MONTANA

NSF EPSCoR

Summer 2023 Newsletter

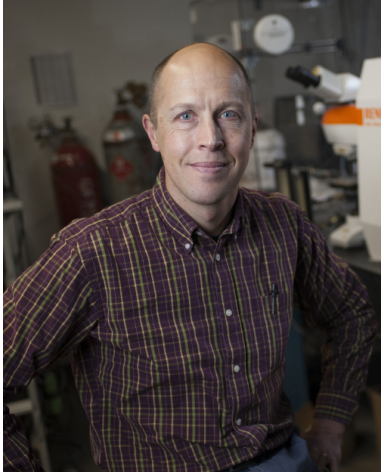
The Summer 2023 Montana NSF EPSCoR newsletter is now available! Read about CREWS news and announcements, discover art pieces created from CREWS research, learn about education and outreach activities CREWS staff have recently facilitated, and more. You can find this newsletter and all other past Montana NSF EPSCoR newsletters online at https://www.mtnsfepscor.org/resources/newsletters.

CREWS News

University of Montana Study Finds Deep Connections in Anaconda to Town's Smelter Stack

A recent story from the University of Montana's News Service highlights the research of CREWS graduate student Megan Moore. Moore, who defended her dissertation in early May, is a member of the CREWS Natural Resource Social Science team and works with Dr. Libby Metcalf. Moore's initial research focused on gathering community input in Anaconda, MT about the ongoing Superfund cleanup on the Clark Fork River. However, Moore's research shifted to focus on the community's relationship with the Anaconda Smelter Stack. As she states in the news story, “I set out to learn more about the community’s collective memories, what gives them pride, what brings nostalgia and what do they hope for the future. And the stack just emerged from these interviews as the thing that everyone wanted to talk about. I spent more time talking about the stack than about Superfund.” READ MORE

Dr. Rob Walker Named Board President of Telluride Science



Dr. Rob Walker, co-PI on the Montana NSF EPSCoR CREWS project and PI of the next Track-1 project, SMART FireS, was named Board President of Telluride Science in January 2023. Telluride Science was founded in 1984 as an interdisciplinary think tank for science and engineering challenges. Currently, the Center enables leading scientists from around the world to convene workshops and summer schools in Telluride. Dr. Walker first joined the board in 2019 and shares, "I am a much better and more broadly knowledgeable scientist because of Telluride Science... I look forward to Telluride meetings immensely because they remind me that I am, at heart, a scientist, and science is fun." READ MORE

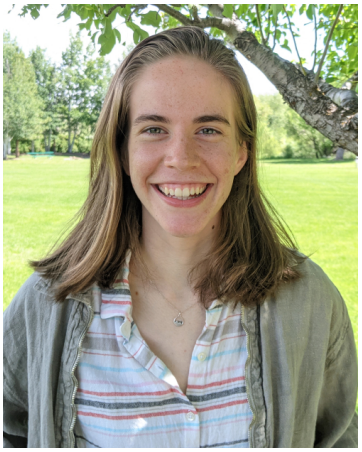
CREWS Undergraduate Student Madison Torrey Receives Prestigious Goldwater Scholarship

Madison Torrey, a junior at Montana State University (MSU) majoring in environmental engineering and CREWS undergraduate student, is one of MSU's two newest winners of the scholarship given by the Barry Goldwater Scholarship and Excellence in Education Foundation. Torrey works in CREWS researcher Dr. Joseph Shaw's Optical Remote Sensor Laboratory (ORSL) at MSU, where her work involves drone-based remote sensing via hyperspectral imaging to estimate pigments in river algae, which is indicative of stream health. Torrey plans to earn a doctorate in environmental engineering with a focus on optics, then teach at the university level, study the natural environment and devise environmental remediation strategies. READ MORE

New Publication from Natural Resource Social Science Team Focuses on Community Resilience and Drinking Water Governance

The CREWS Natural Resource Social Science (NRSS) team in the Judith River Watershed recently published a new article in the journal *Society and Natural Resources*. The article, titled "Public water systems governance in rural Montana, USA: A 'slow drip' on community resilience," uses a community resilience framework to analyze drinking water governance processes in small towns found in the Judith. The paper's authors, which include Grete Gansauer, Julia Haggerty, and Jennifer Dunn, find that the regulatory process drains community social, economic, and environmental capacities, ultimately constraining these small communities from adapting to water quality challenges. READ THE ARTICLE

Undergraduate Student Emory Hoelscher-Hull Receives Award in National Student Research Competition



Undergraduate student Emory Hoelscher-Hull was awarded second place in the National Environmental Health Association's nationwide Student Research Competition for her research assessing the cumulative health risks from home well water quality in Gallatin and Madison counties. As part of the award, Hoelscher-Hull received a scholarship. Hoelscher-Hull also presented her research in the Association of Environmental Health Academic Program's 2023 Student Symposium in April. Hoelscher-Hull graduated this spring from the Environmental Health Program in the Microbiology and Cell Biology Department at Montana State University.

