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Department of
Land Resources & Environmental Sciences

Land Resources and
Environmental Sciences

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Congrats Grads and Happy Holidays to All!

Please enjoy perusing this fall's departmental newsletter highlighting some of our many research, teaching, and service pursuits. We currently enroll 219 undergraduate students, 77 M.S. students, and 24 Ph.D. students. We want to congratulate our graduates who have completed their studies this fall. Best wishes to you in your endeavors!

Tracy Sterling, Professor & Department Head

Join our Faculty: Position Announcements

Assistant/Associate Professor of Environmental Systems Science

The department of Land Resources and Environmental Sciences is seeking a talented and collaborative colleague who will embrace a multidisciplinary approach to a mechanistic understanding of agricultural ecosystems in the context of earth system science. The successful candidate will address critical fundamental and applied questions related to agricultural systems sustainability and optimization in a new data-rich world. We are looking for a faculty member with a vision for future agriculture that makes use of the big data streams now available to address the questions of environmental sustainability, food quality and security, and climate change adaptation. This is an academic year (nine month), tenure-track faculty position at the Assistant or Associate Professor level with research, teaching, and service responsibilities. Equal opportunity employer, Veterans/Disabled. Screening will begin December 9th 2019.

Link to Apply: <https://jobs.montana.edu/postings/18283>

Assistant/Associate Professor of Watershed Analysis

The department of Land Resources and Environmental Sciences is seeking a talented and enthusiastic individual who will embrace a multi-disciplinary approach to quantitative watershed hydrology and understanding the couplings among natural, agricultural, and human systems. The successful candidate will have a vision of how watershed analysis and environmental simulation modeling can be used to address critical, fundamental, and applied questions. This is an academic year (nine month), tenure-track faculty position at the Assistant or Associate Professor level. The appointment will be 55% Research, 35% Teaching, and 10% Service funded by the Montana Agricultural Experiment Station and the College of Agriculture. Equal opportunity employer, Veterans/Disabled. Screening will begin December 20th 2019.

Link to Apply: <https://jobs.montana.edu/postings/18294>

Join our Faculty: Position Announcements

Assistant Professor of Remote Sensing

The Department of Land Resources and Environmental Sciences seeks a talented and enthusiastic individual who will: (1) provide leadership in the acquisition, analysis, characterization and application of remotely sensed imagery at multiple scales; (2) actively contribute to sustaining and enhancing the department's research, teaching, and outreach programs related to remote sensing as applied to land resources and environmental sciences; and (3) contribute to the MSU Spatial Sciences Center and its mission to advance academic research and instructional programs and to participate in campus-wide synergistic collaborations. This is an academic year (nine month) tenure-track faculty position at the Assistant Professor level. The appointment will be 45% Research, 45% Teaching, and 10% Service funded by the Montana Agricultural Experiment Station and the College of Agriculture. Equal opportunity employer, Veterans/Disabled. Screening will begin December 15th 2019.

Link to Apply: <https://jobs.montana.edu/postings/18304>

New LRES Staff

Justin Arntz was hired on as the Student Academic Coordinator for the LRES main office.

Paul Hegedus is a Research Associate for the Maxwell Lab.

Toby Koffman is the manager for the Environmental Analytical Lab.

Jade Lawrence is the Research Operations Manager for the Priscu Lab.

Ann Marie Reinhold is an Assistant Research Professor.

Milestones in Service

Ann Marie Reinhold- 5 yrs

Jack Brookshire- 10 yrs

Mett Davis- 10 yrs

Ana Murphy- 10 yrs

Tracy Sterling- 10 yrs

Jane Mangold- 15 yrs

Fabian Menalled- 15 yrs

Jeff Holmes- 20 yrs

Tim McDermott- 25 yrs

LRES Recognition



Ed Davis, was honored as the College of Agriculture's Distinguished Staff award.



After 35 years at MSU, **Linda McDonald** was recognized at her retirement ceremony for her dedicated and loyal service to LRES.



Shantell Frame-Martin, received an Excellence in Outreach Award from the Office of the Provost.



LRES hosted Tumursukh Jal, Director of Ulaan Taiga National Park in Mongolia

Daniel Flavin and Zach Fighter both received the Undergraduate Research Scholarship through the Initiative for Regulation and Applied Economic Analysis.



Sam Carlson, Ph.D. student, received the Graduate School's Dissertation Completion Award



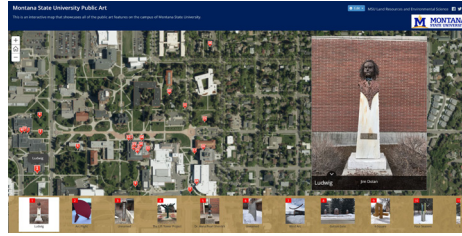
Lisa Rew gave a presentation on invasive plants during IOE's Distinguished Lecture Series.

