2014. Tom Petersen, CJF Bozeman, MT was the 2nd alternate on the 2014 team, which means he was sixth place at the national convention, Tom is also an MSU alumni. Tom was not in attendance over the weekend due to a conflict in his schedule. He was in Florida competing at a World Championship Blacksmiths contest. The WCB consists of 5 contests held around the United States, Tom finished the year in the top 4 so he will be part of the prestigious WCB team that will compete internationally along side the AFA team. Good job Josh, Rusty and Tom.



Mike Frisina, was invited by the Wild Sheep Foundation (WSF) to attend their annual meeting in Reno, NV, January 5-9, 2015. Mike was asked to assist the WSF in developing their International Conservation Strategy for Wild Sheep.

A retirement coffee was held for Jim Knight, MSU Animal Science Professor and Extension Wildlife Specialist on September 30, 2014 in the Animal Bioscience Building. Well wishers visited with Jim to wish him well on his retirement from MSU. Jim's immediate plans are to do some traveling, but we will see him occasionally as he will maintain an office here for the time being. Good luck Jim!



Partnering with Industry: 2014 Accelerated Genetics AI Short Course Class. The Department of Animal and Range Sciences, once again, partnered with Accelerated Genetics, Billing, MT to offer a short course for artificial insemination (AI) in cattle. Mr. John Jackson, of Accelerated Genetics, cooperated with Dr. Jim Berardinelli and his graduate and undergraduate students to certify 15 students in technologies and techniques of AI in beef cattle in December, 2014. Students and producers use the Student Physiology Laboratory facility in the Animal Bioscience Building and the AI Facility at the Bozeman Area Research and Teaching Facility. These interactions contribute to our teaching mission and enhance our relationships with Montana companies and producers to improve the overall use of AI in our State.

Student Highlights



L to R: Jarrett Payne, Ben Dhiman, Nicole Novack and Brady Johnson.

Four students from the Department of Animal & Range Sciences recently won the 2014 Forage Legacy Scholarship in AG SC 342 this year. First place team was Ben Dhiman and Brady Johnson (\$400 each) the second place team was Jarrett Payne and Nicole No-

vack (\$100 each).

Medora Lachman, a graduate student for Dr. Carl Yeoman, presented a poster entitled “Neonatal lambs’ gastrointestinal tracts are initially colonized by a unique and dynamic vaginal microbiota but rapidly transition toward the dam’s teat” at the Symposium of Gut Health in Production Animals on November 10, 2014 in St. Louis, MO.

Check out this video from the Montana State University Alumni Foundation: <http://msuaf.org/s/1584/index.aspx?sid=1584&gid=1&pgid=719>. The video includes the Academic Quadrathlon students that won in San Angelo, TX along with their Team Advisor, Rachel Endecott.

Coleen Kaiser, who completed her MS degree in the joint Animal & Range/Plant Sciences barley program,

recently received the Rufus T. Firefly Award for Innovative Service. Coleen is director of the Montana Dietetic Internship program. The Firefly Award of Excellence is given to an employee who holds a professional position within the university system and who has demonstrated tangible innovation, positive and broad impact on student experience, and/or leadership distinguished by role modeling in a professional capacity. The award carries a \$1,500 honorarium. Coleen became director of the Montana Dietetic Internship program in 2010. Since then, the program has become an excellent example of MSU fulfilling its land-grant mission. As the only dietetic internship program in Montana, it allows more MSU nutrition graduates to complete their internships in the state. In four years, Coleen has expanded the number of internship opportunities to 57 rotation sites and assisted professions in the state to create a scholarship fund for the interns. Three classes have graduated so far from the self-supporting program. Twenty-six of the 46 graduates are working in Montana. Congrats to Coleen!

Kate Sharon, who completed her MS degree in the Animal and Range Sciences Department (2012) recently took 1st Place in the Graduate Student Competition at the 2015 American Society of Animal Science Southern Section Meeting. Kate is currently a PhD student at Texas Tech University. Her abstract was titled: “Plane of nutrition during preweaned period influences the pathophysiological responses to a combined intranasal bovine herpesvirus-1 and intratracheal Mannheimia haemolytica challenge in post-weaned Holstein calves.”

Goodbye and Good Luck to Peggy Kelley

The department of Animal and Range Sciences would like to wish Peggy Kelley a Happy Retirement. Peggy retired on December 31, 2014 after 43 years of service to Montana State University. Peggy was an Administrative Associate for Extension and the Department of Animal & Range Sciences. Her smile and helpfulness will truly be missed, but we all want to wish her well in her new role as grandma.

Peggy started her career at MSU on December 31, 1972. Her career included working for Financial Aid, ITC, Extension and the Department of Animal & Range Sciences. Peggy was a crucial part of the department’s Administrative Team.

If you would like to contact Peggy you can still do so at kelley@montana.edu.



Current News: Update on Position Searches



The Animal and Range Sciences Department at Montana State University is growing, and currently has the following searches in progress. Updates on these searches are outlined below:

Extension Sheep Specialist (Assistant/Associate Professor of Sheep and Wool Production)

We will be welcoming Dr. Whit Stewart to Bozeman in June. More information will follow in the next newsletter.

Animal Physiologist (Assistant/Associate Professor)

Information on this position will be in the next newsletter.

If you have further questions please contact the Animal and Range Sciences Department at 406-994-3721 or Susan Cooper at scooper@montana.edu.

Facebook

We would like to invite you to “Like us” on Facebook and keep up with the latest postings on the Department of Animal Sciences. You will find job postings, internship opportunities, award announcements, upcoming events, etc.

You can find our page at: <https://www.facebook.com/MSU.Animal.Range.Sciences>



Help Support Animal and Range Sciences

A gift to the department is a great way to support student and faculty endeavors. Donations can be earmarked for student scholarship funds, faculty research, the new Animal Bioscience Building, and more.

For more information about making a donation to the department contact:

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Animal Bioscience Building

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