Montana NSF EPSCoR supports first Clark Fork Science Forum

On April 20 and 21st of 2023, the first Clark Fork Science Forum was held at the Holiday Inn Downtown Missoula. Continuing the tradition of a recurrent meeting to address the status of the Clark Fork River and its floodplain, the meeting was a research-focused forum intended to foster the exchange of data, ideas, and interpretations. The Clark Fork Science Forum was a joint effort among the Montana University System, CREWS (Montana's EPSCoR-funded Consortium for Research on Environmental Water Systems), the Montana Natural Resource Damage Program, and the United States Geological Survey. Researchers both presenting and in attendance represented multiple CREWS-funded state universities, as well as state and federal agencies, nonprofit organizations, and industry organizations. The forum was possible due to the groundwork efforts of the Upper Clark Fork Working Group (UCFWG). READ MORE

CREWS Undergraduate Student Shannon Hamp Awarded NSF Graduate Research Fellowship

Montana State University (MSU) and CREWS undergraduate student Shannon Hamp was recently awarded a National Science Foundation (NSF) Graduate Research Fellowship. This award will support Hamp, who graduated this spring, with her ongoing research at MSU focused on harnessing optical technology for monitoring water quality and other environmental applications. Hamp has worked for four years in Dr. Joseph Shaw's Optical Remote Sensor Laboratory (ORSL) and will use the funding from the fellowship to continue her research with Shaw while pursuing a graduate degree in optics and photonics.
READ MORE

Undergraduate Student Sarah Warnke Presents at National Water Quality Monitoring Conference

Undergraduate student Sarah Warnke was accepted to the 13th National Water Quality Monitoring Conference that took place in April in Virginia Beach, VA. At the conference, Warnke presented her research "Cumulative Health Risk Assessment of Drinking Water Contaminants in Cascade and Lewis and Clark Counties, MT". Warnke recently graduated this spring from the Environmental Health Program in the Department of Microbiology and Cell Biology at Montana State University.

Dr. Jerry Downey Receives Montana Tech Lifetime Distinguished Researcher Award

Dr. Jerry Downey was recently named the recipient of the 2023 Montana Tech Lifetime Distinguished Researcher Award. Downey is the Goldcorp Professor of Extractive Metallurgy at Montana Tech (MTU) and a co-PI on the Montana NSF EPSCoR CREWS project. The Lifetime Distinguished Researcher Award, which faculty are nominated for, is a special, one-time annual award that recognizes the sustained, long-term career accomplishments of senior faculty and researchers at MTU. Recipients of the award also receive a one-time cash honorarium. Congratulations to Dr. Downey on this well-deserved honor! READ MORE

Crow Water Quality Project Selected by Urban Institute as One of Fifteen National Case Studies

The Crow Water Quality Project, led by CREWS researchers John Doyle (Little Big Horn College), Mari Eggers (MSU), and colleagues, was selected by the Urban Institute as one of 15 U.S. case studies for their Advancing Contextual Analysis and Methods of Participant Engagement in OPRE (CAMPE) project. This project is a national review of participatory methodology being conducted for the Office of Planning, Research and Evaluation (OPRE) in the Administration for Children and Families. The project aims to advance knowledge of and capacity to employ innovative research and evaluation methods related to equity in projects overseen by OPRE. READ MORE

Dr. Aaron Thomas Featured in Most Recent UM Vision Magazine

The most recent edition of the University of Montana's (UM) Vision magazine features a story on Dr. Aaron Thomas, Diversity and Inclusion lead on the current RII Track-1 CREWS project. Vision is published annually by the UM Office of the Vice President for Research and Creative Scholarship and includes stories on UM research, innovation, and imagination. The magazine article, titled "UM's Native STEM Advantage," focuses on Thomas and others' work to support Indigenous students in STEM research at UM. READ MORE

Project Highlights

Women in STEM: Caitlin Mayernik

Meet Caitlin Mayernik, a Ph.D. student at Montana State University and a member of the EPSCoR Track 1 CREWS research team. In this interview, Caitlin shared information about her work, studies and career pathway with the Montana Girls STEM Collaborative, an outreach program of Montana NSF EPSCoR. A portion of her interview is included below.