Continued on Pg. 3

LRES Recognition



Kevin O'Neill and Casey Dephia featured in Entomology Today for work with farmers and native bees.



Nick Fox led a Pecha Kucha workshop titled, "Community Engaged and Transformational Scholarship" showcasing work from SSC and GPHY 352 students with the model above.



Scott Powell, Jennifer Watts, and Ph.D student **Mary Farina** examine climate trends in Alaska.



Jane Mangold was featured on *Voices of Montana* with Brian Mealor from the University of Wyoming to discuss "Combating

the spread of non-native and invasive plant species".

Laissa Cavallini dos Santos and Buddi Achhami recieved a Professional Advancement Grant from the Graduate School to cover travel expenses to ESA's national conference in St. Louis, MO.



Rehka Bhandari was awarded MSU's Foundation Endowed Fund for MS students in Entomology.

Clare Dittmore received the COA Student Scholar travel award to present her research on the army cutworm moth abundance and distributions on montain peaks in the GYE as part of a USFS grizzly conservation project..



Dean of the College, Sreekala Bajwa and Professor and IOE Director Bruce Maxwell during MSU Field Days at the Post Farm in Bozeman, MT.



Luke McKay, Assistant Research Professor, was invited to participate on the Early Career Faculty Advisory Panel for the Center for Biofilm Engineering .



Jennifer Watts received the NSF-funded *Training and Retaining Leaders in STEM-Geospatial Sciences (TRELIS)* program fellowship.



LRES Administrative Assistant, **Jessie Sheperd**, has spent the past three years volunteering with the Gallatin County 4-H Extension program. The Extension 4-H Youth Development Program provides youth between the ages of 8-18 the opportunity to develop and grow their life skills in a fun, supportive environment. One of her favorite roles is serving as a Director for the camp program. This past year we were hosted by Luccock Camp in Livingston, MT. Our teen counselors have the chance to practice important leadership and decision-making skills while leading youth through educational workshops. The College of Agriculture as a few future bobcats as some of the topics included "Super Foods & Animals" where counsels discussed topics such as farming, plant and animal by-products, nutrition and other related subjects. What better place to learn than camp?!

Women in Agriculture Summit

“Great resource and information. Opportunity to meet a breath of women in ag.”

This is the way an attendee described her experience in the inaugural MSU Summit Celebrating Women in Agriculture on Saturday, October 12, 2019. The Summit was part of a U.S. Department of Agriculture’s National Institute of Food and Agriculture funded project, Empowering Women in

Agriculture. The purpose of the summit was to showcase the contribution of women to agriculture in the state and to bring the opportunity for a dialogue between people with different perspectives. The Summit opened with Dr. Sreekala Bajwa, Vice President and Dean, MSU College of Agriculture, giving remarks followed by the premier screening of five video clips depicting the creative work and contributions of women to the sustainability of agriculture. Dr. Vince Smith, Professor of Economics and Agricultural Economics, presented a talk on Domestic and International



From left to right: LRES Professor Rew led a discussion with Sue Brown, Amaltheia Organic Dairy; Karin Broughton, 3 Fiddles Farm; and Becky Weed, Thirteen Mile Lamb & Wool Company; to discuss the future of agriculture .

Agricultural Policy setting the stage for three panel discussion, Women in the 21st Century Agriculture, Opportunities and Challenges in Current Agriculture, and Food Access and Food Security. The panels were moderated by MSU faculty and addressed issues regarding the future of agriculture and agricultural practices. Participants came from all corners of the State including farmers, ranchers, students, Extension agents, and faculty from MSU and other institutions of higher education. Additionally, Western SARE, DNRC, and LRES shared information on funding and educational resources for agriculture. All in all, it was an informative and powerful event where participants had the opportunity to exchange ideas and network.

Irene Grimberg, WSARE Deputy Regional Coordinator

For more information:

Summit Celebrating Women in Agriculture- <http://www.montana.edu/empowering-women-in-ag/summit/index.html>
Empowering Women in Agriculture- <http://www.montana.edu/empowering-women-in-ag/>

Regenerate Conference Albuquerque, New Mexico



In November, on behalf of the LRES department, I attended the second the annual Regenerate Conference in Albuquerque, New Mexico. The conference, organized by the Quivira Coalition, Holistic Management International, and the American Grassfed Association, brings together a collaboration of ranchers, farmers, environmentalists, land managers, students, teachers, and others to explore ideas of regeneration. This year’s focus topic was Health from the Soil Up.



