



Rosie Wallander

Fieldwork at Fort Ellis

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**MONTANA
STATE UNIVERSITY**

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 200 undergraduate students, 88 M.S. students, and 30 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

Stream Restoration Ecology (ENSC 448)

Spanning the classroom and natural laboratory for an immersive learning experience

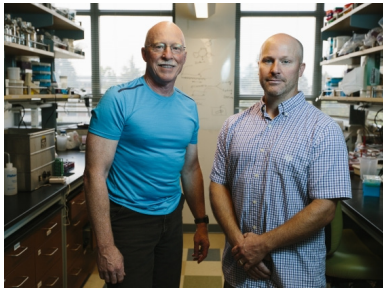


In many stream restoration projects, channels are reshaped to resemble more natural channel forms, which in turn influence water movement, nutrient cycling, water temperature, and aquatic habitat in rivers and on floodplains. These ideas form the foundation of the concepts Dr. Geoff Poole teaches to students enrolled in "Stream Restoration Ecology" (ENSC448), a class offered each fall at Montana State University. In a learning environment that spans the classroom and the natural outdoor laboratory, students are challenged to design and conduct research, think critically about the interplay between science and management, work together in teams to accomplish tasks that feel sometimes insurmountable, and to provide one another critical yet constructive feedback on performance and contributions to the class. The students also integrate the knowledge

and skills learned from their earlier undergraduate experiences.

The first three weeks of the semester is a crash course in fundamentals of Stream Ecology, consisting of primary literature readings and associated discussions of

Continued on page 4



Professors **Tim McDermott** and **Seth Walk** (MBI) received a grant to study the relationship between microbe-arsenic interactions and the human gut microbiome concerning arsenic levels in drinking water.



Regents Professor and ASLO Fellow, **John Priscu**, had his work featured in *Nature Ecology and Evolution* on the extreme ice melt season in Antarctica's McMurdo Dry Valleys. Priscu also presented his research at the VPR's 994 Calling Event this Fall.



Bruce Maxwell was named the new director for Montana's Institute on Ecosystems. His work contributed

to the Montana Climate Assessment released this year to help those in Montana who will be impacted by climate change.

Sam Leuthold received an award from the Undergraduate Scholars Program.



M.S. student **Shannon Dillard** presented her research on arid-lands restoration techniques in Yellowstone at the annual Society for Ecological Restoration conference in Foz do Iguaçu, Brazil this August.

Graduate students **Florence Miller** (Advisor: **Ewing**) and **Meryl Storb** (Advisor: **Payn**) got first and second place respectively in the student oral presentations at the MT American Water Resources Association.



Adam Sigler, in partnership with MSU's Engineers without Borders program, helped to map more than 50 rural schools and their water resources in the Khwisero district of western Kenya.

Joe Lazarus received an Undergraduate Research Scholarship from the Initiative for Regulation and Applied Economic Analysis.

Laura Ippolito received an Undergraduate Research Scholarship from the Initiative for Regulation and Applied Economic Analysis.



Tony Hartshorn collects soil samples with students in Tom Miner Basin



Andrew John, LRES graduate, works with the state of Idaho to write permits and inspect wastewater reuse facilities in potato and sugar beet processors.

Rachel Ulrich, a research assistant in Scott Powell's lab, received an award from the Montana NASA EPSCoR program, to attend the annual meeting of the American Association of Geographers in New Orleans, LA, in April, 2018.



Juliana D'Andrilli received an award to present research and participate in US-China Workshop on Impacts of a Changing Cryosphere on Lakes and Streams in Mountain Regions in Qinghai Lake, Xining, China.

Guta Abeshu was awarded a scholarship to attend the WaterSmart Innovations Conference in Las Vegas, NV this October.

LRES Recognition



Jane Mangold, Stacy Davis, and Audrey Harvey floated the Smith River with MT FWP and the ASMSU Outdoor Recreation Program in May to help assess and treat weeds along this highly traveled river corridor. This was a multi-day float trip on 59 miles of the Smith River. The group stopped at several campgrounds and highly-visited areas to apply herbicides to a variety of weeds including houndstongue, leafy spurge, bull thistle, and musk thistle. They also had lots of fun admiring steep rock cliffs, watching soaring birds, eating s'mores, and visiting pictograph sites.

Jane Mangold presented "Weeds from Obnoxious to Noxious" in the MSU 10 x 10 Roadshow on October 26th.



Kelsey Simon received the Hubert J. Byrd Sr. Scholarship Award from the Soil Science Society of America.



Dayane Reis received an award from the Montana State University Foundation Endowed Fund for MS Students in

Entomology. Her poster also placed first in Natural & Social Sciences at the Graduate Research Rendezvous.

Madelyne Willis received a travel grant from MSU's Graduate School to present a poster titled "Detection of Organic Matter in Greenland Ice Cores by Deep-UV Fluorescence" at the 2017 AGU Fall Meeting in New Orleans, LA this December



Rachel Rawle in Tim McDermott's lab was awarded the Kopriva Graduate Student Fellowship.