Who were some of the role models, mentors or other adults who influenced you as a young person?
My parents and family always encouraged me to try new things and supported me through school, sports, and things I wanted to do that might have been unfamiliar to them.

My high school calculus and biology teachers and volleyball coach took time to get to know me as a person and talk to me as a person. The patience and encouragement they showed me was incredible.

My undergraduate major advisor and honors college advisor always made time for me, listened to issues I was facing, pointed out what I could work on improving, and generally provided me with incredible mentorship.

What advice would you give to a Montana young person who is interested in a career like yours?
Remember that science is not linear (it is very sinuous, like a river) and it is not isolated from other disciplines, so we, as scientists, need to be flexible in changing course and learning from others along the way. My lifelong interest in other people's stories allows me to learn a lot about human perceptions of the environment, why we do some of the things we do, and how to make science relevant to folks of different backgrounds. Learning the history of a place through others experiences helps me think through the cause and effect of the chemical signals I'm seeing in my water samples – it gives me a more holistic view of what's going on in these environmental systems and why.

Ask questions! And ask more questions. Learn to admit that you don't know something, it is truly how we learn.

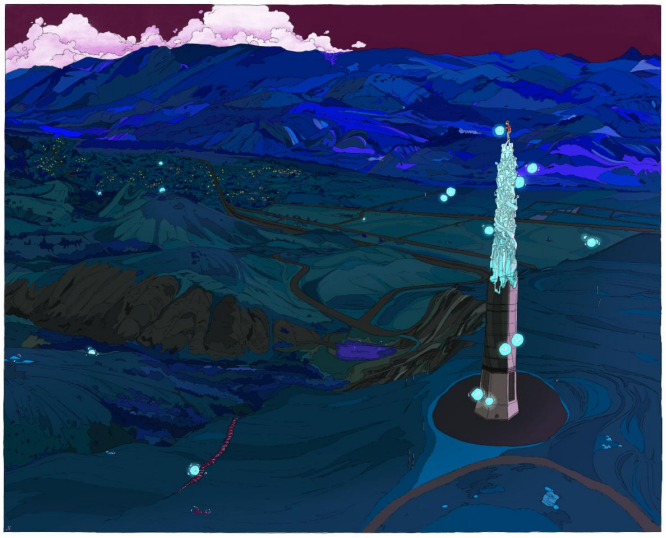
Be confident in your resilience. We all have the ability to change course and overcome obstacles, despite how scary and challenging the unfamiliar may seem.

READ THE FULL INTERVIEW

Anaconda Art + Science Project

In Spring 2023, students at Montana State University (MSU) were given the opportunity to create art pieces that portrayed CREWS research. The idea to bring art and science together came from recently graduated University of Montana Ph.D. student Megan Moore, a member of the CREWS Natural Resource Social Science team. Moore wanted to communicate her results through storytelling and creative representations which offer a novel way to engage with community members. Three MSU students applied and submitted art pieces in May as part of the project, including Rachel Ingle, a Masters of Fine Arts graduate student, Aria Dang, a Biochemistry graduate student, and Athena Garron, a student in the Studio Arts program.

Rachel Ingle used a copper printmaking medium to create a series of images representing Lost Creek, a tributary of the Upper Clark Fork River. Rachel traveled to Anaconda and Lost Creek to collect natural materials like pine needles, moss, and other vegetation that she then incorporated into the print. The print also includes a small image of the Anaconda smokestack juxtaposed against the natural elements of the area. As Rachel shared about her piece “The materials gathered at Lost Creek represent the motivating factor for clean up, seeing a change in the environment, in one’s own backyard. The small image of the Stack represents Anaconda’s history, still present, but diminished when considering the natural beauty returning to Anaconda.”

