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	
Quantifying Sulfur and Iron Availability in Waste Rock to Predict Acid Mine Drainage Potential	University of Idaho	**Jeff Langman** jlangman@uidaho.edu	Full-time	In-person	Acid rock drainage (ARD) is a worldwide environmental issue for the mining industry, including mining companies in Idaho, such as the release of ARD from the Bunker Hill Mine in the Silver Valley of Idaho. An ongoing project is examining the ARD that is emanating from a sulfidic waste rock stockpile at the Red Dog mine site near the Arctic Circle in Alaska. The ARD impacts the operation of the mine and the ability of the mine operator to discharge water to the environment at this globally significant zinc mining facility (10% of the worldwide zinc supply is produced at this mine). The UI research team collected waste rock samples from the stockpile during a drilling event to analyze the rock for its acid-generating capacity. The goal is to assist the mine operator in understanding the acid-generating potential of the stockpile to design appropriate remediation efforts. Such efforts are common to the industry, which has struggled to manage this problem that has caused significant deleterious effects around the world, including the designation of the Bunker Hill Superfund site in the Silver Valley.	No
Developing a Landlab model to study the spatial and temporal variation of Idaho's river water quality - Application to Stream Temperature	University of Idaho	**Angel Monsalve** amonsalve@uidaho.edu	Full-time	In-person	As river temperatures show dramatic variability, understanding these shifts is critical for the resilience of regional energy-water (E-W) systems and aquatic ecosystems, where temperature governs dissolved oxygen solubility, nutrient cycling rates, and species metabolic performance. To predict where and when critical thermal thresholds are exceeded, we will develop a spatially explicit thermal model that will be directly incorporated into the open-source Python framework Landlab. Because temperature controls most chemical and biological reaction rates in water, successfully modeling these thermal dynamics within Landlab's modular architecture serves as the foundational first step toward building a comprehensive, multi-parameter river water quality model. To ensure this newly developed model accurately captures real-world complexities, the project will heavily feature active field sampling to collect direct evidence and validate the computational results. In this opportunity, the student will gain practical experience at the intersection of computational ecohydraulics and field-based data collection. The student will learn how to measure critical hydrological parameters and integrate them into an open-source numerical modeling environment. Specifically, they will: • Collect field measurements of water temperature, depth, and flow velocity using modern hydraulics instrumentation. • Contribute to the development and testing of a river temperature model within the Python-based Landlab framework. • Apply collected field data to validate the computational model, gaining a deeper understanding of temperature transport mechanisms. • Analyze spatial and temporal variations in stream temperature to assess their broader impacts on river water quality. Desired knowledge/skills include: • Basic understanding of fluid mechanics and river hydraulics.	No

					- Interest in field-based research and a willingness to work in outdoor river environments. - Familiarity with, or a strong willingness to learn, Python programming. - Data analysis capabilities and high attention to detail. - Ability to work collaboratively across both field and computational settings. This experience will provide valuable training in computational modeling and hydraulics field methods while contributing to research on how dramatic variations in stream temperature affect overall water quality in Idaho's river systems.	
Biological Control of Fermentation Contamination to Improve Energy–Water Efficiency and Resilience in Brewing Systems	University of Idaho	**Paul Rowley** prowley@uidaho.edu	Full-time	In person	We estimate from our surveys of brewers that 50% have suffered at least one diastatic yeast contamination - we do not know the frequency of these events. The average loss (likely to be an underestimation) is \$30,000 per event.There are 9,796 operating U.S. craft breweries, which means that if 50% of breweries have suffered a loss of ~\$30,000, the total loss is \$147M. Assuming a cost of \$40 of raw materials per barrel of beer, that would mean a loss of ~3.7M barrels lost (114M gallons), and the brewing industry consumes 4–6 L of water for every liter of beer.That would mean 22 million barrels of water lost (682 million gallons). Average energy usage to make a barrel of beer is 66 kWh, which would mean a loss of 244M kWh of energy. This project evaluates antifungal “killer” yeasts as a biological strategy to prevent contamination by Saccharomyces cerevisiae var. diastaticus in fermentation systems, reducing reliance on energy- and water-intensive mitigation approaches such as pasteurization, filtration, and equipment sterilization. The student will quantify how toxin-mediated biocontrol alters fermentation stability, resource use, and process resilience under variable environmental conditions. This work will contribute to building a more sustainable and resilient fermentation-based industry, saving both water and energy.The student will investigate how biological antifungal strategies (killer toxins) can replace or reduce conventional contamination control methods that require significant energy (e.g., heat pasteurization) and water (e.g., cleaning and sterilization cycles). They will perform controlled fermentation experiments comparing traditional and toxin-mediated approaches, generating datasets on growth inhibition, fermentation performance, and stability. They will also look to improve the efficacy of natural antifungal agents to better control diastatic contamination. This will be achieved by molecular modeling of killer toxins structures and correlating improved antifungal activities with changes to protein structure and function. Students should have evidence of coursework or exposure to microbiology, biochemistry, molecular biology, or a related field and a basic understanding of molecular/cell biology and microbial growth. Ideally (but not essential), students should have familiarity with aseptic technique and microbial culturing and experience with basic laboratory methods (e.g., pipetting, solution preparation, growth assays). Students should be comfortable with basic data analysis (e.g., Excel, R, or similar tools) and have strong organizational skills and the ability to maintain accurate lab records.	No
Combining Open and Site-Specific Data for	University of Idaho	**John Shovic** jshovic@uidaho.edu	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	No