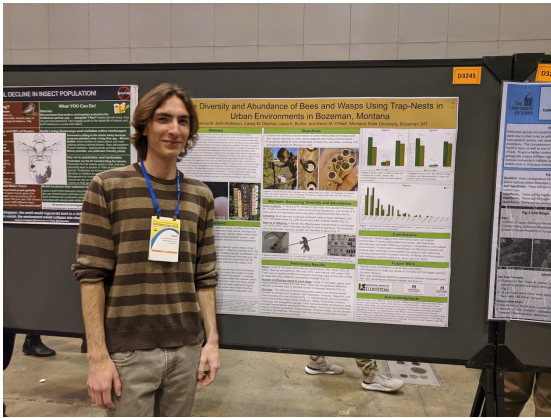
We heard from presenters about Nurturing Health from the Ground Up, Regenerative Ag in Indigenous Cultures, and learned about blending holism and government. Other presenters gave us a discussion on the importance of relationship in a successful regenerative ag business. Break -out sessions presented the opportunity for conversations about the connections between agriculture, conservation, soil health, and human health. Ideas and take-home messages from these presenters and discussions will strengthen the offerings of NRS 421/LRES 521 Holistic Thought and Management. Additionally, I established useful contacts for our course and students with Western Landowners Alliance, Montana Organic Association, Cooper Hibbard from the Sieben Livestock Company in Cascade, MT, and several others. These new relationships will be integrated into our course through guest speakers and contributions from on-the-ground stewards of the landscape.

A special thanks to Dr. **Tracy Sterling**, Dr. **Cliff Montagne**, and the Holistic Management Program Fund in the LRES Department, for the opportunity to attend this insightful and informative event.

Lora Soderquist, Instructor

Advocate Entomology!

Entomological Society of America National Conference



Josh Botti-Anderson placed second in the ESA Plant-Insect Ecosystem Section #1 undergraduate poster session for his work titled, "The diversity and abundance of bees and wasps using trap-nests in urban environments in Bozeman, MT".

The 2019 Entomological Society of America national meeting provided me with the opportunity to present the results of a research project I conducted working with **Casey Delphia**, **Kevin O'Neill**, and **Laura Burkle**. My study involved a group of insects known as *solitary cavity-nesting bees and wasps*, which can be induced to build their nests in artificial substrates called *trap-nests*. My goal was to test the hypothesis that the abundance and diversity of these insects vary between Bozeman's urban and nearby semi-natural landscapes. The current findings suggest that the urban sites we studied support communities of cavity-nesting bees and wasps with diversities, abundances, and viable offspring production comparable to the semi-natural habitats. During the poster session, I had constructive interactions with scientists and other students regarding the use of trap-nests, interpretation of data, and future studies. Much interest revolved around forthcoming species-level identifications that I will complete this winter, supported by new funding from the Undergraduate Scholars Program. This experience

enhanced my science communication skills and provided me with a deeper perspective of my project through discussions of its finer details. I was gratified that the poster was awarded second place in the Undergraduate Poster Competition (Plant-Insect Ecosystems Section 1).

In addition to the poster presentation, I attended a variety of interesting symposium sessions covering topics in pollinator ecology, and met with entomologists and other scientists from around the country to discuss research and graduate school opportunities. I learned about the current research activities of scientists whose work I had previously only read about in the scientific literature. Among those who I had the chance to speak with was a professor that I previously contacted with regard to graduate student opportunities. The chance to meet with her in person to discuss her current research projects, and for me to more openly articulate my own research background and interests, was one of the most valuable aspects of attending this meeting.

*Joshua Botti-Anderson
LRES Travel Grant Recipient, Fall 2019*



Miles Maxcer presented on his company, The Ant Network, at ESA's national conference in St. Louis, MO. Earlier this fall, Maxcer's company placed second in the "BIG Idea Challenge" entrepreneurial competition.

"I knew I wanted to attend a university that would support my passion for ant research and outreach"

Attending the Entomological Society of America's annual meeting in St. Louis afforded me an unparalleled opportunity to engage with entomologists from around the world. This networking helped me explore possible career tracks as I consider moving on to graduate education. Presenting a poster on my research in collaboration with Yellowstone National Park gave me valuable experience and feedback on my work, which I will use in the future. As a finalist for the Antlion Pit pitch competition, I had the opportunity to take the stage and share my science communication company's mission of engaging the world with insects and inspiring others to take action on environmental issues. All told, attending ESA not only gave me the opportunity to present my research, but it opened new doors for collaboration and expanded my knowledge of future career opportunities.

*Miles Maxcer
LRES Travel Grant Recipient, Fall 2019*

Quotes from:

<https://www.montana.edu/news/19385/interdisciplinary-program-leads-msu-student-to-research-business-success>

LRES Quarantine Lab: The Eastern Heath Snail- What is it? Why is it important?