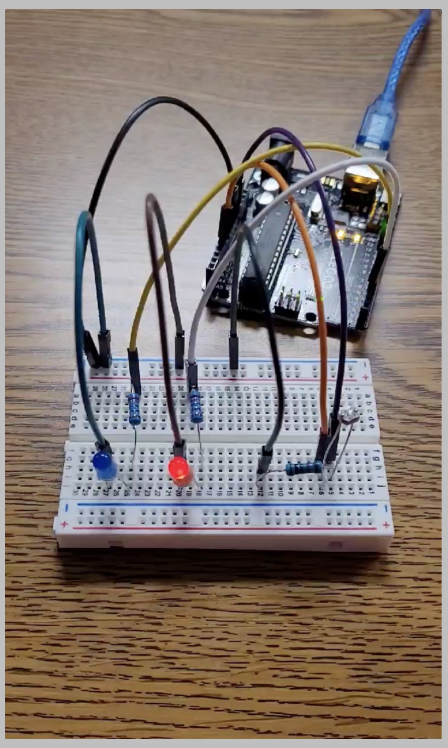


Aria Dang used a digital medium to create her art piece, titled "*Survey*." As Dang shares, the piece "is a fantastical representation of the Anaconda smokestack" and combines the themes from Moore's research, including "community identity", "resilience", "perception", and "uncanny", with "the literary style of magical realism [that] predominated Latin American and 20th-century literature." Dang further shares that the smokestack "morphs into a community of ghostly figures upholding one another and, at the very top, a child, who is surveying the town. Tying back to the interview themes are the butterflies drifting around the smokestack/ghosts and into the surrounding landscape, symbolizing hope and change for the area. Further emphasizing 'new beginnings' is the lighting from the east—an impression of a rising sun."

Finally, student artist Athena Garron created a series of sculptures to interpret and represent Moore's research, drawing on natural and manmade symbols and elements of the past and the future. In one piece, titled "*Oxidation*," Garron shares "Metal grows so slowly within the earth, spreading through the soil like roots and veins. It blooms when exposed to air, colors and form springing forth."

LEARN MORE ABOUT THE ARTISTS AND PIECES

Education and Outreach



Sensing for Science Program Teaches Educators How to Code and Collect Water Quality Data

The Sensing for Science Professional Development Program for Teachers is a free, self-paced, modular online course that teaches educators how to use an Arduino microcontroller to create an electrical device that collects data on water quality. One of the original participants of the program was Madison McCallum, a middle school math and science teacher at LaMotte School outside of Bozeman. McCallum was drawn to participate in the Sensing for Science course because she liked the hands-on experience offered at the STEM Summer Institute. At first, she thought that Arduino coding and sensor would be too difficult to figure out, but the hands-on experience showed her just how interesting and applicable these tools can be. Although McCallum had very little exposure to coding as a whole, she said that it was fantastic to be able to follow along with the videos and see how approachable coding can be. “My school begins teaching coding to students as young as second grade,” McCallum explains. “It is amazing to have a new application for my middle schoolers that builds on their past information.” READ MORE

Four New Citizen Science Kits Available to Checkout at MSU Library

The MSU Science Math Resource Center is partnering with the MSU Library to provide four citizen science kits that all MSU Library users, including community borrowers, may use for free. A citizen science kit holds everything needed to gather data for a specific citizen science project. Each kit was field-tested by librarians and patrons and includes a printed activity guide, helpful tips, and any specialized tools or materials needed to complete the project, as well as information about student researchers in Montana. The kits are all linked to national citizen science projects and focus on light pollution, pollinators, biodiversity and water. Citizen scientists help scientists with their research by making observations, collecting data or documenting changes in nature. Anyone, regardless of their age, education or profession, can be a citizen scientist. The kits are part of the outreach efforts of the National Science Foundation's EPSCoR program. READ MORE

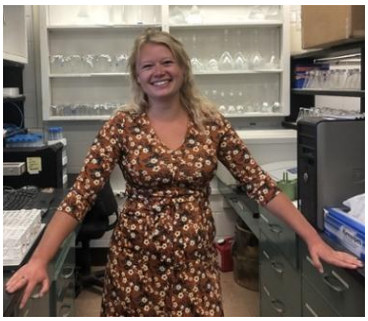
New Coloring Sheets Highlight CREWS Research Sites

Coloring sheets for each of the three CREWS research sites - the Judith River Watershed, Upper Clark Fork River, and Powder River Basin - are now available to download for free. The coloring sheets feature black and white illustrations depicting the unique CREWS research and work that occurs at each site. The backside of each coloring sheet also features more information about the watershed, the kinds of CREWS research and work occurring there, and the CREWS project as a whole. Visit the CREWS coloring sheet webpage to download individual PDFs. READ MORE

Shoutouts and Announcements

Congratulations to the following students who defended and graduated this spring!

Megan Moore, Ph.D.



Claire Utzman, M.S.
University of Montana

Galip Yiyen, Ph.D.