Agricultural Water Management					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.	
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** mawolf@uidaho.edu	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.
Evaluating reduced tillage to manage Potato virus Y and protect water quality	University of Idaho	**Erik Wenninger** **erikw@uidaho.edu**	Full-time	In-person	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. 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	Yes, University of Idaho passenger car or truck

					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.	
Co-Creating Resilient Water Futures: Open Source Pathways with LiDAR Databases Amidst AI Concerns	Idaho State University	**Jose Luis Benevidas** josebenavides@isu.edu	Full-time	Virtual learning experience	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: ●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 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. 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 skills to the creative project in a scaffolded and additive process, are ideal attributes for this project.	No
Applied Computational Models and Algorithmic Solutions to Common Optimization	Idaho State University	**Paul Bodily** bodipaul@isu.edu	Full-time	In-person, virtual, or hybrid	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.	No

Problems In Energy-Water Systems					The student will gain valuable experience in: • 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	
Regional Economic Drivers of Water	Idaho State Unviersity	**Karl Geisler** geiskarl@isu.edu	No preference	No preference	This project will analyze and quantify the economic drivers of water demand in the United States at the county-level by integrating data from the U.S. Geological Survey's National Water Use Science Project with data from the U.S. Census Bureau's County Business Patterns. Employing spatial econometric models to analyze this data set will show which industries tend to drive different factors of water usage while accounting for spatial heterogeneity and autocorrelation. The student will begin their Summer Authentic Research Experience (SARE) by merging these two county-level data sets. After the data set is compiled, the student will conduct baseline analyses to determine the most useful NAICS-level of industry aggregation. At this point in the project the student will be guided in employing spatial econometric models to find the most useful functional form with the most accurate estimates. This project seeks a student who expresses an interest to learn about regional economic development and spatial econometrics. A strong work ethic, attention to detail, and willingness to learn are all important when engaging in this type of project. The student completing this SARE will be expected to present their findings at a university-level event such as the Idaho State University Research and Creative Works Symposium.	No
Closing the Loop: Developing Polymers to Recover Critical Minerals	Idaho State University	**Courtney Jenkins** jenkcour@isu.edu	Full time	In-person	Idaho relies heavily on wind and hydropower and the state's energy future relies on access to critical minerals. A vast, untapped critical material resource already exists within Idaho's stockpiled mine tailings, mineral processing waste, and e-waste. We have initiated collaborations with regional partners to take advantage of these waste streams. By developing low-cost, scalable polymers designed to selectively capture and refine high-value metals from these complex Idaho waste streams, we could enhance recovery and strengthen environmental and economic performance. This project will focus on developing sulfur-based polymers for targeted critical mineral recovery. This project will have three central goals. • Provide students with hands on training in polymer synthesis and characterization and critical mineral extraction, including instrumentation such as NMR, LC-MS GC-MS, and ICP-OES, which will prepare the students for a range of industrial jobs. • Increase student knowledge regarding the chemical importance, applications, and relevance of critical minerals in Idaho and across the world. • Enhance student scientific communication skills including reading and interpreting scientific literature, creating and delivering research presentations and scientific reports.	No