PC: Jeff Littlefield; Inset PC: J.M. Hernandez Otero

The eastern heath snail (*Xerolenta obvia* or XO) is a dryland massing snail that originated in southeastern Europe but whose geographical range is expanding in Europe and on other continents. In 2012, XO was reported in Cascade County and was subsequently located over an estimated 30,000 hectare area around Belt, Montana. This infestation is one of three in North America along with Detroit, Michigan and Ontario, Canada. The presence of XO in Montana poses a potential regulatory risk for grain and hay production and for export markets. Little is known about the snails' biology or invasive behavior. This information is essential to assess the risk of XO to natural ecosystems and grain growing regions and to human health. To develop long-term management strategies, **Jennifer Birdsall** (Research Associate), **Jeff Littlefield** (Research Scientist), and **Ann deMeij** (Research Technician) are investigating the biology of XO with assistance provided by David Robinson (USDA-APHIS), Ian Foley (MDA), and Gary Adams (USDA-APHIS-PPQ). We are studying factors such as rate of development, egg laying behavior, feeding preferences, and mortality. Interesting discoveries include that XO can live more than one year in Montana and exhibits great variability in growth rate; there can be more than 1,250 XO per square

meter in an area; snails are hermaphroditic and a pair can lay over 280 eggs (in clusters of up to 80 eggs) of which 70% hatched; a solo XO that never mated can also lay eggs; eggs can be found in the soil in nearly all months of the year except those that are most dry; XO can feed on a wide variety of plants; and several species of nematodes are associated with dead and dying XO. Our second year of studies should provide more insight into this generally unknown snail which has become well established in Montana. This research is funded through the 2018 Farm Bill and the Montana Agricultural Experiment Station.

Jennifer Birdsall, Research Associate

Huazhong University Visits MSU



A group of 14 students from Huazhong Agricultural University in the city of Wuhan, China, had the opportunity to experience a wide variety of Montana's ecosystems ... thanks to collaborations between HZAU researchers and members of the Land Resources and Environmental Sciences department.

Tim McDermott, an LRES professor who specializes in microbiology and freshwater ecosystems has collaborated with HZAU's Gejiao Wang for several years through an international research partnership. MSU faculty leading the tours and classes included McDermott, associate

professor **Tony Hartshorn**, assistant research professor **Bill Kleindl**, and professor Dave Mogk of the Department of Earth Sciences.

[LRES department head Tracy] **Sterling** helped organize this year's trip and has high hopes that a delegation of American students may someday get the opportunity to visit those universities to complete the cultural exchange. "HZAU is an urban university, and when the visiting students spoke to us, they were very impressed with the sheer beauty here," said Sterling. "We hope this experience will inspire them to understand how agricultural and natural ecosystems work so that they know how to restore damaged lands, reduce pollution or understand how soil and water influence food production, so they can apply those things back home"

Adapted from:

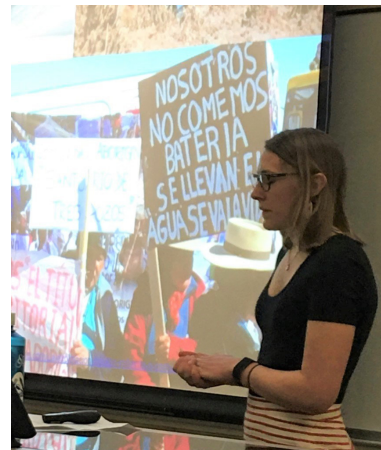
<https://www.montana.edu/news/18934/huazhong-agricultural-university-students-enjoy-field-experience-through-msu-partnership>

LRES Capstone

"[I]t was useful to have a course on ethics. As scientists, we are trained to think analytically so by having to incorporate the ideals of ethics and science together challenged me to think differently" -ENSC 499 student

This semester the LRES senior capstone class focused on discussing the role of ethics in environmental science. As all of the students will soon graduate and enter the world of environmental science and it is important for them to think about what role ethics plays in many aspects of scientific careers. The students were encouraged to research environmental topics that interested them, while thinking carefully of the ethical components involved. Within the broader topic of science and ethics, the students narrowed their research interests into seven major sections:

1. Coral reef decline;
2. How urban areas in arid regions manage water, with a focus on Phoenix, Las Vegas, Los Angeles, and Brisbane;
3. Wildfire management;
4. Environmental impacts of mining;
5. Environmental impacts of agriculture;
6. The costs of alternative energy production; and
7. Water scarcity with climate change



Above: Stacey Robbins presenting on the ethics of resource extraction.

The capstone class presented their research to an LRES freshman class, LRES professors and graduate students, and the general public at the Bozeman Public Library. To read their final paper visit: <http://landresources.montana.edu/capstone.html>.