University of Montana
Advisor: Dr. Libby Metcalf

Dissertation Title:
"Collective Memory in a Post-Industrial Town: A Mixed-Methods Approach for Understanding Community Resilience and Transitions"

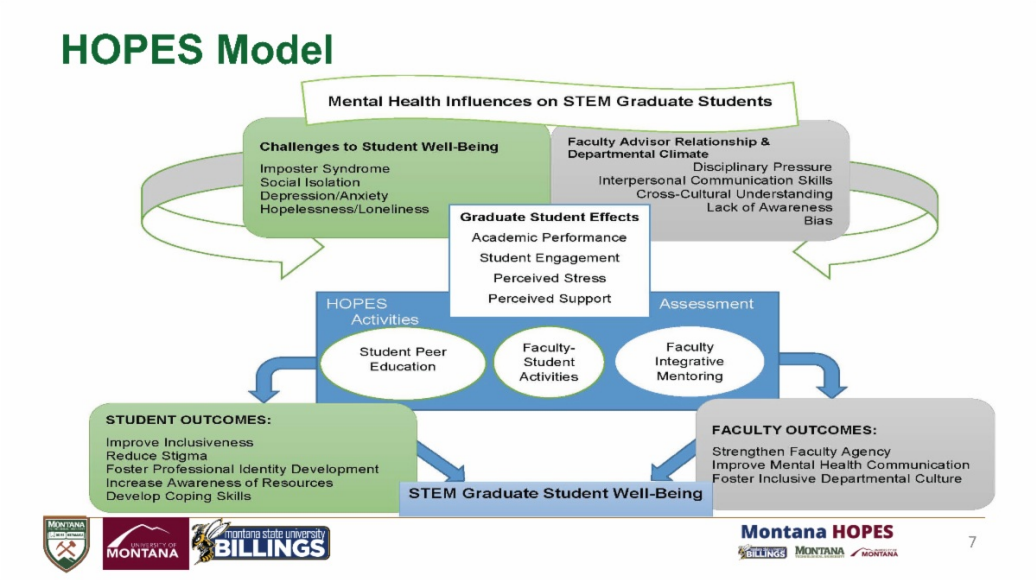
Advisor: Dr. Ben Colman

Thesis Title:
"Quantifying Wastewater Nutrient Inputs to the Clark Fork River"

Montana State University
Advisor: Dr. Rob Walker

Dissertation Title:
"Nonlinear Optical Studies of Gypsum Dissolution Mechanisms, Surfactant Adsorption on Gypsum Surface and Analysis of Environmentally Related Ions"

Mental Health Opportunities for Professional Empowerment in STEM (HOPES): Supporting Graduate Student Mental Health and Wellbeing



The Mental **H**ealth **O**pportunities for **P**rofessional **E**mpowerment in **S**TEM (**HOPES**) project began in August 2021 as a collaboration between Montana Tech, MSU-Billings, and the University of Montana, with funding support from the National Science Foundation. The project, which just completed its pilot year, is funded through Summer 2024. The goal of HOPES is to design, pilot, assess, and implement evidence-based, sustainable, and replicable strategies to enhance graduate student mental health. HOPES was born from an awareness of the growing mental health struggles of graduate students across the country. The project recognizes that the broadening diversity of graduate students also entails varied mentoring needs, with many campus mental health services primarily designed for undergraduate students.

To address the mental health needs of graduate students, HOPES has four main objectives:

1. Build and test activities that enable diverse STEM graduate students to acquire positive mental health and resilience
2. Provide professional development for STEM faculty advisors to support graduate student mental health and transform the department's culture

3. Pilot scale-up and expansion to other campuses
4. Assess to guide the project and determine its impacts

As part of its design, HOPES has several project components, including annual baseline and follow-up surveys for faculty and students, peer groups and cognitive behavioral therapy (CBT) for students, and various faculty and student activities like workshops and role-playing. In AY 2023/2024, HOPES will scale up to MSU Bozeman, the University of Idaho, and the University of the District of Columbia. Ultimately, HOPES seeks to develop and support strategies that help build a sense of community and cross-disciplinary interaction at participating campuses, as well as tailor counseling and student services to fit graduate student needs.

Upcoming Events

Year 5 CREWS All Hands Meeting
September 12 - 13, 2023
Missoula, MT

We will hold the CREWS Year 5 All Hands Meeting September 12-13, 2023 at the Holiday Inn Missoula Downtown. The project's last All Hands meeting will showcase CREWS outcomes, students, and partners. More information

View Events Calendar

Other MT NSF EPSCoR Newsletters

Montana Girls STEM Collaborative Winter 2023

Upper Clark Fork Working Group Spring 2023

Do you have an idea, story, event, or opportunity that you would like included in a future Montana NSF EPSCoR newsletter? Please contact Madison Boone at madison.boone@montana.edu

Montana NSF EPSCoR Website