Terry Rick received the **PURE GOLD** award this Fall. Her nomination states that "Terry is a stellar research associate because she possesses both field and lab expertise; she has soil sampling, observation and description skills; can fix lab and field equipment; can respond to medical emergencies; and has produced thousands of robust soil analyses in support of research."



Linda McDonald was recognized at MSU's Milestones in Service Awards Ceremony in October for over 35 years of dedicated and loyal service.

Badamgarav Dovchin received the Soros Foundation Civil Society Award for Ph.D. students.



M.S. student, **Rekha Bhandari** received first place in the Graduate ten-minute paper competition for the Integrated Pest Management-Crops 3 Session at the

Entomological Society of America Conference in Denver, CO.

New LRES Staff

Logan Parvinen is the Student Office Assistant for the LRES main office.



LRES graduate student, Kim Roush traveled to view the 2017 Solar Eclipse from the Path of Totality in rural Idaho

ENSC 448 Summary Continued...

foundational scientific concepts. The students then participate in the first of two weekend field trips to Spanish Creek, on Ted Turner's Flying D Ranch outside of Bozeman.

Students make observations and formulate questions about how ranch operations, especially bison grazing, may be affecting the physical and biotic characteristics of the creek. Based on the observations and questions, each student develops a research plan during the next two weeks of the course, including a hypothesis, prediction, and associated experimental design to validate or invalidate the prediction and support or reject the hypothesis. The second field trip is all about data collection – hopefully before the snow starts flying! Late October can be touch-and-go for field work... Yet the students invariably execute their research plans successfully and acquire the data necessary to challenge their own understanding of how stream ecosystems work.

As the snow begins to pile up outside, the focus turns toward data analysis. Students also read and discuss scientific papers and stream restoration manuals that highlight the ways in which research informs stream restoration, and the challenges of incorporating the best science into the on-the-ground realities of stream restoration practices and projects. As students struggle to compile and make sense of their own field data, they also struggle to identify a balance between the possibilities revealed by restoration science and the constraints imposed by the realities of budgets, technology, time, and the omnipresent challenge of seeking alignment between what humans want for natural systems and what we want for ourselves.

Lastly, students identify stream restoration case studies from the literature, identify class readings, and lead in-class discussions of real-world restoration projects. At the same time, students compile their results from the individual research projects into an on-line report and associated public presentation, complete with a set of management recommendations for Flying D Ranch operations and restoration actions on Spanish Creek. Over the years, ranch staff have attended these presentations, resulting in some lively discussions of the students' work. In the end, the class is designed to highlight and leverage the fact that senior-level undergraduates have everything they need to begin to act as producers rather than consumers of information and the confidence to do so.

Geoffrey Poole, Associate Professor

Professional Spotlight

Jane Klassen, Environmental Analytical Laboratory (EAL)



Dr. Jane Klassen has served as the Analytical Chemist in the Environmental Analytical Laboratory (EAL) since March 2013. It is testament to Dr. Klassen's skill as an analytical chemist that when she arrived, the lab contained only three actively functioning water analysis instruments, but now provides environmental analysis services, research support and student training with eight actively functioning instruments. Annually, Dr. Klassen provides research support and analytical services to 25 to 30 MSU faculty from a range of departments including LRES, Research Centers, Earth Sciences, Ecology, Engineering and Chemistry. In collaboration with lab leaders and key faculty associates, Dr. Klassen has developed accounting and data management systems for the lab that now have it fully operational. But students have been the main beneficiaries of Dr. Klassen's work, either in building

sound datasets or landing jobs based on their work with the EAL.

"My experience in the EAL really helped enhance my graduate experience at MSU," says Meryl Storb, a PhD student in Rob Payn's Watershed Hydrology lab working on stream metabolism in Big Sky. "Working with Jane provided me an incredible perspective in understanding data quality and uncertainty within my different data sets, as well as practical skills running and troubleshooting a range of analytical instruments." In 2016, nearly 30 students worked in the lab with guidance from Dr. Klassen, with two to three students undertaking work for independent study credits each term. LRES undergraduate student Sam Leuthold agrees: "Thanks to Jane, I went from a bunch of water samples I wasn't sure about to a dataset that I'm pretty proud of. As soon as the new water isotope analyzer arrived last summer, I got to help Jane get it out of the box and running." Leuthold was awarded an Institute on Ecosystems undergraduate fellowship for summer 2017 based on his results, as well as USP funding for fall 2017.

The EAL is located in room 824 of Leon Johnson Hall. For information about the lab, contact Dr. Klassen at jane.klassen@montana.edu, or 406-994-5703.

Stephanie Ewing, Associate Professor

Zabinski's Sabbatical Highlights



Being a faculty member with both teaching and research responsibilities involves some mental dexterity: research requires ever-intensive focus on the details to incrementally build an understanding of natural systems, while teaching has you stepping back to think about the big picture. Switching back and forth between the two can leave your brain feeling like the bellows of an accordion. That's why sabbatical leaves can be so restorative—a whole year to pursue your research without distraction. I spent the past year working on a new and very challenging project—thinking about how to explain the evolutionary science that underlies agriculture in a way to make it engaging to people who like food, but don't necessarily spend a lot of time thinking about how we grow the crops that get processed into our meals. Rather than writing academic, scholarly articles, I worked on a book, directed toward interested readers who don't necessarily have a science background.