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
Bio-Inspired Polymers from Idaho Native Plants for Mineral Recovery from Mining Wastewater	Idaho State University	**Kativa Sharma** Sharkum2@isu.edu	Full time	In Person	This project seeks to develop a sustainable method for recovering valuable critical metals from Idaho's mine tailings and wastewater using the state's abundant sagebrush plants. We plan to turn natural compounds from sagebrush into special engineered polymers that can selectively capture important rare metals, like neodymium (Nd), while leaving others behind. These polymers have tiny "pockets" designed to fit the target metals, making the process highly efficient. The work begins by extracting and purifying natural compounds from sagebrush, which serve as the building blocks for these polymers. The recovered metals are critical for many technologies, including green energy (electric vehicle motors, wind turbines), defense systems, consumer electronics, and medical imaging devices. Students will gain hands-on experience in the extraction, and purification of natural products from sagebrush. They will learn biopolymer synthesis and chemical functionalization techniques such as Michael addition, diamine coupling, and polymer modification. Students will also develop skills in materials characterization techniques. Students will be trained in analytical techniques relevant to critical materials research, such as mass spectrometry, Nuclear Magnetic Resonance (NMR) spectroscopy, and chromatography for compound identification and purity assessment. They will also learn metal quantification and speciation methods (e.g., ICP-MS), data analysis, and interpretation of complex chemical datasets. Through this project, students will build a strong foundation in natural product chemistry, polymer chemistry, and coordination chemistry of rare earth elements. They will gain an understanding of size- and geometry-based selectivity in metal–ligand interactions, bio-inspired materials design, and the principles governing adsorption and separation processes. Students will develop critical literature analysis skills by reviewing and discussing current research on bio-inspired polymers, rare earth element recovery, sustainable separation technologies, and circular economy approaches. Students will strengthen scientific communication skills through preparation of figures, written reports, abstracts, and presentations for group meetings and conferences. Students will be expected to present their work at regular group meetings and have the opportunity to present at conferences, including ISU Research and Creative Works Symposium for the spring semester, Idaho Conference Undergraduate Research (ICUR) at Boise State University for coming years.	No
Land Change Modeler Application for I-	Idaho State University	**Keith Weber** **webekeit@isu.edu**	No preference	No preference	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	No

CREWS Fort Hall Site					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. 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.	
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. **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. **Students need to be available during normal daytime hours, since training will require the efforts of myself and senior students in the lab.	No

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. **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 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.	Possibly, but not necessary

					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)
1) Water System Impacts of Biting Black Fly Surveillance and Control in South-Central Idaho	College of Southern Idaho	**Brian Simper** bsimper@csi.edu	Full-time	In person preferred	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. 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	Yes, pickup trucks

					with managed water infrastructure and by generating data that can improve the sustainability and efficiency of these systems. Undergraduate interns will participate in authentic, hands-on research experiences that integrate biological science with water systems management. Activities will include: • 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 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	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. 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 ** Students will need a Part 107 UAS Certificate, or be interested in obtaining a Part 107 UAS Certificate to conduct drone work.	Yes, pickup trucks
Reducing Codling Moth Populations in the Magic Valley Using Sterile Insect Release	College of Southern Idaho Mid Snake Resource Conservation and Development Council	**Heidi Tubbs** midsnakercd@gmail.com	Part-time	In-person	Mid Snake Resource Conservation and Development Council (RCD) is conducting a research project that seeks to mitigate the economic impact of codling moth damage to apple and pear trees by locating orchards throughout the valley (commercial, backyard, and lone trees), monitoring the presence of codling moth through trapping, and then releasing sterile male codling moths into infected orchards weekly during the season to mate with wild moths, reducing their population and economic impact utilizing a biological control. Targeting trees throughout the valley instead of just individual orchards should result in greater reduction and decrease the occurrence of re-infestation as compared to targeting individual orchards. The use of biological controls in place of chemical applications in agricultural operations can significantly reduce the amount of ag-related chemicals finding their way into ground and surface water, as well as decreasing the energy needed to apply these chemical controls. Sterile insect release has been shown to be effective in other states having large orchard blocks, we are looking at the effectiveness in Southern Idaho with small blocks and lone trees. The SARE student will be expected to assist with making connections with individuals and orchard owners participating in the study, place and monitor moth traps throughout	Student will be reimbursed for driving personal vehicle

					the season, release the sterile moths weekly in the study areas, compile data, and assist with creating and presenting data to community leaders, industry partners, and interested community groups.	
Groundwater Monitoring of New Wells to Assess Water Quality and Treatment Energy Needs	College of Western Idaho	**Emily McIntier** emilymcintier@cwi.edu	Full-time of Part-time	In-person	This project will investigate groundwater quality in three newly developed wells at the College of Western Idaho in Nampa to establish baseline conditions and assess variability across sites. Students will analyze key chemical parameters and evaluate how water quality influences treatment needs. In collaboration with regional partners such as the Idaho Department of Health and Welfare, the project will connect local water monitoring to broader public health and water-energy system challenges. This work will generate foundational data while training students in applied environmental chemistry. Students participating in this SARE project will engage in hands-on field and laboratory research focused on groundwater quality assessment. They will collect water samples from newly developed campus wells, perform chemical analyses (e.g., pH, conductivity, nitrate, hardness, and heavy metals (if feasible)), and apply quality assurance/quality control practices used in environmental chemistry. Students will analyze and interpret their data to compare water quality across wells and evaluate implications for water treatment. This opportunity is designed to engage college students in authentic research experiences that build confidence and pathways into STEM careers.	No
Wildfire Smoke - Risks in Idaho Communities	Lewis Clark State College	**Nancy Johnston** **najohnston@lcsc.edu**	Full-time or Part-time	In-person	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. 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.	No