Wyoming EPSCoR

Wyoming EPSCoR's mission is to fundamentally advance our predictive understanding of scientific phenomena, innovations in technology, workforce development, and problem solving to improve Wyoming's living conditions and environment. EPSCoR prides itself on developing cutting-edge data science training and resources along with research and economic development capacity in Wyoming, with a particular focus on underserved communities such as the Wind River Indian Reservation. We promote science-based outreach, service, and economic programs that continue to benefit our home state.

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Impact of Wyoming EPSCoR

Research

- 23 UW faculty hires
- 291 peer-reviewed journal publications during the award periods
- 11 research centers established

Education

- Native American Student Higher Education Mentorship program
- 539 SRAP students
- CWC to UW pathways for STEM tribal students
- 12 Wyoming AISES College chapter students
- Professional development and research opportunities for K-12 educators

Workforce Development

- 787 undergraduate research fellowships
- 246 graduate students supported
- 20 professional internships with WEST, Inc.
- 5 Deaf and Hard of Hearing interns

Outreach

- Wind River Indian Reservation education, outreach, and entrepreneurial investments
- Stakeholder meetings with Latino and tribal communities in partnership with GTNP and GYC
- Teacher Researcher Knowledge Exchanges

Current NSF EPSCoR Awards

Track-1: FY 2022-2027. $20M *Anticipating the Climate-Water Transition and Cascading Challenges to Socio-Environmental Systems in America's Headwaters or WyACT.*

- WyACT will establish lasting and nationally competitive capabilities and infrastructure that improves predictive understanding of the coupled human-environment impacts of climate change on water availability. WyACT will enable Wyoming's communities to anticipate and prepare for significant and lasting changes in water availability.

Track-1: FY 2017-2023. $20M *Linking Microbial Life to Ecosystem Services Across Wyoming's Dynamic Landscape -The Microbial Ecology Collaborative or Micro*

- Wind River Indian Reservation Education, Outreach, and Entrepreneurial investments.
- UW Support - 20 faculty members, 7 postdocs, 33 grad students, 53 undergraduate students.
- Community College Support - 5 faculty members, 21 undergraduate students.
- 24 High School Summer Research Participants.
- 5 Deaf and Hard of Hearing interns.
- 4 faculty hires.
- Established 2 core research facilities on the UW campus.
- Two co-PIs on the Micro award were EPSCoR faculty hires on the Track-1 RII awarded in 2005; EPSCoR improves Wyoming faculty over decades.

Track-2 FEC: FY 2018-2023. ($2.3M to UW). *Insect Cryobiology and Ecophysiology (ICE) Network: Integrating Genomics, Physiology, and Modeling.*

- Collaborative project with North Dakota State and New Mexico State.

Track-2 FEC: FY 2018-2023 ($1M to UW) *Genomics Underlying Toxin Tolerance (GUTT): Identifying Molecular Innovations that Predict Phenotypes.*

- Collaborative project with Boise State, University of Nevada-Reno, and the College of Idaho.

Track-2 FEC: FY 2020-2024 ($3.778M to UW). *Highly Predictive, Explanatory Models to Harness the Life Science Data Revolution.*

- Collaborative project with University of Nevada-Reno and University of Montana..

Track-2 FEC: FY 2020-2024 ($1.84M to UW). *From Ecosystems to Evolution: Harnessing elemental data to detect stoichiometric control-points and their consequences for organismal evolution.*

- Collaborative project with Middlebury College and University of Central Arkansas.

Program Overview

Since our beginning in 1986, Wyoming EPSCoR has leveraged over $95M in NSF funding (from a total of eight Track-1 Research Infrastructure Improvement awards, seven cross-jurisdictional Track-2 awards, and 4 Track-4 research fellowships) to increase research capacity and economic development in the state. We have invested in personnel, cutting-edge equipment, and established core facilities and research centers that benefit the research enterprise of the entire state. Our educational programs strengthen and diversify the STEM workforce of all communities of Wyoming while our outreach initiatives engage a wide audience in the value of science to decision making and build partnerships with industry.