Writing can be done from just about anywhere—you need either pen and paper or laptop, and a good library. With about as big of a change from Montana as possible to imagine, I spent my sabbatical year in New York City, arguably the center of science publishing. I worked on a book proposal, found an agent to represent me, and signed a book contract to write a book on how we change the plants that we use as food, focused on wheat. New York and Columbia Universities have excellent writing programs, and they both organize public seminars with writers and journalists, to talk about how to effectively communicate technical material to the general public. It's hard not to fall in love with the NY Public Library, and all the cultural opportunities that a large urban area has to offer. But there's no place like home, and I am happy to return to Montana State with a new project and a year's worth of new experiences.

Catherine Zabinski, Professor

Nielsen Graduate Research Assistantship Awardees

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.



2017 Awardee
Advisor: Brookshire

Bryce Currey is interested in understanding how variation in soil physical properties and chemistry give rise to variation in soil-vegetation feedbacks and their response to precipitation and fire. His Ph.D. will collaborate with the BLM to investigate the effects of fire on soil properties and vegetation dynamics in a largely unstudied landscape in the Missouri and Musselshell River Breaks area of central Montana.



2016 Awardee
Advisor: Ewing

Florence Miller's M.S. thesis investigates the sources of uranium contamination in drinking water on the Crow Reservation, including soil-deprived pathways from the Pryor, Little Bighorn, and Bighorn drainages.

New LRES Graduate Students

2017

Master of Science

Rekha Bhandari

M.S. ENTO

Advisors: Weaver & Sterling

Michelle Majeski

M.S. LAND

Advisor: Hartsborn

Emma Bode

M.S. LRES

Advisor: Lawrence

Kristen D'Agati

M.S. LRES

Advisors: Jones, Miller, & Zabinski

Latrice Tatsey

M.S. LRES

Advisor: Hartsborn

Briana Whitehead

M.S. LRES

Advisor: Hartsborn

Doctor of Philosophy

Abaye Abebe

Ph.D. ESEC

Advisor: Li

Guta Abeshu

Ph.D. ESEC

Advisor: Li

Elizabeth Mohr

Ph.D. ESEC

Advisor: Poole

Justin Gay

Ph.D. ESEC

Advisor: Brookshire

Carolynn Harris

Ph.D. ESEC

Advisor: Priscu

Fasil Worku

Ph.D. ESEC

Advisor: Li

Online Master of Science

Welles Bretherton

M.S. LRES Online

Olympia, WA

Kyla Gupta

M.S. LRES Online

Fairfax, VA

Eliot Jones

M.S. LRES Online

Rice, TX

Elizabeth Jones

M.S. LRES Online

Nacogdoches, TX

Charles McDowell

M.S. LRES Online

Milan, TN

Kelsey Smith

M.S. LRES Online

Bigfork, MT

Great Expeditions to Germany and Iceland

LRES faculty members **Tony Hartshorn** and **Scott Powell**, along with Honor's College faculty member **Douglas Fischer** led a group of 11 undergraduate students on a two week "Great Expeditions" trip to Germany and Iceland in May of 2017. The class spent the first week in Bonn, Germany, getting a behind-the-scenes look at the United Nations climate change talks. Students witnessed the negotiations, participated in strategy sessions and had private, one-on-one meetings with negotiators from the United States, Fiji, and other countries. Then the class flew to Iceland, where students visited the research site of Ecology faculty member Wyatt Cross, toured a large geothermal energy plant, and trekked on a rapidly receding glacier. The photograph captures the three faculty leaders at the conclusion of the trip: thoroughly exhausted, yet elated about the overall experience for our students.

From left to right: **Douglas Fischer**, **Tony Hartshorn**, & **Scott Powell** at the Reykjavik airport.

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



Alumni News: Oh, The Places You'll Go!

Los Alamos National Laboratory (LANL)



In 2004, **Jake Meadows**, a native Montanan, graduated from the Land Resources and Environmental Sciences Department at MSU with a Bachelor of Science Degree in Environmental Science with a Soil Science emphasis. Following graduation, he moved to northern New

Mexico for what was to be a one-year post baccalaureate internship at Los Alamos National Laboratory (LANL), working in the Water Quality and Hydrology Group. The internship turned into a Graduate Research Assistant position while he completed the Master of Water Resources Program at The University of New Mexico. Following completion of graduate school, Jake was converted to a technical staff member with Los Alamos National Security, LLC, who

operates LANL for the Department of Energy. Since being hired at LANL, Jake has worked across a broad spectrum of projects and programs, providing environmental compliance and permitting guidance to support national security efforts. He currently facilitates the Laboratory's Aboveground Storage Tank and Spill Prevention, Control, and Countermeasure Program to ensure suitability of service, safety for workers, and compliance with federal and state environmental compliance programs. He also supports the Laboratory's Government Affairs and Protocols Office in working with pueblos in northern New Mexico on technical environmental topics. Working at LANL has provided Jake an opportunity to give back to his country by supporting the mission of the Laboratory through ensuring compliance with environmental regulatory requirements.

