2026 SARE Project Descriptions

SARE Project Title	University/ College	Faculty/ Email	Full-time/ Part-time	In-person/ Virtual	SARE Opportunity Description	Will student be driving vehicle?
Steelhead Survival	University of Idaho	**Matt Falcy** mfalcy@uidaho.edu	Full-time	In-person	Analyze Idaho steelhead count data to determine ocean survival. Statistically connect steelhead ocean survival to Columbia River hydropower operations (spill) and physical oceanic conditions like El Nino and sea surface temperature. Collaborate with graduate students in my lab and present findings in a writing and/or at a professional conference. I desire a student with a background in math/statistics and an interest in ecology. The student will learn advanced statistical analyses and gain experience applying these techniques to real-world data in a socially important context. The student will also obtain experience communicating technical results to professionals with and without advanced statistical knowledge.	No
Understanding Columbia Spotted Frog distribution and habitat features: risk characterization for geothermal energy exploration and development	University of Idaho	**Tracey Johnson** traceyj@uidaho.edu	Full-time	Both (see notes in description)	This project will aid in examination of effects of physical infrastructure of energy-water systems on flowing water and its wildlife end-users. We will describe population abundance and distribution of Columbia spotted frogs (CSF; Rana luteiventris) in relation to riparian and aquatic habitat features at University of Idaho's Rinker Rock Creek Ranch, a biological research station near Hailey, Idaho. The data collected will be used to inform risk characterization for impending geothermal energy exploration and possible development near the ranch and may contribute to future environmental assessments. The student will compile relevant scientific literature, collect and summarize field-based data, and evaluate how CSF at the ranch may be affected by geothermal energy exploration and development within or near the watershed. The student will learn sampling design and field-based methods for sampling aquatic amphibian populations and their habitat. Field sampling will include hiking mostly through riparian zones conducting sight surveys for frogs and temporarily restraining them for identification and measurement while following safety and animal-handling protocols. Field sampling will also include sampling water temperature, flow, quality, depth, etc. and possibly some plant identification. Data will be entered and summarized. The qualified student will be able to: hike off trail for several miles per day while potentially encountering cows, rattlesnakes, moose, etc.; work in challenging conditions including heat and rain; navigate using a GPS; learn to identify frogs and some plants with faculty training and assistance; collect data while following strict protocols; potentially live in a remote field setting (i.e., wall tent, outdoor shower, cooking outside) with interns, graduate students, and faculty at the ranch; use Microsoft Office, ArcGIS, and potentially Program R to summarize data.	Yes (personal vehicle) or possibly a ranch truck. Very occasional use of a UTV may be required.

					**The student will need to spend all or most of their time during summer 2026 working and living in person at Rinker Rock Creek Ranch while gathering and analyzing data. Planning meetings before data collection commences can take place virtually. Faculty is based at UI Boise and spends substantial time at the ranch	
Combining Open and Site-Specific Data for Agricultural Water Management	University of Idaho	**John Shovic**	Full-time preferred Part-time acceptable	In person preferred Hybrid acceptable	We have been developing an agriculturally-focused wireless sensor network with a partner vineyard in Virginia, which includes sensors measuring soil moisture, plant water uptake, temperature, humidity, and rainfall. This project continues this research by having the student develop technology to synthesize the existing site-sensed data with free OpenET (Open Evapotranspiration project, funded by a public-private consortium including NASA) data to understand the relation between evapotranspiration, vapor pressure deficit, and precipitation and irrigation events in the vineyard. This study aims to define interactions between vine behavior and environmental water factors and determine irrigation practices and schedules that meet plant needs while minimizing agricultural inputs. This study also aims to create and document open-source tools for visualizing this information. The student will be using the free Grafana visualization software along with databases and the Python programming language. Some familiarity with programming will be useful. Student will be analyzing data, creating visualizations and reports, and meeting with stakeholders. An interest in wireless sensing networks, agriculture technology, or software development is useful.	No
Linking Satellite Observations and Field Data to Improve Understanding of Reservoir Management Impacts on Lake Coeur d'Alene Water Quality	University of Idaho	**Meg Wolf**	Full-time		This project will collect and analyze long-term water quality data to support restoration and management planning for Lake Coeur d'Alene in North Idaho. Coeur d'Alene Lake is a naturally occurring lake that is managed as a reservoir at its outflow to the Spokane River at the Post Falls Dam, a key regional hydroelectric power source. Current management maintains elevated lake levels late into the summer to extend power generation, which connects wetlands that were historically disconnected from the main lake and alters nutrient cycling dynamics. These hydrologic changes may contribute to harmful algal blooms, which are closely linked to dissolved oxygen levels and have important impacts on the Coeur d'Alene Tribe and other local stakeholders. By examining the interactions between reservoir management, water quality, and algal bloom dynamics, this study will help illuminate the connections between water management and energy production in the region. Data collection and analysis will be conducted in partnership with the Baywatcher water quality monitoring program. They will integrate with other ongoing efforts related to nutrient and water quality monitoring across North Idaho lakes. Through participation in this project, a student intern will gain hands-on experience in surface water quality monitoring, including field-based sample collection and laboratory analysis of key water quality parameters. Interns will develop skills in data management and interpretation, satellite imagery acquisition and analysis (including Sentinel-2 chlorophyll-a products), and the integration of ground-based observations with remote sensing data to assess harmful algal bloom dynamics. This experience will strengthen students' understanding of abiotic and biotic responses to environmental change, such as nutrient and sediment loading, and understanding tradeoffs and connections between environmental management and energy generation, and build their capacity to communicate scientific findings effectively to community members, resource managers, and stakeholders across North Idaho lakes.	Yes, their own vehicle/ self - transport to lakes to collect samples.