*Cathy Zabinski, Professor
Kristi D'Agati, M.S. student*



From left to right, Jack Paloucek, Stacey Robbins, Axel Barth, and Megan Deming, with Joseph Lazarus introducing the Capstone presentation titled, "Ethics of Managing Critical Global Resources: Mining and Food Production" during the LRES graduate seminar.

College of Agriculture Outstanding Undergraduate Student Awardees

The purpose of the College of Agriculture Outstanding Undergraduate Student Awards is to recognize student accomplishment above and beyond in the areas of Leadership, Engagement, and Research. Students were recognized at the Fall College of Agriculture Scholarship and Awards Banquet on November 1st.

CoA Outstanding Research Awardee



Daniel Chichinsky
*Major: Sustainable Foods and Bioenergy Systems- Agroecology
Advisor: Miller*

CoA Outstanding Leadership Awardee



Clare Dittmore
*Major: Sustainable Foods and Bioenergy Systems- Agroecology
Advisor: Maxwell*

CoA Noteworthy Engagement Awardee



Natalie Sturm
*Major: Sustainable Foods and Bioenergy Systems- Agroecology
Advisor: Miller*

New LRES Graduate Students

2019

Master of Science

John Bowley
M.S. ENTO
Advisor: Peterson

Willa Fouts
M.S. LRES
Advisor: Zabinski

Lilly Sencenbaugh
M.S. LRES
Advisor: Rew

Kendall Wojcik
M.S. LRES
Advisor: Hartsborn

Doctor of Philosophy

Samuel Koeshall
Ph.D. ESEC
Advisor: Miller

Caitlin Mitchell
Ph.D. ESEC
Advisor: Ewing

Duncan Ocel
Ph.D. ESEC
Advisor: Ewing

Online Master of Science

Sarah Beeson
M.S. LRES Online
Thomasville, GA

Hannah Boesinger
M.S. LRES Online
Sagamore Hills, OH

Kevin Casula
M.S. LRES Online
Marble Falls, TX

Brad Catron
M.S. LRES Online
Helena, MT

Casey DeLay
M.S. LRES Online
Cambria, CA

Adam Hallihan
M.S. LRES Online
Naperville, IL

Lauren Hillmer
M.S. LRES Online
Stanwood, CA

Drew Howing
M.S. LRES Online
Estherville, LA

Denise Huff
M.S. LRES Online
Santa Fe, NM

Danielle Korecki
M.S. LRES Online
Bronx, NY

Tashi MacMillen
M.S. LRES Online
Rancho Santa Fe, CA

Isaac Newell
M.S. LRES Online
Portland, OR

Erik Norderud
M.S. LRES Online
Bakersfield, CA

Rebecca Oliver
M.S. LRES Online
Austin, TX

Andrea Przygoda
M.S. LRES Online
Athens, GA

Zachary Rittner
M.S. LRES Online
Scotch Plains, NJ

Emily Wermann
M.S. LRES Online
Germany

ESEC: Ecology & Environmental Sciences
LAND: Land Rehabilitation
LRES: Land Resources & Environmental Sciences
ENTO: Entomology



LRES Faculty/ Staff & Student Winter Social

Martin Luther King Day
January 20, 2020*
at CrossCut Ranch

Stay tuned for details...



Nielsen Graduate Research Assistantship Awardee



FY20 Awardee
Advisor: Brookshire

The Nielsen Graduate Research Assistantship is awarded to graduate students providing research support to full-time faculty in soil science, specifically *Montana Pedogenesis*, or the basic understanding of Montana soils.

Justin Gay's research centers on terrestrial ecosystem ecology with an emphasis on better understanding how these systems work through a biogeochemical lens. He is interested in how global changes from modern human activity are altering geographically broad patterns of soil nutrient cycling, fluxes of greenhouse gases, and carbon storage. Justin's research seeks to improve our current understanding about the consequences from global changes (CO₂ fertilization, atmospheric deposition, climate change, and shifts in disturbance regimes) and their impact on ecosystem structure and function that control biologically critical nutrient loss and retention. Justin integrates a number of approaches to answer research questions across different spatial and temporal scales including: field sampling and laboratory analysis, satellite imagery, ecosystem modeling, and stable isotope approaches. He is currently working on a diverse array of projects across a number of different ecosystems including: savannas in the northern great plains, tropical montane forests, agro-ecosystems, and subalpine grasslands.

Justin holds a B.S. in Environmental Science from Endicott College in Beverly, MA and a M.A. in Science Curriculum and Instruction from the University of Vermont in Burlington, VT.