Tim McDermott, Professor

Returning Buffalo to Wyoming's Wind River Reservation

A Montana State University graduate's successful efforts to bring buffalo back to Wyoming's Wind River Indian Reservation has earned him a place in the national news, including the cover of a national research magazine.

Jason Baldes, the buffalo representative for the Eastern Shoshone Tribe, received both his bachelor's and master's degrees in Land Resources and Environmental Sciences from MSU.

Baldes said his work at MSU under mentor **Cliff Montagne**, professor emeritus in the Department of Land Resources and Environmental Sciences in the College of Agriculture, helped equip him for his responsibilities. He emphasized that the successful return of the buffalo has been a collaborative effort.



"We came, we saw, we were moved."
-Linda McDonald, Academic Programs Coordinator

Among those involved was Tom Dougherty, adviser to the president of the National Wildlife Federation, [and U.S. Fish and Wildlife Service].

In recent news, a second small herd of 10 buffalo (he prefers "buffalo" to the scientific term "bison") [were] delivered last weekend to Fort Washakie, Wyoming,

from the National Bison Range in Moiese, Montana. The Montana buffalo join a small herd sent last fall from the Neal Smith National Wildlife Refuge in Iowa. One of the 10 buffalo sent last year calved this spring, so there are now 21 genetically pure wild buffalo in a 300-acre pasture near the Pilot Butte Reservoir in the center of the Wind River Indian Reservation[...] following a 131-year absence.

LRES Department Head, Tracy Sterling, with Academic Programs Coordinator, Linda McDonald traveled down for the big event.

After more than 15 years of work by Baldes and more than 40 years of effort by his father, Richard Baldes, the younger Baldes calls the return of the buffalo "a blessing"

Adapted from:

<http://www.montana.edu/news/17236>



Alumni News: Oh, The Places You'll Go!

The Adventures of Mochi the Dog



A Montana State University graduate who owns a dog with the world's longest tongue is hoping her St. Bernard will help more children become excited about science. Passionate about science as well as rescue dogs, **Carla Rickert** of Bozeman recently incorporated both in her new book, "The Adventures of Mochi the Dog."

It's the first in a series of scientific books that target children between ages 2 and 8. The initial book -- a combination of fact and fiction -- features the 145-pound dog that Rickert rescued about seven years ago. It tells how Mochi was shunned and teased for being different, but eventually found a loving home where her uniqueness was appreciated.

This first book hints at science, but focuses more on compassion, respect and resiliency. Those are qualities that will help children value themselves, others and eventually the environment, Rickert said. Each upcoming book will address a topic in environmental sciences, such as bugs or water quality. Like her first book, the books will draw upon what she learned as a master's student in MSU's Department of Land Resources and Environmental Sciences in the College of Agriculture.

"We are very excited about this book series and its potential to excite kids about science," said **Tracy Sterling**, professor and head of the LRES department. "It's well established that the innate curiosity of children draws them into science inquiry every day as they explore their surroundings, and Carla's book series about Mochi's adventures will be an excellent way to get them even more excited about learning how our world works and their participation in it."

Adapted from:

<http://www.montana.edu/news/17300/msu-alumna-uses-her-unusual-dog-as-star-of-book-series-to-inspire-young-scientists>

BLM Scientist assessing habitats

Dr. Tanya Skurski (PhD, Ecology and Environmental Science, 2012) works as a Geospatial Ecologist for the Bureau of Land Management (BLM) at the Montana/Dakotas (MTDK) State Office in Billings, Montana. This is one of the new positions created by the BLM in 2016 as part of implementation of the Greater Sage-Grouse (GRSG) Conservation Strategy. In September 2015, the BLM and U.S. Forest Service completed amendments and revisions to 98 separate federal land use plans that address sage-grouse habitat loss, fragmentation, and other threats to the species. Commitments under the GRSG Plans include standardized, consistent monitoring and data collection using statistically valid sample designs, increased use of scientific research and quantitative data to inform management decisions, and assessment of habitat and resource condition and trend at multiple spatial scales. Tanya's primary duty as a Geospatial Ecologist is conducting these multi-scale habitat assessments. This work entails researching and gathering appropriate geospatial and remotely sensed data sets and conducting GIS analyses for threats assessment, prioritization of oil and gas lease parcels based on multiple factors related to GRSG habitat quality, such as distance to and density of anthropogenic disturbance and likelihood of future development, and prioritization of areas for conservation and/or restoration with respect to GRSG. Primary threats to GRSG in the Rocky Mountain region are fossil fuel and renewable energy development, infrastructure such as roads and power lines, mining, improper grazing, the conversion of sagebrush to croplands, and urban and ex-urban development, all of which are considered in the multi-scale assessments. Prior to the Geospatial Ecologist position, Tanya was the BLM State Botanist in Wyoming based in Cheyenne. She started her BLM career as a Term Botanist at the BLM Lander Field Office where she conducted fieldwork in some of the most extensive intact sagebrush-steppe remaining in the West. The PhD from LRES and a subsequent post-doc position at the University of Nevada, Reno/Rocky Mountain Research Station were crucial to entering the BLM workforce as permanent natural resource management positions have become increasingly scarce and competitive.