Code quality for water and energy systems	Idaho State University	**Sean McBride** **mcbrsean@isu.edu**	Part-time		Technological change for water and energy systems means that key elements of these systems are now under the direct control of computerized control systems. Irrigation pumps, canal gates, and dams rely on automated control systems. Cooling for power plants, heat plants, and data centers rely on a steady water supply provided through computer-controlled pumps and valves. This project examines the quality of the programming in these computerized systems. The student will engage in the following activities: 1. Create a repository of code from energy-water systems 2. Extend methods for measuring the quality of that code 3. Prepare results for publication	No
1) Development of Cold Atmospheric Pressure Plasma Devices to reduce industrial water use.	Boise State University	**Ken Cornell** **kencornell@boisestate.edu**	Full-time preferred I will take part-time if the student is also enrolled in courses or other experiences.	In person	There are three projects in my lab that relate to the development of cold atmospheric pressure plasma (CAP, nonthermal plasmas) technology and its application to water systems. The first project concerns the development of the technology for industrial food processing systems where large quantities of water are consumed in sanitization of food contact systems to reduce foodborne illness and spoilage. In this project students will work on demonstrating that the application of CAP can decontaminate conveyor belts and other industrial surface materials of bacterial pathogens (Salmonella, E. coli O157:H7) that are frequent causes of recalls of processed food products and sources of foodborne illness. Students working on this project will gain skills in microbiology, sterile technique, and chemical analysis of reactive oxygen and nitrogen species. These studies will serve as the basis of translation of this technology to industrial environments. The students working on this project will learn skills across the fields of microbiology, analytical chemistry, spectroscopy, and cell culture. Students will also learn valuable skills in record keeping, data analysis, preparation of presentations (oral, poster), and report writing. The desired knowledge and skills will be taught, but students who are detail oriented and dedicated to working hard will be more successful. **For both of these, the students need to be available during normal daytime hours, since training will require the efforts of myself and senior students in the lab.	No
2) Cold Atmospheric Pressure Plasma remediation of PFAS contaminated water.	Boise State University	**Ken Cornell** **kencornell@boisestate.edu**	Full-time preferred I will take part-time if the student is also enrolled in courses or other experiences.	In person	The second project involves research into the use of CAP to chemically degrade perfluoralkyl/polyfluoroalkyl substances (PFAS, "forever compounds") that contaminate water supplies and are of increasing concern due to their ability to accumulate in the environment and potentially cause harmful hormonal dysregulation, developmental effects, and cancer. CAP produces short lived reactive oxygen and nitrogen species that are among the few compounds with the ability to oxidize PFAS into simpler, nonharmful byproducts (like CO_2 and fluoride ion). For this project, students will gain training in a variety of spectroscopies, including UV/Vis, fluorescence, LC/MS, IR, and F-NMR to measure CAP-mediated degradation of PFAS compounds in water. The results of this work will serve as the basis for the development of CAP systems for municipal and industrial water systems. The students working on this project will learn skills across the fields of microbiology, analytical chemistry, spectroscopy, and cell culture. Students will also learn valuable skills in record keeping, data analysis, preparation of presentations (oral, poster), and report writing. The desired knowledge and skills will be taught, but students who are detail oriented and dedicated to working hard will be more successful.	No

