



Welcome to Idaho NSF EPSCoR (2023 - 2028)

About Idaho EPSCoR/Governance

What is EPSCoR?

The Established Program to Stimulate Competitive Research (EPSCoR) in Idaho is a program started at the National Science Foundation (NSF) designed to fulfill the mandate of the NSF to promote scientific progress nationwide. EPSCoR partners with eligible states to enhance the competitiveness of Science, Technology, Engineering, and Mathematics (STEM) researchers and institutions in jurisdictions that historically receive smaller amounts of federal research funding. Idaho has participated since 1989.

Mission: EPSCoR enhances research competitiveness of targeted jurisdictions (states, territories, commonwealth) by strengthening STEM capacity and capability.

Vision: EPSCoR envisions its jurisdictions as recognized contributors to the national and global STEM research enterprise.

Goals:

- Catalyze the development of research capabilities and the creation of new knowledge that expands jurisdictions' contributions to scientific discovery, innovation, learning, and knowledge-based prosperity
- Establish sustainable STEM education, training, and professional development pathways that advance jurisdiction-identified research areas and workforce development
- Broaden direct participation of all individuals, institutions, and organizations in the project's science and engineering research and education initiatives
- Effect sustainable engagement of project participants and partners, the jurisdiction, the national research community, and the general public through data-sharing, communication, outreach, and dissemination
- Impact research, education, and economic development beyond the project at academic, government, and private sector levels

To achieve its goal, NSF EPSCoR uses Research Infrastructure Improvement (RII) programs such as Track-1, Track-2, Research Fellows (formerly Track-4), E-CORE, and E-RISE; Co-Funding of disciplinary and multidisciplinary research; and Workshops and Outreach investments strategies. See [NSF EPSCoR](#) for more information.

Research Infrastructure Improvement (RII) - Track 1

RII Track-1 awards provide up to \$4 million per year for up to five years. They are intended to improve the research competitiveness of jurisdictions by improving their academic research infrastructure in areas of science and engineering supported by the NSF and critical to the particular jurisdiction's science and technology initiative or plan. These areas must be identified by the jurisdiction's EPSCoR governing committee as having the best potential to improve the jurisdiction's future R&D competitiveness.

Idaho's Higher Education Research Strategic Plan identifies these priority areas.

Governance

Idaho EPSCoR Committee

Idaho EPSCoR currently is led by a State Committee composed of 16 members with a range of professional backgrounds from both the public and private sectors and from all regions of the state. The EPSCoR Committee reports to the Idaho State Board of Education. The State of Idaho has demonstrated long-standing commitment to develop its research bases through EPSCoR by contributing to non-federal match as part of the appropriation for the State Board of Education (SBOE) via the Higher Education Research Council (HERC). The Idaho EPSCoR office and the Idaho EPSCoR Project Director are located at the University of Idaho; partner research institutions are Boise State University and Idaho State University, along with other organizations including Tribal nations and 2-year and 4-year colleges. For more information visit www.idahoepscor.org.

Idaho EPSCoR Staff

As a statewide program interacting with numerous participants at all levels, the Project Director is assisted by a professional staff to ensure the efficient and effective performance of all project responsibilities.

U of I location

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Research/I-CREWS

Idaho Community-engaged Resilience for Energy-Water Systems



Idaho's newest RII Track-1 award (2023-2028), I-CREWS, is a \$20 million NSF EPSCoR award plus a \$4 million state-match that aims to address the consequences of meteorological, population, and technological change on energy-water (E-W) systems.

The project will advance research, education, workforce development initiatives, and partnership capacity in Idaho in two strategic directions. First, I-CREWS leverages and builds linkages among existing areas of academic research strengths in the geosciences, biological sciences, social sciences, and resilience science, and second, I-CREWS expands Idaho's nascent research capacity in computational modeling, machine learning and artificial intelligence, to provide analytical outcomes to proactively address the consequences of meteorological, population, and technological change on energy-water (E-W) systems.