LRES alum Tanya Skurski does fieldwork in Sweetwater Canyon outside of Lander, WY.

Mongolian Educators visit Bozeman

From September 18-23, a group of seven educators from the Songino-Khairkhan district in Ulaanbaatar visited Bozeman area schools to learn about education techniques and practices in the United States. Their visit was facilitated by Mary Hubbard, MSU Earth Sciences Department Head and Cliff Montagne, MSU Land Resources and Environmental Sciences and BioRegions International. Participants included a kindergarten supervisor, senior administrator, grades 1-5 elementary teacher, school social worker, teacher trainer, and two teachers of physical education. Two translators accompanied the group. Some of the tours and activities included:

- At Montana Outdoor Science School, the group fed trout; held live snakes, millipedes and centipedes; and gawked at giant cockroaches. Education Director Liz Green and Lead Instructor Corie Rice explained the concepts of outdoor 'learning by doing' and Executive Director Hans Figi shared how non-profit organizations depend on fundraising. (Top photo)

- At Gallatin College, General Education Director Janet Heiss showed-off their new facilities at the East Campus. Instructors in metal machining, computer networking, computer literacy, and doctors' assistant training showed the group rooms full of appropriate equipment and supplies for hands-on learning. (Second photo)

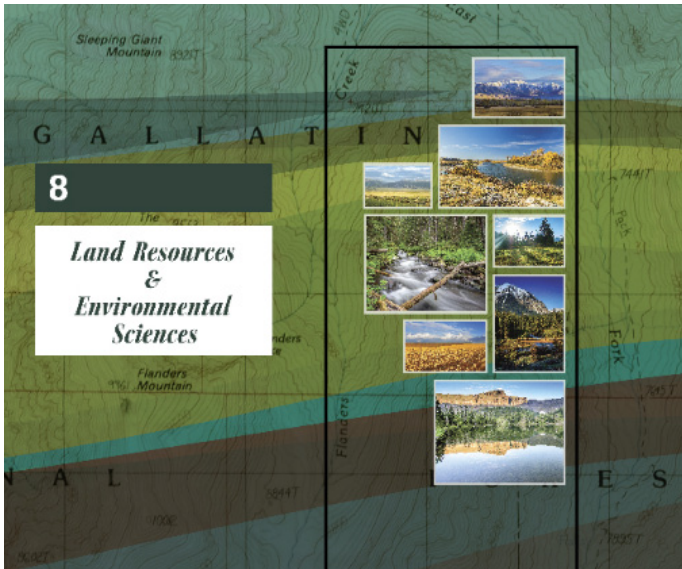
- At the MSU Department of Education Rose Vallor and her Science Methods K-8 students engaged the group in sharing common concerns of professional teachers before participating in a 'science of sound' investigation designed to meet a next Generation Science Standard objective. (Third photo)

- At the MSU Miller Livestock Pavilion, equine science professor Dr. Shannon Moreaux showed the group the farrier school, gave a facility tour by team and wagon, and then invited the group to watch the Colt Starting Class. Members who wanted to got a chance to ride a western saddle on a big horse. (Bottom photos)

Cliff Montagne, Professor Emeritus

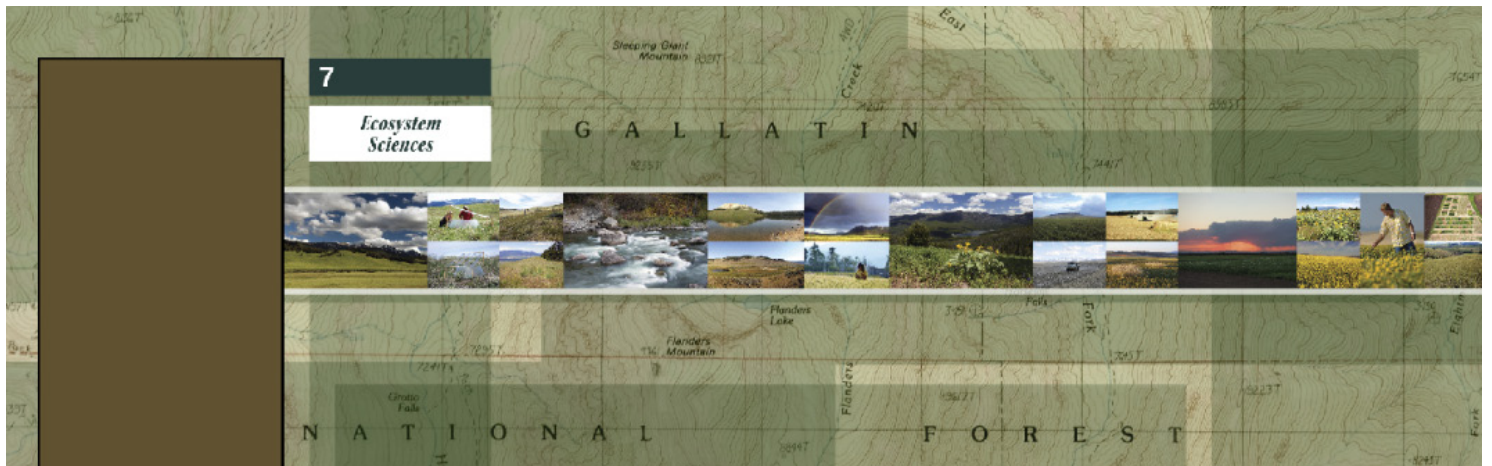


That's a Wrap!