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3) Elimination of water-borne diseases using Cold Atmospheric Pressure Plasma.	Boise State University	**Ken Cornell** kencornell@boisestate.edu	Full-time preferred I will take part-time if the student is also enrolled in courses or other experiences.	In person	The final project involves the application of CAP technology to virus and parasite contaminated water systems. Viruses like Norovirus, and parasites like Giardia intestinalis frequently contaminate water supplies and lead to intestinal illness in humans and animals. The CAP production of reactive oxygen and nitrogen species provides a mechanism to oxidize biomolecules on these pathogens that leads to their inactivation, thus preventing their ability to infect hosts. Students working on this project will gain experience in cell culture, sterile technique, microbiology, protein chemistry, and mass spectrometry. This project serves as the basis for the development of this technology to treat water supplies, particularly in isolated or remote systems (ocean vessels, rural wells, etc.) that would benefits from simple treatments requiring only room air and electricity for effective decontamination of pathogens. The students working on this project will learn skills across the fields of microbiology, analytical chemistry, spectroscopy, and cell culture. Students will also learn valuable skills in record keeping, data analysis, preparation of presentations (oral, poster), and report writing. The desired knowledge and skills will be taught, but students who are detail oriented and dedicated to working hard will be more successful. **For both of these, the students need to be available during normal daytime hours, since training will require the efforts of myself and senior students in the lab.	No
Elucidating the Molecular Level Mechanism of PFAS Degradation with Cold Atmospheric Pressure Plasma Treatment	Boise State University	**Jenee Cyran** Jeneecyran@boisestate.edu	Full-time or Part-time	In person	The goal of this proposed research is to elucidate the molecular level details of the impact of plasma treatment on perfluoroalkyl substances (PFAS). Per- and polyfluoroalkyl substances (PFAS) are globally recognized as persistent organic pollutants (POPs) owing to their resistivity to environmental degradation, known as "forever chemicals." More recently, specific bans on the use of PFAS in manufacturing have been established as a result of links to serious health concerns, including immunotoxicity, developmental toxicity, and several cancers. This research would provide a potential way to degrade and remediate PFAS from our water sources. The student will learn cutting-edge research techniques, such as nonlinear spectroscopy and cold atmospheric plasma. The student will also learn data analysis and coding skills in MATLab and Python, as well as presentation skills to communicate their science in group meetings and local conferences.	No
Community Engaged Microplastic Sampling in Idaho River Basins	College of Idaho	**Rachel Headley** rheadley@collegeofidaho.edu	Full-time or Part-time	In person preferred	Microplastics are a pollutant of concern in natural water systems and are clear marker of human influence, both direct and indirect. In order to guide policy on how to control and mitigate microplastic problems, we first need to better monitor and understand their distribution. In Idaho in particular, the transport and collection of microplastics through water systems in our dam-controlled rivers, whether for energy, irrigation, or recreation, is not well connected, and our research intends to directly look at the time and spatial variance of suspended microplastics over these anthropogenic controls on flow in our waterways. We intend to investigate a variety of rivers and drainage basins within SW Idaho. While we expect microplastics to exist most everywhere due to their known range and air borne distribution, we hypothesize that there will be differences among waterways within urbanized, rural, and wilderness drainage basins. We expect to find that more remote samples will tend to show more microplastics from atmospheric transport and precipitation (particularly in the form of fibers) whereas more urbanized waterways will	Possibly, but not necessary

					contain more locally sourced microplastics. We also predict that seasonality will lead to variations in microplastic concentration, likely related to climate, geographic context, and anthropogenic control of each specific river basin. We intend to focus our sampling around a two-pronged approach, incorporating community sampling strategies: 1. Continue and expand our sampling in Idaho for both temporal and spatial variation in microplastic pollution. 2. Start up our community research project distributing community science water sampling kits to local recreational facilities. The student will combine field work and lab work within SW Idaho. We will travel around the Boise River and Snake River basin to collect in situ water samples. We will also focus on developing and distributing the community water sampling kits to local river outfitters and processing these samples for both microplastics as well as general water quality. In the lab, the student will process and analysis the microplastic samples, plus measure TSS and related water quality parameters. Additionally, we will work on finalizing FTIR measurements on prior fiber samples from previous years.	
Scaling Photogrammetric and GPS-Based Approaches for Streamflow Monitoring in Natural Channels	College of Southern Idaho	**Jeffrey Cooper** **jcooper@csi.edu**	Full-time	In-person (with a minor virtual component)	Research will expand on prior work developing GPS- and photogrammetry-based methods for monitoring open-channel streamflow in natural systems. Building on initial modeling efforts using controlled channel sections, this project will focus on collecting additional field data across multiple stream reaches and flow conditions to improve, validate, and generalize streamflow estimation techniques. This project advances Energy–Water (E-W) systems research by developing scalable, data-driven methods for monitoring streamflow, a foundational variable linking water availability to energy production, agricultural demand, and water infrastructure operations. Improved streamflow monitoring supports resilience in coupled energy–water systems by enabling better forecasting, management, and response to hydrologic variability driven by natural and population changes. The integration of drone-based photogrammetry, GPS, and field measurements directly contributes to data and knowledge flows that underpin E-W system planning and management in the Snake River and Columbia Basins. Students will use drone-based photogrammetry, GPS surveying, and in situ flow measurements to relate stream stage, channel geometry, and surface characteristics to discharge. Emphasis will be placed on evaluating accuracy, repeatability, and efficiency across varying channel morphologies and hydrologic conditions. The project will also explore protocol refinement and data-processing workflows to support scalable, low-cost streamflow monitoring in remote or data-limited watersheds. Student researchers will play a central role in field data collection, data processing, model refinement, and method evaluation. Participants will be responsible for substantial portions of the research and will contribute directly to the development of improved monitoring approaches applicable to tributaries of the Snake River Basin.	Yes (students will drive their own personal vehicle)