



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	<p>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.</p> <p>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.</p>	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)	<p>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; <i>Rana luteiventris</i>) 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.</p> <p>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.</p>	Yes (personal vehicle) or possibly a ranch truck. Very occasional use of a UTV may be required.

					<p>**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</p>	
<p>Combining Open and Site-Specific Data for Agricultural Water Management</p>	University of Idaho	John Shovic	<p>Full-time preferred</p> <p>Part-time acceptable</p>	<p>In person preferred</p> <p>Hybrid acceptable</p>	<p>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.</p> <p>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.</p>	No
<p>Linking Satellite Observations and Field Data to Improve Understanding of Reservoir Management Impacts on Lake Coeur d'Alene Water Quality</p>	University of Idaho	Meg Wolf	Full-time		<p>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.</p> <p>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.</p>	Yes, their own vehicle/ self - transport to lakes to collect samples.

<p>Evaluating reduced tillage to manage Potato virus Y and protect water quality</p>	<p>University of Idaho</p>	<p>Erik Wenninger erikw@uidaho.edu</p>	<p>Full-time</p>	<p>In-person</p>	<p>Potato producers face increasing pressure to maintain the resilience of Idaho's energy-water systems by reducing agricultural runoff and energy-intensive inputs. This project investigates reduced tillage as a dual-benefit strategy: it lowers energy consumption by decreasing tractor passes and protects watercourses by reducing runoff while also reducing the need for insecticides that contribute to pollution. This research will evaluate the effects of reduced tillage on aphid vectors of Potato virus Y and beneficial predatory arthropods to determine how agroecological management practices can proactively address the impacts of environmental and technological change on energy and water systems.</p> <p>The student will collaborate with the faculty advisor and graduate students on an I-CREWS-aligned project aimed at evaluating aphid and beneficial arthropod responses to reduced tillage, a key practice for reducing energy inputs and improving energy-water system resilience. The student will gain hands-on experience in the biological sciences by sampling insects from field plots, deploying traps, and identifying specimens to quantify the value of sustainable farming practices. Beyond insect identification and data management, the student will learn how these biological outcomes provide the analytical data necessary to address technological changes affecting energy-water systems. An interest in field work and the intersection of agriculture and water quality is desired; comprehensive training on sampling, identification, and curation of insect collections will be provided.</p>	<p>Yes, University of Idaho passenger car or truck</p>
<p>Co-Creating Resilient Water Futures: Open Source Pathways with LiDAR Databases Amidst AI Concerns</p>	<p>Idaho State University</p>	<p>Jose Luis Benevidas josebenavides@isu.edu</p>	<p>Full-time</p>	<p>Virtual learning experience</p>	<p>This project will investigate and utilize open source pathways for co-creation in creative workflows, toward the potential creation of a short video-art and experimental documentary. This project output will engage themes of water consumption, artificial intelligence, and environmentalism through creative modeling. Through an exploration of advanced 3D modeling and Blender tools, we'll build off ongoing knowledge-production about local-Idaho and Snake-River-Valley-to-regional concerns with AI water consumption, to visualize, model, and assess broader environmental concerns. This project aims to:</p> <ul style="list-style-type: none"> ●Explore Geographic Information Systems (GIS) maps of the Idaho-Snake River Basin that already exist in LiDAR databases online ●Create video artwork using aerial maps to explore themes of AI water consumption ●Posit ethical and sustainable AI uses by scientists and artists alike <p>Students will learn methods of engagement and experimental film/video techniques to co-construct, learn investigative documentary techniques, plus the methods, and contemporary discourse around video-art and speculative documentary practices. Students will investigate and implement Blender skills and explore open-source tools and techniques to utilize smart phone and tablet-based applications to incorporate spectrometry and LiDAR maps into their creative workflow. Students will evaluate the similarities and differences, plus the pros and cons between using spectrometry vs. LiDAR as methods of analysis, and their utility or functions in creative workflows. Students will gain added skills in advanced Blender workflows and broaden their overall research and investigative skills.</p> <p>This project seeks a student with an openness to learn, and strong desire to engage independent research. A willingness to experiment and independently explore digital softwares, a desire to co-facilitate self-guided instruction, and an ability to self-manage time, while coming back to the collaboration ready to share, build, and add newfound</p>	<p>No</p>