For quite some time, Leon Johnson Hall visitors to the 7th & 8th floor were greeted with elevator doors opening to a wall that gave no insight of the type of work that goes on here. We decided something was needed to better welcome occupants and visitors alike, so we invited recent MSU Graphic Design Alum, Scott Sharp (Get Sharp Designs, Inc.), to help us. Scott created the wrap designs for the 7th and 8th floor. Lisa helped coordinate photos that several faculty and staff donated- particular thanks go to Drs. Bob Peterson and Rick Engel- and took the lead to find appropriate topo maps. Tracy handled feedback and ensured the displays represent our research and education activities. Wraps were printed and installed by SCS Wraps from Bozeman. Merry Pacey and Stephanie Ewing are working with Facilities to update the soil monolith boxes so they have clear cases, and to add highlight lighting to accent monolith features on either side of the wrap when remounted. We hope this new look helps better represent the work we do in LRES.

Lisa Rew, Associate Professor & Tracy Sterling, Professor & Department Head



LRES Fall 17 Capstone Presentation



Photo by John McColeen, Bureau of Land Management Alaska Fire Service

LRES SENIOR CAPSTONE PRESENTATION

NOVEMBER 15TH, 2017
ENVIRONMENTAL REGULATIONS: CAN'T LIVE WITH THEM, CAN'T LIVE WITHOUT THEM

Senior Capstone Presentation
 The Land Resources and Environmental Science Senior Capstone Class will be giving their final presentation at 7pm at the public library.

LRES Senior Capstone Presentation!

Learn about natural resource use and Environmental Regulations

7pm at the public library

LRES SENIOR CAPSTONE CLASS

Public Library Large Meeting Room
 November 16th, 2017
 7pm



Research & Outreach in Photos



LRES Environmental Science Senior, **Braden Leach** (far left), visited DC for Congressional Education Day with the Montana delegation. Braden will be attending law school after graduating from the department this Fall. Advisor: Clain Jones



Lisa Rew and **Tim Seipel** attended the 8th MIREN Meeting with the Mountain Invasion Research Network in Centennial Valley, MT from July 31st- August 3rd.

#WILDCLAY

In partnership with the College of Arts and Architecture, students in Soils (ENSC 245), got a taste of studio ceramics this semester. Soils TA **Shannon Dillard** led students on a field trip to Bear Canyon to harvest a well-known source of clay-rich soil. The raw soil was then slaked (saturated with water), blunged (homogenized with a paint mixer), and screened (sieved) by a team of hardworking Soils and Ceramics students and faculty members. Finally, the slurry was poured in plaster bats to dry, forming a workable clay body. Volunteers from the Ceramics program, led by adjunct professor Matt Levy, gave hand-building demonstrations and ceramics advice to Soils students, which led to an interesting mix of conversations about art concepts such as foundations and design and soils concepts like water holding capacity and pore space. Student work was kiln-fired and is now on display in the Soils Lab on the second floor of Leon Johnson Hall. Scroll through #wildclay, #MSUceramics, #soilculture to find photos of the entire clay processing and sculpture process on social media. Thank you to Dr. **Tony Hartshorn**, Josh Dewese and Matt Levy for facilitating this STEAM collaboration, to countless passionate Soils students for their clay-making, and to Ceramics volunteers Ben Blackwood, Ashleah Elias and Vince Rozzi for sharing their expertise and enthusiasm!



Shannon Dillard, LRES MS student

Call for abstracts coming for the Spring LRES Research Colloquium

The 8th Annual LRES Research Colloquium will be held in the Strand Union Ballrooms C & D on **April 11, 2018** (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. Come and share what you have been working so hard on!

Other highlights of the Colloquium include a keynote speaker, door prizes, and prizes 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**:

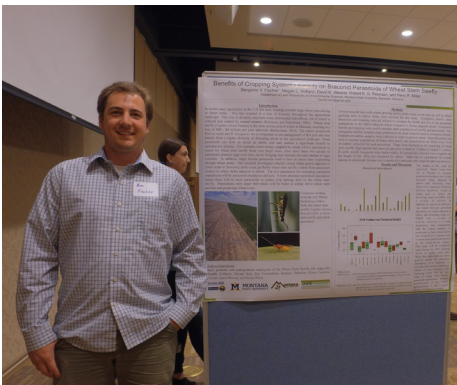
Co-Chairs: Keenan Brame & Madi Willis

Mentoring Committee: Buddhi Achhami

Curriculum Committee: Mallory Morgan

Social Committee: Kim Roush

Online Student Rep: Chris Caron



Ben Fischer presents his research at the Spring 2017 Research Colloquium

LRES Undergrad Club Participates in Nano Days



Elementary students gathered around the Ant Network table with Miles Maxcer.