Using a range of Idaho's communities, landscapes, and watersheds, the **main research objectives** of I-CREWS are to:

- Evaluate E-W configurations for various resilience strategies,
- Model E-W configurations and their resilience,
- Develop future scenarios for E-W trajectories and their resilience.

I-CREWS integrates local knowledge, governance dynamics, and advanced modeling. It involves over 35 core university and college faculty, plus 8 new early-career hires, 10 postdocs, and 20 graduate students while supporting 30 Vertically and Community Integrated Projects designed to reach over 500 students and community members. Partnerships outside of academia involve a wide range of entities, from state and federal agencies, public and private utilities, Idaho National Laboratory, to Tribal nations.

I-CREWS will support a robust Seed Funding program guided by external peer merit review. This mechanism will provide the ability to invest in emerging research and community-based education opportunities and/or pursue high-risk, high-impact research.

I-CREWS Vision

Idaho envisions generating world-class research competitiveness and capacity in collaboration with resilient urban, rural, and tribal communities that can address the consequences of meteorological, population, and technological changes on energy-water (E-W) interactions. The I-CREWS mission is to jointly develop research and solutions that transform the relationship between research, education, technologies and Idaho's urban, rural and tribal communities.

The motivating research hypothesis is that communities undergoing changes in their E-W systems can be characterized at different scales to determine patterns of multisystemic resilience to change. Thus, E-W system resilience will be more effectively evaluated, shaped, and implemented by incorporating jointly developed local knowledge, and governance dynamics with advanced data analysis and modeling of stressors.

Two cross-cutting research questions will guide the research and the capacity-building:

1. What role do trade-offs and changes in E-W systems, including storage, efficiency/conservation, local knowledge, and governance dynamics, play in determining resilience strategies or options to meteorological, population, and technological change?
2. How does incorporating multiple ways of knowing, community engagement, and advanced modeling improve the parameterization of pathways associated with more resilient and planned E-W futures?

Broader Impacts

The project's approaches and outcomes, including an E-W Data Hub and a Resilience Futures Reciprocal Network, will be nationally transferable. The E-W Data Hub is a centralized data catalog, repository and interweaving platform for all I-CREWS data. The Resilience Futures Reciprocal Network will sustain and advance knowledge on energy-water resilience.

The project emphasizes community engagement and jointly developed knowledge and will conduct multiple initiatives to increase the participation of all groups in STEM. We will build on models of engaged STEM education while developing researchers' abilities to collaborate more effectively with communities and work with students to build the technical skills necessary to fill E-W systems workforce needs.

I-CREWS will support WFD and student training through high-context, community-engaged courses and projects that are jointly developed with community members to address E-W systems issues. A Tribal Nation Research Network (TNRN) will be developed to recenter knowledge exchange between Tribes and Idaho universities, focusing on collaboration through the development of tribally originated research.

The project will also support over 120 undergraduate research summer experiences that will provide meaningful research opportunities. Innovative programs for professional development will be expanded to 140 scholars across participating institutions, creating a cohort of researchers supported and enabled to pursue transformative and community-engaged scholarship.

Alignment with State and National Priorities

I-CREWS responds directly to NSF grand challenges of resilience research and innovation and understanding the interplay between availability and distribution of energy and water. Likewise, it addresses NSF's Sustainable and Clean Energy theme and is aligned with NSF's 10 Big Ideas of Harnessing the Data Revolution and Growing Convergence Research. I-CREWS is well-aligned with the State's new Science and Technology (S&T) plan, directly supporting research and economic development in energy systems, natural resource use and conservation, and systems engineering. This alignment coupled with the promise of I-CREWS increasing collaboration among the State's universities and colleges served as a backdrop to the theme's selection by the Idaho EPSCoR Committee.