Bayard-Taylor Scholarship Awardees

The Bayard-Taylor Scholarship Fund provides a stipend to support two Graduate Research Assistantships in the Environmental Analytical Laboratory (EAL) for graduate students contributing to the research support of full-time faculty in Land Resources and Environmental Sciences.



FY 20 Awardee
Advisor: Poole

Elizabeth Mohr's research interests are at the intersection of freshwater ecosystem biogeochemistry and simulation science. Her focus is on advancing scientific understanding of freshwater biogeochemistry via complementary *in silico* and laboratory experiments. Currently, Libby is developing mechanistic models describing how variation in physical, chemical, and biological processes interact to influence biotic transformations of nutrients in streams. She is challenging these computer models with data from mesocosm experiments that include the addition of stable isotope tracers. Libby earned her B.S. in Environmental Earth Science and Chemical Engineering from Washington University in St. Louis in 2015. She is beginning her third year of Ph.D. work in Dr. Geoff Poole's Fluvial Landscape Lab.



FY 20 Awardee
Advisor: Payn

Meryl Storb's research interests revolve around how human alteration of the landscape influences watershed systems. She is exploring the idea of human influence on lotic ecosystems through building mechanistic understanding related to how ecosystems respond to both changes in hydrology and also alterations to water chemistry (e.g. anthropogenic sources of nitrate). Meryl's dissertation research is focused on alpine stream ecosystems in the northern Rocky Mountains. Her fieldwork is focused on the West Fork of the Gallatin River in the rapidly developing Big Sky watershed in western Montana. Meryl learned her B.S. in environmental geology from the University of Montana in 2008. Afterwards she worked for 7 years as a hydrogeologist in the environmental consulting industry before she decided to return to school to pursue a doctorate. Meryl is also currently a Pathways student with the U.S. Geological Survey Wyoming-Montana Water Science Center, where she works in a part time capacity as a hydrologist while she is completing her degree at M.S.U.

Save the Date for the Spring LRES Research Colloquium

The 10th Annual LRES Research Colloquium will be held in the Strand Union Ballrooms C & D on **April 29, 2020** (more details coming soon).

The event offers on-campus and online graduate and undergraduate LRES students an opportunity to present their research to friends, colleagues, and faculty in an informal setting. All LRES undergraduate and graduate students are encouraged to submit a poster and/or oral presentation. Travel grants are available to assist online M.S. students who would like to participate. Come and share what you have been working so hard on!

Other highlights of the Colloquium include a keynote speaker, door prizes, and awards for the best presentation(s). Appetizers and beverages will be served.

Questions? Interested in helping organize the event?

Email lresgso@gmail.com or touch base with current **LRES GSO Leadership**:

Co-Chairs:

Jordan Meyer-Morey &
Laissa Cavallini dos Santos

Curriculum Committee Liaison:

Duncan Ocel

Faculty Meeting Liaison:

Hannah Duff

Mentoring Committee Liaison:

Hannah Duff

Social Committee Liaison:

R. Sasha Loewen



MSU Giving Day

February 13-14, 2020

This year the undergraduate and graduate LRES clubs will be taking part in the first MSU giving day on **Thursday February 13th to 5 pm MST Friday February 14th** to raise money for the LRES Colloquium this spring. The MSU giving day is a platform in which donors can make a minimum \$5 donation to a project of their choice. We hope that by making alumni, parents, students, faculty, staff and friends aware of this opportunity we can raise funds to help offset the event space, poster printing, and catering for the colloquium. The colloquium is an important student organized event which showcases the great work LRES graduates and undergraduate are conducting in classes, research, and internships.

Grad Research Around MT



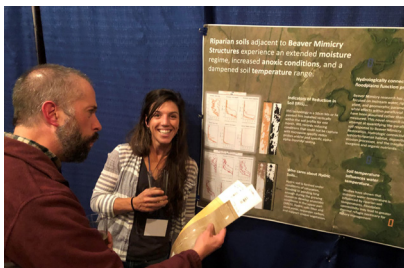
Kristen D'Agati, M.S. LRES
Northern Agricultural Research Center
Field Day
Havre, MT
"Cover Crop Microbial Activity"



Sydney Atencio, M.S. LRES
Post Farm Field Day
Bozeman, MT
"Fusarium Research for the Lentil Underground Project"



Michelle Majeski, M.S. LAND
Western Agricultural Research Center
Field Day
Corvallis, MT
"Modifying Seeding Date of Bluebunch Wheatgrass and Herbicide Application Timing during Revegetation to Limit Re-Invasion by Cheatgrass and other Weedy Species"



Bree Whitehead, M.S. LRES
Montana American Water Resource Association Conference
Red Lodge, MT
"Riparian soils adjacent to Beaver Mimicry Structures experience an extended moisture regime, increased anoxic conditions, and a dampened soil temperature range"

New LRES Grants Awarded from Dec. 2018 - Nov. 2019

These funds fuel our research and teaching mission-to discover new knowledge, to engage and train students using laboratory and field studies across local to global scales, and to enrich the lives of Montanans. Please take a minute to congratulate our faculty and staff **in bold** on their meaningful work and impressive accomplishments.