The bioluminescence table featured (from left to right) Natalie Sturm, Elizabeth Rieger, Abby Northrup.

The LRES Undergraduate Club aims to provide students with the opportunity to participate in departmental research, meet fellow LRES students and faculty, and volunteer in the surrounding community.

Emma Lathrop, LRES Undergrad Club President

Mallory Morgan: Graduate Student Organization Curriculum Committee Chair



As the LRES GSO's Curriculum Committee Liaison, I am interested in supporting and engaging undergraduate and graduate students in computer programming. Environmental scientists and ecologists can benefit greatly by integrating a myriad of computing applications in data analysis, especially by using languages that can easily process 4-D data, like Python, and those with exceptional statistical power, like R. My vision is to expand undergraduate and graduate student fluency in these programming languages through upcoming workshops that both introduce programming for newcomers and develop current skill sets for veterans in a collaborative environment. Stay tuned as we organize these events!

LRES Degrees Awarded Fall 2017

Bachelor of Science

Environmental Biology

Melissa Marlen, with Honors

Environmental Sciences

Haley Gonsalves

Braden Leach, with Highest Honors

Emily Lindner, with Honors

Geospatial & Environmental Analysis

Austin Wrem

Land Rehabilitation

Faith Doty, with Highest Honors

Paul Hegedus, with Honors

Jacob Hoffman, with Honors

Paul Rychener

Kelsey Simon, with Honors

Soil & Water Science

Samuel Leuthold, with Honors

Sustainable Foods & Bioenergy Systems-Agroecology

Genna Shaia, with Honors

Sarah Spear, with Honors

Master of Science

Land Rehabilitation

Emily Pierson Metier

Dorjderem Sukhragchaa

Land Resources & Environmental Sciences

Sarah Fogg

Samuel Tittle

Robert Walker

Entomology

Alyssa Piccolomini

Online Master of Science

Land Resources & Environmental Sciences

James Dauray

Joshua Hall

Allison Molnar

Doctor of Philosophy

Ecology & Environmental Sciences

Collin Prefrakes



Lora Soderquist (2nd from right) posing with, from left to right, co-advisors Tracy & Cliff, & Linda during Spring '17 graduation.



LRES Faculty/ Staff & Student Social

Martin Luther King Day

January 15, 2018

Stay tuned for details...



New LRES Grants Awarded from Dec. 2016 - Nov. 2017

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.

Montana Grants

Montana Fertilizer Tax Fund

| | |
|---|---|
| Engel & Jones | Understanding acidification and management of Montana soils |
| Ewing & Miller | Soil carbon accrual in progressive Montana crop rotations- Baseline soil carbon analysis Research Analytical Chemist, Environmental Analytical Laboratory |
| Ewing, Brookshire, Klassen & Jones | |
| Ewing, Brookshire, Engel, Klassen, & McDermott | Purchase of an inductively coupled Plasma optical emission spectrometer for analysis of cereal micronutrients, environmental waters, and soil chemistry |
| Jones, Ewing, Miller, & Sigler Maxwell | Fallow replacement and nitrogen rate effects on nitrate leaching, yield, and quality On-farm experiments to optimizing site-specific application of nitrogen fertilizer rates to maximize producer profits |
| Miller, Jones, & Zabinski Miller, Jones, & Ewing | Advancing cover crop knowledge in Montana: Soil fertility implications Long-term N management in alternative crop rotations |

Montana Noxious Weed Trust Fund

| | |
|--|--|
| Littlefield | Biological control of invasive mustards |
| Littlefield | Host screening of new biocontrol agents for common tansy and oxeye daisy |
| Littlefield | Host testing of gall wasp for the biocontrol of invasive hawkweeds |
| Littlefield | Russian knapweed biological control |
| Mangold & Frame-Martin | Montana Noxious Weed Education Campaign |
| Mangold & Miller | Effect of perennial grass seeding date on revegetation outcomes in weed-infested range and pasture |
| Mangold, Fuller, & Rew Weaver | Impacts of invasive annual grasses on forage, biodiversity, and litter decomposition rates Stemming the yellow tide: Integrated toadflax management |
| Weaver | Continuing development of candidate agents for biological control of Russian olive |

Montana Wheat & Barley Committee

| | |
|------------------------------------|---|
| Menalled | Non-herbicide techniques for controlling multiple herbicide-resistant (MHR) wild oats |
| Miller | Soil Carbon Accumulation in progressive montana crop rotations |
| Powell, Maxwell, & Stoy | Frequent, high resolution observations of crop development to improve predictions of wheat yield and protein content |
| Stoy & Gerken | The Dakotas are cooling during summer, but Montana is not: Combining measurements and models to better-understand summer climate in Montana's wheat growing regions |
| Trowbridge | Keeping it on the down low: Can mycorrhizal associations help prepare neighbors for attack via underground signals? |
| Weaver | IPM of wheat stem sawfly |

Federal Grants

National Institutes of Health (NIH)