People



A core group of approximately 40 researchers and educators, many with existing cross-institutional and cross-discipline collaborations worked together to develop this inspiring research and education plan. There are also over 15 collaborating and advisory organizations that are working in partnership with I-CREWS. For more information on I-CREWS participants visit “People” at www.idahoepscor.org/i-crews.

Education and Workforce Development

I-CREWS’ research and education ecosystem includes three research universities, two Tribal nations, three primarily undergraduate institutions (PUIs), and more than a dozen public, private, and nonprofit collaborators and stakeholders. PUIs include Lewis-Clark State College (LCSC), College of Western Idaho (CWI), and College of Southern Idaho (CSI). Tribal nations include Coeur d’Alene Tribe and Shoshone-Bannock Tribes. As described here, a fully integrated research, education and workforce development program will be implemented to increase the number of skilled scientists and engineers.

Education and Workforce Development

The overall goal of the I-CREWS Education (Ed) and Workforce Development (WFD) plan is to develop individual, community, and institutional capacity for more resilient and planned futures with respect to education and E-W systems. I-CREWS builds capacity and implements programs at levels spanning K-12, through graduate education, to faculty. Proposed activities will build the necessary skills for leadership and participation in E-W systems through internships, coursework, and teacher professional development.

Further, institutional capacity to support community-engaged teaching and learning will be developed through graduate student, faculty, and administrator development programs. Each of this plan’s five objectives is aligned with the community-engaged research and capacity-building priorities of I-CREWS and integrated with plans to enhance direct participation of all individuals.

Our overall goal will be achieved through the completion of these five Ed and WFD objectives:

- (1) Creating both Community-Integrated and Vertically Integrated projects/courses
- (2) Integrating a Certificate in Environmental Education and Science Communication (EE&SC) for graduate students
- (3) Expanding PUI and university undergraduate research opportunities
- (4) Infusing high context, community-engaged E-W content in General Education (GenEd) courses at PUIs
- (5) Expanding an innovative faculty professional development model for transformative scholarship

Community Integrated Programs (CIP)

Community Integrated Programs (CIP) are a new course type offered to undergraduate and graduate students, modeled after courses developed at Arizona State University, and are jointly developed with community members to address E-W systems issues. CIPs engage learners across disciplines (e.g., across STEM, policy, and law) and knowledge systems (e.g., local and Indigenous knowledge, academic knowledge). Community, students, and faculty together learn with each other as they imagine different interdisciplinary solutions to complex E-W issues.

Vertically Integrated Projects (VIP)

Vertically Integrated Projects (VIP) are an intentional curricular infrastructure that establishes an onramp for students and provides a range of training, mentoring and professional development support to both students and faculty. The VIP is implemented statewide, and the goal is to provide the scaffolding to support transdisciplinary science and grow the next generation of conservation science leaders and workers.

Environmental Education and Science Communication (EE&SC) Certificate

Graduate students recruited from UI, ISU, BSU, or from Tribal nation partners, will take part in the Certificate in EE&SC. This professional development program is currently offered with the UI McCall Outdoor Science School (MOSS). In this 22-credit Certificate, graduate students develop skills in community-integrated education and research and science communication. A teaching practicum provides a context for these graduate students to solidify their learning while working with middle school students and members of the community. Additionally, graduate students support the development of CIP courses and teacher professional development at I-STEM Institutes.

Undergraduate Research Program - SARE

I-CREWS Summer Authentic Research Experience (SARE) program a paid summer experience designed to provide meaningful research experiences to cohorts of undergraduate students from all participating institutions, complementing CIPs, the VIP program, internships with Tribal, State, and Federal agencies, and INL. Students will gain educational workforce and research experience, participate in high context learning, and form a learning community to share experiences, develop a professional network, and gain additional professional development support.