					skills to the creative project in a scaffolded and additive process, are ideal attributes for this project.	
Applied Computational Models and Algorithmic Solutions to Common Optimization Problems In Energy-Water Systems	Idaho State University	Paul Bodily bodipaul@isu.edu	Full-time	In-person, virtual, or hybrid	<p>Sub-optimal solutions to common optimization problems in energy-water systems can result in significant inefficiencies. Examples of such problems include: Optimal Water Flow (OWF), Optimal Pump Scheduling, Sensor Placement in Water Distribution Networks, Energy-Water Nexus Planning and Scheduling, and/or Infrastructure Design and Placement. Our research lab has already developed an easy-to-use online, dynamic, interactive framework called Redux for modeling and visualizing optimization problems. The proposed research project would extend Redux to include these and similar problems/solutions, making them readily accessible to academic, industrial, and government stakeholders worldwide.</p> <p>The student will gain valuable experience in:</p> <ul style="list-style-type: none"> • full-stack development of computational models, algorithms, and visualizations; • development of written and oral communication skills in the context of group collaborations and research presentations; • programming skill development in C#, .NET, JavaScript, Docker, D3, and git; and • advanced computational theory with significant real-world application 	No
Code quality for water and energy systems	Idaho State University	Sean McBride mcbirsean@isu.edu	Part-time		<p>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.</p> <p>The student will engage in the following activities:</p> <ol style="list-style-type: none"> 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
Land Change Modeler Application for I-CREWS Fort Hall Site	Idaho State University	Keith Weber webekeit@isu.edu	No preference	No preference	<p>I will personally supervisor the student as they acquire and prepare (1) Landsat satellite imagery time series and (2) land cover dataset time series, ideally back to 1980 although that may not be possible due to data availability. The student will use these data in Idrisi Terrset and its Land Change Modeler (LCM) processing module to create a modelled future land cover for southeast Idaho and specifically the Fort Hall Site (FHS) study area. Various time steps forward will be used based on the series of past time steps entered into the LCM model.</p> <p>Student will learn experimental design satellite remote sensing applications, modeling and forecasting, and most importantly, will experience critical thinking opportunities during the assessment of results.</p>	No
1) Development of Cold Atmospheric Pressure Plasma	Boise State University	Ken Cornell kencornell@boise.state.edu	Full-time preferred	In person	<p>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.</p>	No

<p>Devices to reduce industrial water use.</p>			<p>I will take part-time if the student is also enrolled in courses or other experiences.</p>		<p>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.</p> <p>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.</p> <p>**Students need to be available during normal daytime hours, since training will require the efforts of myself and senior students in the lab.</p>	
<p>2) Cold Atmospheric Pressure Plasma remediation of PFAS contaminated water.</p>	<p>Boise State University</p>	<p>Ken Cornell kencornell@boise.state.edu</p>	<p>Full-time preferred</p> <p>I will take part-time if the student is also enrolled in courses or other experiences.</p>	<p>In-person</p>	<p>The second project involves research into the use of CAP to chemically degrade perfluoroalkyl/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 CO₂ 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.</p> <p>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.</p> <p>**Students need to be available during normal daytime hours, since training will require the efforts of myself and senior students in the lab.</p>	<p>No</p>
<p>3) Elimination of water-borne diseases using Cold Atmospheric Pressure Plasma.</p>	<p>Boise State University</p>	<p>Ken Cornell kencornell@boise.state.edu</p>	<p>Full-time preferred</p> <p>I will take part-time if the student is also enrolled in courses or other experiences.</p>	<p>In-person</p>	<p>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 benefit from simple treatments requiring only room air and electricity for effective decontamination of pathogens</p>	<p>No</p>

					<p>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.</p> <p>**Students need to be available during normal daytime hours, since training will require the efforts of myself and senior students in the lab.</p>	
<p>Elucidating the Molecular Level Mechanism of PFAS Degradation with Cold Atmospheric Pressure Plasma Treatment</p>	Boise State University	<p>Jenee Cyran Jeneecyran@boisestate.edu</p>	Full-time or Part-time	In person	<p>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.</p> <p>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.</p>	No
<p>Community Engaged Microplastic Sampling in Idaho River Basins</p>	College of Idaho	<p>Rachel Headley rheadley@collegeofidaho.edu</p>	Full-time or Part-time	In person preferred	<p>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.</p> <p>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 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.</p> <p>We intend to focus our sampling around a two-pronged approach, incorporating community sampling strategies:</p> <ol style="list-style-type: none"> 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. <p>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</p>	Possibly, but not necessary