Success Stories

Wyoming Anticipating Climate Transitions or WyACT will establish novel and innovative capacity in Wyoming for addressing the ecological and socioeconomic consequences of climate driven changes in water resources. The project will substantially augment capabilities for refining and applying local- and regional-scale models collaboratively developed with stakeholders that address scenarios related to abrupt shifts in water availability. Sustained elements of the project will include establishment of the Laboratory for Regional Earth System Modeling with five new faculty hires at the University of Wyoming and the Center for Climate, Water and People. We plan to launch observational infrastructure and stakeholder engagement activities in each of the three watersheds (Snake, Wind, Green) during this 5-year project. In September 2022, we launched these efforts through a pilot workshop centered at the UW-NPS Research Station at the AMK Ranch in Grand Teton National Park. The central goal of the project is to enable communities, including tribal collaborators and the region's growing Latino/Latina community, to anticipate and prepare for significant and lasting changes in water availability.

Microbial Ecology Collaborative or Micro Predicting the ecological consequences of microbes in natural and disturbed settings is a grand challenge for microbial ecology. To date, this challenge has been addressed only in case studies or in simple systems with low taxonomic diversity. Characterizing the relationship among microbial genes, traits, and functions will improve predictive understanding of biogeochemical cycling and ecosystem services, and involves significant opportunities for economic development. Determining microbial consequences requires ambitious sampling of -omic and environmental data, followed by analyses of this information through cutting-edge data science, as well as computational education, outreach, and access by groups historically underrepresented in the sciences.

Statewide EPSCoR Funding

Program/Grant Name	Type / Institution	Award Period	Amount
Implementation Proposal to Stimulate Competitive Research in Wyoming	Track-1 RII	1986-1992	$3.0M
Wyoming EPSCoR ADP Infrastructure Proposal	Track-1 RII	1992-1995	$3.0M
EPSCoR Systemic Initiative	Track-1 RII	1995-2000	$5.6M
Science and Engineering in Harsh Environments	Track-1 RII	2000-2005	$3.2M
Program in Ecology	Track-1 RII	2005-2009	$8.8M
Water in a Changing West: The Wyoming Center for Environmental Hydrology and Geophysics	Track-1 RII	2012-2017	$20M
Linking Microbial Life to Ecosystem Services Across Wyoming's Dynamic Landscape	Track-1 RII	2017-2022	$20M
WyACT: Anticipating the Climate-Water Transition and Cascading Challenges to Socio-Environmental Systems in America's Headwaters	Track-1 RII	2022-2027	$20M
Collaborative Research: CI-WATER, Cyberinfrastructure to Advance High Performance Water Resource Modeling.	Track-2 RII	2011-2015	$2.6M
Collaborative Research and Education on Synergized Transformational Solar Chemical Looping and Photo-Ultrasonic Renewable Biomass Refinery	Track-2 RII	2016-2021	$1.4M
Sustainable socio-economic, ecological, and technological scenarios for achieving global climate stabilization through negative CO2 emission policies	Track-2 RII	2016-2021	$1.8M
Genomics Underlying Toxin Tolerance (GUTT): Identifying Molecular Innovations that Predict Phenotypes of Toxin Tolerance in Wild Vertebrate Herbivores	Track-2 RII	2018-2022	$975k
Insect Cryobiology and Ecophysiology (ICE) Network: Integrating Genomics, Physiology, and Modeling	Track-2 RII	2018-2022	$2.3M
Highly Predictive, Explanatory Models to Harness the Life Science Data Revolution	Track-2 RII	2020-2024	$3.778M
From Ecosystems to Evolution: Harnessing elemental data to detect stoichiometric control-points and their consequences for organismal evolution	Track-2 RII	2020-2024	$1.84M
Ecological Community Responses to Global Change: Predicting Effects on Community Dynamics and Ecosystem Stability. PI – Lauren Shoemaker	Track 4: EPSCoR Research Fellow	2021-2023	$180,120
Partnership Between the University of Wyoming and the Missoula Fire Sciences Laboratory in Multi-Scale Wildland Fire Research. PI – Erica Belmont	Track 4: EPSCoR Research Fellow	2021-2023	$190,322
Adaptive Fault Detection and Diagnosis Based on Growing Gaussian Mixture Regressions for High-Performance HVAC Systems. PI – Liping Wang	Track 4: EPSCoR Research Fellow	2020-2023	$202,866
Controlling Point-Defect Energetics in Complex Oxides Via Interfacial Strain. PI-Dilpuneet Aidhy	Track 4: EPSCoR Research Fellow	2019-2021	$202,866
Total Funds $95,080,451			