- 1- CIP, VIP, SARE, PUI CoPs (Gen Ed), Rural Educator Needs Assessment
- 2- Internships
- 3- EESC Certificate
- 4- Tribal Nations Research Network
- 5- ASSERT
- 6- Literacy Framework

Figure 6: Diagram of the Education/Workforce Development/ Broader Impacts model

Idaho 2-4 Year Colleges - Community of Practice for E-W Literacy

A cohort of PUI instructors and faculty members will implement concepts relevant to E-W systems literacy into their General Education (GenEd) courses. Led by CSI, course revisions will build STEM learning opportunities that are high-context and engaged with local and community-based issues.

ASSERT Program

Aligning Stakeholders and Structures to Enable Research Transformation (ASSERT), a program developed at Boise State University, will be expanded statewide. The goal is to support faculty to overcome structural and personal barriers to performing transformative research. It realizes this goal through a two-pronged approach that includes, 1) bringing together a cohort of faculty to build an ASSERTive community of scholars from different fields and at different career positions, and 2) helping to uncover structural to transformational research and then works with the appropriate administrative units on campus to advance solutions.

Funding Opportunities

Seed Funding

I-CREWS will support a robust Seed Funding program guided by external peer merit review. This mechanism will provide the ability to quickly respond to new opportunities and/or pursue high-risk, high- impact research. Eligibility will include individuals currently involved in I-CREWS as well as those not yet involved. To receive seed awards, an applicant must demonstrate synergy with ongoing I-CREWS efforts, including those to enhance participation, foster convergence research, and foster inter-institutional collaboration.

Two sizes of awards (Small and Large) will be divided into two investment categories, all directly related to E-W challenges. The first category will be Convergence Research and Education, open to any qualifying teams or research partnerships in Idaho. This category will include projects that are driven by a specific and compelling problem and demonstrate deep integration across disciplines; involvement of non- academic collaboration will be optional. The second category will be focused on Community-engaged Collaboration (CEC) to support jointly developed research and education outcomes with communities (including Tribal representatives) through integration using local (e.g., Indigenous) knowledge. At least one (Large or Small) CEC category award will be granted in each of Yrs 1-3 or funds will be held until such awards can be made.

Small Seed Funding (<\$55k, 1 year). These awards will primarily be led by early-career faculty members initiating research directly related to E-W. Established faculty members seeking to expand or apply their expertise into a new E-W research direction will also be eligible. Multi-institutional collaboration will be prioritized but not required. Funding will support personnel, summer salary, or other resources needed to gather preliminary data and/or explore high-risk, high-reward E-W activities.

Large Seed Funding (<\$165k, 2 years). These awards will support collaborative, multi-disciplinary, multi-institutional E-W research, and will be led by early or mid-career faculty members. Funding will support graduate student research, postdoctoral fellows, faculty summer salary, or technical personnel. Co-mentoring, co-advising, and co-supervision will be encouraged, as will in-state student exchanges.

For additional information and to apply – visit: <https://idahoepscor.piestar-rfx.com/opportunities>

Partnerships & Collaborations

I-CREWS will leverage state and federal resources to promote resilience-centered outcomes. Partnerships and collaborations are fundamental to all project areas, facilitating the integration of science with informed governance and system management. Partnerships allow for stronger co-generation of knowledge, leveraging of data relevant to the E-W systems, and development of sustainable cyberinfrastructure. INL and Tribal nations, together with other private and public sector groups, will support capacity-building, leverage computational cyberinfrastructure, and support knowledge-sharing, research, and professional networks among students and employers. Engagement of partners across constituencies (scientists, land managers, policymakers, administrators, sovereigns, and users) will help to advance the integration of more comprehensive science with management and policy strategies for resilient stewardship and governance that accounts for locally valued choices as well as capacity-building to achieve proposed impacts.

Research and Education

Regional and State partnerships with representatives from Idaho's Native American Tribal nations plus INL, public agencies, and other relevant groups will enable I-CREWS to pursue a research and capacity building agenda that prioritizes resilience in E-W systems.