Federal Grants

National Park Service (NPS)

Maxwell Predicting Invasive Potential of Annual Wheatgrass (*Eremopyrum Triticeum*) in the Gardiner Basin of Yellowstone National Park

National Science Foundation (NSF)

Payn & Ewing
Trowbridge NSF EPSCoR Consortium for Research on Environmental Water Systems (CREWS) Year-2 Collaborative Research: How to live on a (carbon and water) budget: Tree investment in chemical defenses across a gradient of physiological drought stress

USDA Agricultural Research Service- Plains Area (ARS-PA)

Reinhold & Poole Determining the Importance of Flood Dynamics on Russian Olive Invasion

USDA Animal And Plant Health Inspection Service (APHIS)

Littlefield An updated survey of biological weed control agents adventive to Montana and the U.S., and agents of unknown establishment

USDA National Institute of Food and Agriculture (NIFA)

Ewing & Capella Fostering resilient plant-soil interactions on working ranches in semi-arid steppe ecosystems of north-central and eastern Montana

Maxwell & Duff Effects of Habitat Heterogeneity on Crop Yield and Biodiversity

Maxwell & Loewen Precision Agriculture Applied to Organic Systems

Menalled Western SARE

USDA Forest Service (USDFOR)

Hartshorn Riley Pass Uranium Mine Growth Medium Study

Littlefield The dispersal of eriophyid mites with implications to host specificity testing and field releases

Mawell Demonstration sites for adaptive management and restoration of natural resources in the Western U.S.

US Fish and Wildlife Service (USFWS)

Maxwell Science applications strategic communications and science outreach cooperative agreement

Montana Grants

Montana Department of Environmental Quality

Sigler 2019-2020 Volunteer Water Quality Monitoring Support

Montana Fertilizer Assessment Fund

Engel, Jones, & Powell Understanding acidification and management of Montana soils

Ewing, Brookshire, & Payn Research Analytical Chemist, Environmental Analytical Laboratory

Maxwell On-farm experiments to optimizing site-specific application of nitrogen fertilizer rates to maximize producer profits

Miller, Jones, & Zabinski Advancing cover crop knowledge in Montana: Soil fertility implications

Miller, Ewing, & Jones Long-term N management in alternative crop rotations

Montana Grants

Montana Noxious Weed Trust Fund

Littlefield	Biological control of Russian knapweed: Continued host testing and agent monitoring
Littlefield	Biocontrol invasive hawkweeds: Host testing, rearing and monitoring
Littlefield	Continued host screening of new biocontrol agents for common tansy and oxeye daisy
Littlefield	Host testing and field release of biocontrol agents for whitetop
Mangold & Z. Miller	Effect of perennial grass seeding date on revegetation outcomes in weed-infested range and pasture
Mangold & Frame-Martin	Montana Noxious Weed Education Campaign
Mangold & Rew	Ventenata in Gallatin County: Surveying, mapping, and evaluating chemical control
Rew & Mangold	Stopping a wave of invasion: Controlling cheatgrass, encouraging desired vegetation and preventing spread
Weaver	Continuing development of candidate agents for biological control of Russian olive
Weaver	Continued mass rearing, release, and monitoring of the northern tamarisk leaf beetle (<i>Diorhabda carinulata</i> Desbrochers): A biological control agent for saltcedar
Weaver	Integrating management of invasive toadflax: Field testing to identify new effective biocontrol and herbicide treatments

Montana Wheat & Barley Committee

Miller & Ewing	Soil Carbon Accrual in Progressive Montana Crop Rotations
Seipel	Integrated weed management in cereals: Confronting challenges of herbicide resistance, herbicide carryover and acidic soils
Powell, Engel, Jones, Maxwell, & Stoy	Mapping nutrient deficiency, water stress, and toxicity with frequent drone observations to improve fertilizer efficiency and management
Weaver	IPM of wheat stem sawfly and other insect pests of wheat

Private, University, Regional and Other State Grants

Bair Ranch Foundation

Mangold	Understanding mechanisms of recent <i>Ventenata dubia</i> invasion on Montana rangelands
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Confederated Tribes of the Umatilla Indian Reservation

Poole	Multi-scale hyporheic exchange
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Montana Academy of Sciences

Maxwell	Precision Agriculture Applied to Organic Systems
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MPG Ranch

Mangold	Soil microbial study of monotypic crested wheatgrass sites
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MJ Murdock Charitable Trust

Brookshire	Understanding drivers of recent afforestation in the Northern Great Plains' mixed-grass prairie
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USA DRY Pea and Lentil Council

E.Davis & Menalled	2019 Weed Control Research in Pulse Crops
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Woods Hole Research Center Inc.