McDermott Mechanisms of arsenic detoxification by the human microbiome

National Science Foundation (NSF)

D'Andrilli & Payn LTREB collaborative research: River ecosystem responses to floodplain restoration
Inskeep **Woods Hole Oceanographic Institution:** Collaborative Research: The Response of Continental Hydrothermal Systems to Tectonic, Magmatic, and Climatic Forcing
McDermott Microbial dark matter: Forging new discoveries in metabolism
Stoy & Kleindl The future of US forest function under changing climate, disturbance and forest management

US Agricultural Research Service (ARS)

Reinhold Developing a database to determine the influence of microtopography on Russian Olive invasion

USDA (USDA)

Mangold & Boss Renovating exotic cool season grass plantings to functional CRP
Mangold Montana State University's Extension implementation plan for integrated pest management

USDA Animal And Plant Health Inspection Service (APHIS)

Littlefield Biological control of whitetop using *Aceria drabae*
Littlefield Redistribution of Biological Control Agents for Russian Knapweed

USDA National Institute of Food and Agriculture (NIFA)

Grimberg, Mangold, Rew, & Sterling Empowering women in agriculture
Peterson, Seipel, & Weaver AWaRe: A Decision tool for assessment of wheat streak mosaic risk

Private, University, Regional and Other State Grants

Confederated Tribes of the Umatilla Indian Reservation

Poole Relative influences of hypoxic exchange and shade on stream temperature

Koch Agronomic Services LLC

Engel Evaluation of Koch Agronomic Services ("KSA") experimental urease inhibitor KAS_060K001 (K32) for control of NH₃ volatilization from urea fertilizers over a soil pH gradient

Montana Department of Environmental Quality

Sigler Volunteer water quality monitoring support 2017-2018

University of Alaska-Fairbanks

Hartshorn Determination of Soil Organic Carbon and Soil Chloride Concentration

University of Colorado- Denver

Priscu Ecosystem response to amplified landscape connectivity in the McMurdo Dry Valleys, Antarctica

University of Southern California

Dore & Boyd Microbial anabolism in seafloor sediments of the North Atlantic subtropical gyre: Carbon vs. phosphorus limitation

USA DRY Pea and Lentil Council

E.Davis & Menalled 2017 Weed Control Research in Dry Pea and Lentil

Utah State University

Engel, Jones, & Powell Soil acidity management of long-term no-till fields in Montana to prevent crop failure
Miller The impact of integrating livestock into cropping systems on soil health and crop production

LRES 2017-2018 Scholarship Recipients

**Aasheim Family
Leadership Scholarship**
Mathew Bain

**Angus & Annie McMillan
Family Scholarship**
Anna Werkhausen

**Anthony C. Gaffke
Scholarship**
Faith Doty

**Arthur H. & Margaret
C. Post Scholarship**
Braden Leach

**August and Mary
Sobotka Memorial
Agriculture Scholarship**
Megan Deming

**Battle Ridge Ranch
Scholarship**
Shannon Dillard

**Bill & Anita Jones
Agricultural Scholarship**
Mathew Bain
Emma Lathrop

**BMCF Agricultural
Scholarship**
Noelani Boise
Faith Doty
James Fauth
Jeana Ratcliff

**Charlie & Wietske
Jarrett Scholarship**
Vanessa Orcutt

**Charlotte Rose Hughes
Memorial Scholarship**
Uriel Menalled
Seth Page

**CHS Foundation
Scholarship**
Todd Schlotfeldt
Sarah Spear

**Cliff Montagne
LRES Scholarship**
Katya Koepsel

**Clyde & Helen Erskine
Fund for Excellence
in Agriculture**
Emma Lathrop

College of Ag Scholarship
Miles Maxcer

**College of Ag Student
Assistance Grant**
Kelsey Simon

**Earl & Pauline Webb
Memorial Scholarship**
Bryce Murph

**Farmers Business
Network Scholarship**
Anna Werkhausen

**John S. McFarlane
Scholarship**
Uriel Menalled

Koebel Family Scholarship
Elena Marburger

**Land Resources
Stewardship Scholarship**
Jeremy Ditto
James Fauth
Bryce Murphy
Chance Noffsinger
Vanessa Orcutt
Sarah Spear
Melissa Wysocki

**Logan & Emily
Standley Scholarship**
Jeremy Ditto

**Marion T. Hedegaard
Scholarship**
Megan Deming

**Nielsen Graduate
Research Scholarship**
Bryce Currey

**Newman/Abbot Nutrition
Undergraduate Scholarship**
Jessica Hays

**Newman Family &
Friends Scholarship**
Subodh Adhikari

**Ralph B. Millice
Memorial Scholarship**
Nicholas Bragg
Shannon Dillard
Faith Doty
James Fauth
Chance Noffsinger
Seth Page
Raeleigh Price
Sarah Spear

**Ted & Thelma Fosse
Scholarship**
Braden Leach

**Wagner Heritage
Scholarship**
James Fauth

**Woodrow W. Overcast
Agriculture Scholarship**
Abigail Northrup



Department of
Land Resources & Environmental Sciences

Opportunities to Support LRES

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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).