Workforce Development

Idaho EPSCoR's collaboration with 2-year and 4-year colleges assists in promoting pathways for students and dialogue among faculty. College partners include Lewis-Clark State College, College of Western Idaho, and College of Southern Idaho. Faculty and students at these colleges will be involved in WFD. I-CREWS partnerships will leverage the strengths of other STEM education organizations within Idaho such as the Idaho STEM Action Center to achieve program goals. I-CREWS will translate research training to agency partners and industry and use the project as a mechanism to engage teachers and students in authentic research experiences and prepare them for a wide range of careers.

Tribal Collaboration

The Coeur d'Alene Tribe and Shoshone-Bannock Tribes are sub-award partners and are recognized as rights holders in Idaho, and active I-CREWS partners, commit a substantial amount of their economic and human resources to land and water management. As sovereign governments and state leaders in fisheries management, they are responsible for managing water and are inextricably connected to the northwest hydropower system. I-CREWS recognizes the interrelationship of Traditional/Indigenous knowledge with other Local Knowledge, Western scientific research, and capacity development, forming the cornerstone of modern tribal energy and water sovereignty. A Tribal Nation Research Network (TNRN) will be established to recenter knowledge exchange between tribes and Idaho universities, focusing on collaboration through the development of tribally- originated research. Many of the E-W research questions addressed by the TNRN will be relevant and critical across Idaho communities.

Industry and Other Collaborations

Falcon Supercomputer Collaboration with INL

The INL is actively transitioning the management and use of its “Falcon” supercomputer via a Memorandum of Understanding (MOU) to Idaho’s three research universities. Falcon will remain at the Collaborative Computing Center in Idaho Falls, managed by Idaho university staff. This allows for immediate benefits in research, education, and WFD throughout the state.

Power Utilities and Water Groups

For power utilities such as Idaho Power and the Idaho Consumer Owned Utility Association, as well as state water groups, collaboration may include support with E-W data- sharing, and access to relevant stake/knowledge holders. For all these groups, collaboration also will include advising opportunities associated with research, education, and/or workforce capacity-building.

Participant Expectations/Data Management

Participant Information

Faculty participation in I-CREWS is coordinated by the Leadership Team (LT) members at each university. Each project area (i.e., each project Component) is managed and coordinated by a set of co-leads with representatives from multiple institutions. Policies and procedures governing participation are administered by the Idaho EPSCoR Office.

Expenditures

Project expenditures are governed by the federal cost principles (2 CFR 200) and must conform to NSF policies, grant provisions, grantee internal policies, and Idaho EPSCoR Office requirements.

- Boise State University - Transactions will be processed by the BSU EPSCoR Research Administrator, Elizabeth Hoeper (elizabethhoeper@boisestate.edu)
- Idaho State University - Transactions will be processed by the ISU EPSCoR Research Administrator, Kitty Griswold (kittygriswold@isu.edu)
- University of Idaho - Transactions will be processed by the UI EPSCoR Business Specialist, Dalynne Veeder (dveeder@uidaho.edu)

To access financial forms or for additional information on reimbursements from the Idaho EPSCoR Office financial procedures visit: <https://www.idahoepscor.org/financial-forms>.

Reporting

Timely reporting is essential for all participants to showcase achievements to NSF, which may be highlighted for the general public; to show compliance with award requirements; and to show how EPSCoR supported research and education is positively affecting quality of life, education, and economic prosperity in Idaho.

Reporting Requirements

EPSCoR reporting requirements are greater than those of a standard award. Participants must be willing to provide ad hoc and regular reports of progress. Eligibility for Seed Funding is dependent on an individual's compliance with reporting requirements for Seed Awards.

Annual reports will be due via an online reporting system called EDOCS and other platforms determined by Idaho EPSCoR. Report data will be due from participants by early April of each year to allow formal report submission to NSF 90 days before the anniversary date of the award (May 1). Reports will include topics such as technical progress, key outcomes and achievements, and anticipated or achieved impacts linked to the Strategic Plan; training and professional development; outreach activities; publications; proposals; websites, data and other products; technologies & techniques, patents, inventions, licenses; organizational collaborations; and honors and awards.