Ewing	Developing a new geospatial approach for rangeland carbon monitoring
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Yellowstone Forever

Maxwell	Fisheries technician support in Yellowstone National Park, 2019 - 2020
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LRES 2019-2020 Scholarship Recipients

Angie & James Anderson Memorial Agriculture Scholarship

Lexi Emeny

Annin Scholarship

Jaydyn Engan

BMCF Agriculture Scholarship

Abigail Northrup

Elizabeth Rieger

Stacey Robbins

Kyle Wyatt

Thomas D. Campbell Memorial Scholarship

Megan Deming

Michael Sainsbury

CHS University Scholarship

Emily Daniels

Nicole Ellis

Cassidy Leno

Leonard Chvilicek Memorial Scholarship

R. Sasha Loewen

College of Agriculture Scholarship

Megan Deming

Eric Healy

Toby Leppicello

Jordan Meyer-Morey

John Radle

Meghan Robinson

Natalie Sturm

Clyde & Helen Erskine Fund for Excellence in Agriculture Scholarship

Elena Marburger

Farmers Business Network Scholarship

Daniel Chichinsky

Clare Dittmore

First Security Bank of Belgrade Scholarship

Lexi Emeny

Gallatin Valley Ag Committee Scholarship

Lexi Emeny

Hayden Agriculture Scholarship

Hannah Duff

Marion T. Hedegaard Scholarship

Megan Demin

Bill & Anita Jones Scholarship

Nathaniel Barnes

Erin Bjorklund

Jacob Martin

Land Resources Stewardship Scholarship

Emily Daniels

Eli Harmon

Daniel Huck

Anya Joyce

Erik Killian

Katya Koepsel

Madelene Lockner

Josephine Rodrigue

Rene Jones Lock Scholarship

Vanessa Orcutt

Arthur H. & Margaret C. Post Scholarship

Elizabeth Hecker

John S. McFarlane Endowed Scholarship

Jennifer Becker

Cliff Montagne LRES Scholarship

Erin Bjorklund

Montana Grains Foundation Scholarship

Bailey Servais

Jacob Zimmerer

Frank F. Munshower Scholarship

Michelle Majeski

Newman/Abbot Nutrituion Undergraduate Scholarship

Kelly McAlpine

Kyle Olszowka

The Rice Family Scholarship

Hetta Williams

Charlotte Rose Rughes Memorial Scholarship

Hadley Barnard

Daniel Chichinsky

Clare Dittmore

James Fauth

Kristin Katchmar

Natalie Sturm

August & Mary Sobotka Memorial Agriculture Scholarship

Lex Heberle

Wagner Heritage Scholarship

James Fauth

Warp Scholarship

Stacey Robbins

Earl & Pauline Webb Memorial Scholarship

Lars Heinstded

Western Seed Association Scholarship

Melissa Wysocki

LRES Degrees Awarded Fall 2019

Bachelor of Science

Environmental Sciences

Tobin Brown
Kesslie Carlson-Ham
Riley Elgerd
Elizabeth Hecker
Patrick Jackson
Joseph Lazarus
Madelene Lockner
McIntyre Murphy
Jack Paloucek
Lukas Reents
Lauren Saint Pierre
James Shafer
Jacob Zimmerer

Sustainable Foods & Bioenergy Systems-Agroecology

Kristin Katchmar
Clare Dittimore
Allison Cooley

Master of Science

Entomology

Rekha Bhandari

Online Master of Science

Land Resources & Environmental Sciences

Charles Byrne (Summer)
Sean Carroll (Summer)
Caitlin Dalby (Summer)
Stephanie Davis
James Douglas
J. Gant Massey
Patrick McGunagle
Mark Schnee
Kelsey Smith
Nicholas Sovner
Emery Three Irons (Summer)
Madelyne Willis (Summer)
Ethan Wologo (Summer)

Doctor of Philosophy

Ecology & Environmental Science

Abdullah Alowaifeer (Summer)



Opportunities to Support LRES

A gift to the department is a great way to support student and faculty endeavors. Donations can be earmarked for student scholarships or internships, graduate fellowships, undergraduate and graduate student programs, endowed professorships, and more.

For information about making a donation to the Department, please contact Kevin Brown, MSU Alumni Foundation, College of Agriculture, Director of Development (406-994-4815 or kbrown@msuaf.org).



Department of
Land Resources & Environmental Sciences