					<p>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.</p>	
<p>Scaling Photogrammetric and GPS-Based Approaches for Streamflow Monitoring in Natural Channels</p>	<p>College of Southern Idaho</p>	<p>Jeffrey Cooper jcooper@csi.edu</p>	<p>Full-time</p>	<p>In-person (with a minor virtual component)</p>	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	<p>Yes (students will drive their own personal vehicle)</p>
<p>1) Water System Impacts of Biting Black Fly Surveillance and Control in South-Central Idaho</p>	<p>College of Southern Idaho</p>	<p>Brian Simper bsimper@csi.edu</p>	<p>Full-time</p>	<p>In person preferred</p>	<p>This project proposes to place two undergraduate interns with the Twin Falls County Pest Abatement District to conduct applied research focused on biting black fly surveillance and control within irrigation canals, rivers, and associated water delivery systems in south-central Idaho. Interns will collect field data, evaluate treatment strategies, and analyze environmental variables influencing black fly populations.</p> <p>The work directly supports the mission of the Idaho Community-engaged Resilience for Energy-Water Systems (I-CREWS) initiative by examining how biological threats interact with managed water infrastructure and by generating data that can improve the sustainability and efficiency of these systems.</p> <p>Undergraduate interns will participate in authentic, hands-on research experiences that integrate biological science with water systems management. Activities will include:</p> <ul style="list-style-type: none"> • Conducting larval and adult black fly surveillance • Mapping breeding locations within canal and river systems • Monitoring water velocity, temperature, and habitat conditions • Assisting with environmentally responsible treatment applications • Evaluating treatment effectiveness using collected datasets • Developing recommendations to improve operational efficiency 	<p>Yes, pickup trucks</p>

					Students will gain experience in field research, data analysis, GIS mapping, and science communication while working alongside pest management professionals.	
2) Using UAS Multispectral Imaging to Identify Mosquito Habitat and Improve Water Management in Arid Landscapes	College of Southern Idaho	Brian Simper bsimper@csi.edu	Full-time	In person	<p>This project proposes to place two undergraduate interns with the Twin Falls County Pest Abatement District to conduct applied research using unmanned aerial systems (UAS) equipped with multispectral sensors to identify standing water and saturated soils in arid environments that may serve as habitat for vector-carrying mosquitoes. Interns will collect aerial imagery, map and measure fields using RTK technology, analyze vegetation and moisture indices, and develop geospatial products that support proactive water management, mosquito surveillance, and targeted treatment strategies.</p> <p>The two interns selected will participate in authentic research that combines drone technology, environmental science, and water systems analysis. The interns will plan and conduct UAS multispectral missions to collect data. They will scout and mark the fields to compare data collected by UAS to what is actually on the ground. The potential for integrating imagery into GIS platforms is anticipated and hopefully developing recommendations for long-term monitoring and water saving strategies</p> <p>** Students will need a Part 107 UAS Certificate, or be interested in obtaining a Part 107 UAS Certificate to conduct drone work.</p>	Yes, pickup trucks
Wildfire Smoke - Risks in Idaho Communities	Lewis Clark State College	Nancy Johnston najohnston@lcsc.edu	Full-time or Part-time	In-person	<p>Energy-water systems are under stress in Idaho due to warmer climates and drought in the summers, and may result in increased wildfires. Wildfire smoke can place communities at risk to air toxics and particulate matter. This project measures 1) the frequency of wildfires related to drought conditions 2) the concentration of air particulates and air toxics in Idaho wildfire smoke 3) the subsequent risk of these air exposures to communities. This project's outcomes will help communities plan and become resilient during these times of environmental change, aligning with I-CREWS's mission for Community-engaged Resilience for Energy-Water Systems.</p> <p>Students will be involved in community air sampling during background and wildfire seasons in Idaho to determine the exposure risk due to emitted air toxics. Students will learn the following skills: field air sampling, analysis of air samples, quality data control, air toxic calculations and data workup, statistical and graphical analysis, preparation of presentations and publications. General chemistry is helpful but not required. Some laboratory experience is preferred.</p>	No