Post Award Reporting

Upon reasonable request, participants should provide Idaho EPSCoR with updated information about their research, education, and outreach activities and accomplishments for five years after RII award completion. This information will be important to promote the lasting impact of the EPSCoR investments and to the state when the Idaho EPSCoR State Committee applies for future EPSCoR support.

Project Advisory Board (PAB)

The Project Advisory Board is a group of independent external experts who annually review the progress of the I-CREWS project and provide guidance to help ensure its success. Their recommendations are provided in written reports to EPSCoR leadership, the State Board of Education, and the NSF.

Expert Advisory Panel (EAP)

The EAP includes regional leaders in the field of E-W resilience, representing private, state, and federal entities. This group will provide the I-CREWS team with insights and feedback that will allow us to be at the forefront of issues in Idaho's dynamic E-W systems. Members will represent key entities including Idaho Power, Avista Utilities, Idaho Department of Water Resources, Bonneville Power Administration, Idaho National Laboratory, and Idaho Workforce Development Council.

External Evaluation

The RII program includes review and evaluation by an independent external evaluator, Dr. Kim Bernard of Oak Hill Consulting Group. Our evaluator regularly participates in project meetings and events (virtual and in-person) and contacts project participants during preparation of her reports; your positive response to her requests for information is essential. A formal Evaluation Plan is being developed in Yr 1. Starting in Yr 2, an annual external evaluation report will be provided to the LT, shared with project participants, and submitted to the NSF.

Data Sharing

Data sharing allows I-CREWS scientists and communities to expedite the translation of research results into knowledge, products, and procedures. By accepting funds from the I-CREWS award, participants agree to federal standards which require that all their data and research products be made available to the public in a timely manner, unless sharing is precluded due to sensitivity or sovereignty. Within the

first year of the award, the I-CREWS data management team will implement a formalized project-wide data sharing plan to define participant expectations to appropriately share and archive data in a timely manner (e.g., research data and products definitions, data licensing, intellectual property, collaboration agreements, data sovereignty, data sharing agreements, sensitive data classification, data archival repositories, etc.).

For additional information on data management, contact the I-CREWS data manager. For additional information on data management and reporting, visit the I-CREWS data management plan at www.idahocrewws.org.

Communication/Related STEM Networks

Communication is key for collaboration and integration. Idaho EPSCoR hosts a number of websites, publications, and social media venues to enhance communication and promote the positive impacts of STEM research and education in Idaho.

Project Information

The I-CREWS Leadership Team, component leads, and project participants use Google Drive for document sharing and project information. Other platforms may be utilized by project teams as communication needs and approaches are identified.

Additional Resources

- **Idaho EPSCoR Website— idahoeppscor.org:** This site provides important EPSCoR announcements, call for proposals, news, highlights, calendar of events, headlines on social media platforms, plans and policies, office staff contact information, online report system, videos, and other resources. This site relates to a wide range of EPSCoR topics and is not specific to a single NSF award.
- **I-CREWS Website - idahocrewws.org:** This site provides information specific to I-CREWS study sites, research teams, stakeholders, education programming, online reporting system, strategic plan, contact information, and other I-CREWS resources for researchers and communities.
- **I-CREWS Strategic Plan:** see it [here](#).
- **The Researcher (newsletter):** The Researcher is an Idaho EPSCoR newsletter that comes out tri-annually and is available in digital or hardcopy format.
- **EPSCoR E-News (e-mail):** Idaho EPSCoR email news publication which comes out monthly. The E-news is a shorter version of an Idaho EPSCoR newsletter containing research highlights, student profiles, and upcoming events and deadlines.
- **Idaho EPSCoR X (formerly Twitter):** To subscribe, submit story ideas, or for more information, visit www.idahoeppscor.org.