Idaho Established Program to Stimulate Competitive Research (EPSCoR)

Research Infrastructure Improvement (RII) Track-1 Award (2018-2023)

The Award

Idaho recently won funding for a new $24 million National Science Foundation (NSF) EPSCoR RII Track-1 project*: Linking Genome to Phenome to Predict Adaptive Responses of Organisms to Changing Landscapes* (OIA-1757324). The project is driven by collaboration among the University of Idaho, Boise State University, and Idaho State University, as well as many of Idaho's 2-year and 4-year colleges.

The Vision

Idaho leads the nation with thriving, collaborative, and inclusive research to discover and predict how plants, animals, and people interact and adapt to changing environments, resulting in the sustainable management of natural resources.

The Research

Idaho's approach is to identify how genetic diversity interacts with the environment to alter the observable characteristics of organisms that are linked to the capacity of populations to adapt to change. The project is known as *Genes by Environment: Modeling, Mechanisms, and Mapping (GEM3).* It combines Idaho research strengths in bioinformatics, complex modeling, ecology, genomics, remote sensing, and social-ecological systems science to contribute to one of the most compelling national challenges identified by NSF: "Understanding the Rules of Life."

Over 30 researchers and educators at Idaho's universities and colleges worked together to develop this inspiring research and education plan. While the scientific discoveries will apply to many organisms, one aquatic (redband trout) and one terrestrial (sagebrush) are emphasized in this study. Both are integral to ecosystems in the American West and are central to land-use management decisions that influence the economy of the region.

Rainbow trout (Oncorhynchus mykiss)
(photo credit: E.R. Keeley)

Researcher in Sagebrush landscape
(photo credit: Jennifer Forbey)

Diversity and Workforce Development

A fully integrated research, education, diversity, and workforce development program will increase the number, diversity and preparation of skilled scientists and engineers in GEM3 fields. The project adopts a Vertically Integrated Projects (VIP) strategy to establish an on-ramp for students and provide a range of training, mentoring and professional development support to both students and faculty statewide.

Alignment with State Priorities

The State of Idaho has demonstrated long-standing commitment to develop its research bases through EPSCoR by contributing $4 million to non-federal match as part of the appropriation for the State Board of Education (SBOE). GEM3 is fully aligned with and guided by the state Science and Technology (S&T) plan, *Strategic Research Plan for Idaho Higher Education,* approved by the SBOE.

The Outcomes

This project involves stakeholders and collaborators at the tribal, state and federal levels to empower sustainable evidence-based management of natural resources and provide opportunities for knowledge sharing and development of professional networks between students and potential future employers. Impacts include: (1) contributions to long-term economic and educational priorities of the state; (2) seamless integration of the academic strengths and priorities of the state's research universities; (3) ability of Primarily Undergraduate Institutions (PUIs) to contribute; (4) helping to meet industry demand for a larger, more diverse, and better trained biological and conservation sciences workforce; and (5) value added to national strategic priorities.

For more information visit the GEM3 and Idaho EPSCoR websites at: www.idahogem3.org and www.idahoepscor.org

GEM3
Genes by Environment
Modeling · Mechanisms · Mapping

Higher Education Research and Development (HERD) in Idaho

Idaho has experienced significant growth in academic research and development activity in recent years. The Gem State exceeded national average growth in HERD expenditures over the past five years (2013-2017)[1], ranking 26th among all states for percent change.

NSF EPSCoR in Idaho

Idaho has been very successful in winning NSF and NSF EPSCoR funding through the competitive merit review and award process, representing widespread positive influence on Science, Technology, Engineering, and Mathematics (STEM) research and education capabilities in Idaho.

NSF Award Type to Idaho[2]	FY17+FY18 Amount (million)	% of Total NSF Funding
Non-EPSCoR	$33.8	69%
Subtotal All EPSCoR	$15.3	31%
EPSCoR RII Track-1	$6.88	14%
EPSCoR RII Track-2	$6.00	12%
EPSCoR RII Tracks-3&4	$0.54	1%
EPSCoR Co-Funding	$1.84	4%
Total NSF Funding to Idaho	$49.0	100%

[1] https://ssti.org/blog/useful-stats-rd-expenditures-colleges-and-universities-state
[2] https://dellweb.bfa.nsf.gov